



United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE

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Sent electronically

Memorandum

To: Collin Ewing, Field Manager, Bureau of Land Management, Arcata Field Office, Arcata, California

From: Vicky Ryan, acting Field Supervisor, Arcata Fish and Wildlife Office, Arcata, California

Subject: Formal Consultation on the Northwest California Integrated Resource Management Plan for the Bureau of Land Management Arcata and Redding Field Offices, Del Norte, Humboldt, Mendocino, Siskiyou, Shasta, Trinity, Tehama, and Butte Counties, California.

Dear Collin Ewing:

This document transmits the U.S. Fish and Wildlife Service's (Service) programmatic biological and conference opinion (Opinion) and letter of concurrence (Concurrence), based on our review of the Bureau of Land Management's (Bureau) Northwest California Integrated Resource Management Plan (Plan). The Plan is synonymous with the Proposed Action, described in the Opinion and Biological Assessment. The Opinion addresses your determinations that the proposed Plan may affect and is likely to adversely affect 19 listed species, eight designated critical habitats, and three proposed species. The Concurrence addresses your determinations that the proposed project may affect but is not likely to adversely affect an additional six listed species and three designated critical habitats.

We received your April 10, 2024, request for consultation and conference on April 12, 2024. Your request and our response are made in accordance with section 7 of the Endangered Species Act (Act or ESA) of 1973, as amended [16 United States Code (USC) 1531 *et seq.*]. Our conference opinion is made pursuant to 50 Code of Federal Regulations (CFR) 402.10. All species and critical habitats for which you have made a likely to adversely affect determination are addressed in the accompanying Opinion. Species and critical habitats for which you have made a not likely to adversely determination are addressed by the Concurrence included in this document. We will hereafter refer to species and critical habitats addressed by the Opinion or Concurrence as covered species and covered critical habitats.

The Bureau has been working on the Plan for many years and have included the Service during the development of the Plan to ensure that listed species and their habitats were considered during the process. In 2022, the Bureau scheduled regular meetings with the Service and the

National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) to discuss the progress of the Plan Environmental Impact Statement (EIS) alternatives development, the consultation agreement (Consultation Agreement) development and to share information to support the Biological Assessment development. The group decided to develop two Biological Assessments: one for the NOAA Fisheries and one for the Service. The NOAA Fisheries Biological Assessment is not discussed further in this document. The Consultation Agreement outlined ESA Section 7 roles and responsibilities, terms and conditions, as well as a consultation schedule that all parties agreed to and was signed by project leaders from the Service, NOAA Fisheries and the Bureau on March 17, 2023.

Table 1. Threatened, endangered, proposed, and candidate species that may be affected by the Proposed Action.

Common Name <i>Scientific Name</i>	Status	Determination
Gray wolf <i>Canis lupis</i>	Endangered	Not likely to adversely affect
Pacific marten, coastal distinct population segment (DPS) <i>Martes caurina</i>	Threatened	Likely to adversely affect
Marbled murrelet <i>Brachyramphus marmoratus</i>	Threatened	Likely to adversely affect
California spotted owl, Sierra Nevada DPS <i>Strix occidentalis occidentalis</i>	Proposed threatened	Likely to adversely affect
Northern spotted owl <i>Strix occidentalis caurina</i>	Threatened	Likely to adversely affect
Western snowy plover, Pacific Coast population DPS <i>Charadrius nivosus nivosus</i>	Threatened	Likely to adversely affect
Yellow-billed cuckoo, western DPS <i>Coccyzus americanus</i>	Threatened	Likely to adversely affect
Giant garter snake <i>Thamnophis gigas</i>	Threatened	Not likely to adversely affect
Northwestern pond turtle <i>Actinemys marmorata</i>	Proposed threatened	Likely to adversely affect
California red-legged frog <i>Rana draytonii</i>	Threatened	Not likely to adversely affect
Foothill yellow-legged frog, North Feather River DPS <i>Rana boylei</i>	Threatened	Likely to adversely affect
Western spadefoot, northern DPS <i>Spea hammondi</i>	Proposed threatened	Likely to adversely affect
Tidewater goby <i>Eucyclogobius newberryi</i>	Endangered	Likely to adversely affect
Franklin's bumble bee <i>Bombus franklini</i>	Endangered	Likely to adversely affect
Monarch butterfly <i>Danaus plexippus</i>	Candidate	Likely to adversely affect
Valley elderberry longhorn beetle	Threatened	Likely to adversely affect

Common Name Scientific Name	Status	Determination
<i>Desmocerus californicus dimorphus</i>		
Conservancy fairy shrimp <i>Branchinecta conservatio</i>	Endangered	Not likely to adversely affect
Vernal pool fairy shrimp <i>Branchinecta lynchi</i>	Threatened	Likely to adversely affect
Vernal pool tadpole shrimp <i>Lepidurus packardi</i>	Endangered	Likely to adversely affect
Beach layia <i>Layia carnosa</i>	Threatened	Likely to adversely affect
Butte County meadowfoam <i>Limnanthes floccosa</i> ssp. <i>californica</i>	Endangered	Not likely to adversely affect
Gentner's fritillary <i>Fritillaria gentneri</i>	Endangered	Likely to adversely affect
McDonald's rock-cress <i>Arabis macdonaldiana</i>	Endangered	Likely to adversely affect
Menzies' wallflower <i>Erysimum menziesii</i>	Endangered	Likely to adversely affect
Slender Orcutt grass <i>Orcuttia tenuis</i>	Threatened	Likely to adversely affect
Stebbins' morning-glory <i>Calystegia stebbinsii</i>	Endangered	Likely to adversely affect
Sand dune phacelia <i>Phacelia argentea</i>	Threatened	Not likely to adversely affect
Yreka phlox <i>Phlox hirsuta</i>	Endangered	Likely to adversely affect

Table 2. Final critical habitats analyzed.

Common Name Scientific Name	Status	Determination
Butte County meadowfoam <i>Limnanthes floccosa</i> ssp. <i>californica</i>	Final	Not likely to adversely affect
Conservancy fairy shrimp <i>Branchinecta conservatio</i>	Final	Not likely to adversely affect
Marbled murrelet <i>Brachyramphus marmoratus</i>	Final	Likely to adversely affect
Northern spotted owl <i>Strix occidentalis caurina</i>	Final	Likely to adversely affect
Pacific marten, coastal DPS <i>Martes caurina</i>	Final	Likely to adversely affect
Sand dune phacelia <i>Phacelia argentea</i>	Final	Not likely to adversely affect
Slender Orcutt grass <i>Orcuttia tenuis</i>	Final	Likely to adversely affect
Tidewater goby	Final	Likely to adversely affect

Common Name Scientific Name	Status	Determination
<i>Eucyclogobius newberryi</i>		
Vernal pool fairy shrimp <i>Branchinecta lynchi</i>	Final	Likely to adversely affect
Vernal pool tadpole shrimp <i>Lepidurus packardi</i>	Final	Likely to adversely affect
Western snowy plover, Pacific Coast population DPS <i>Charadrius nivosus nivosus</i>	Final	Likely to adversely affect

Consultation History

- December 7, 2022 NOAA Fisheries, Service, Bureau, and Bureau contractors met to discuss the Consultation Agreement and approaches to defining the Action Area, and to review the anticipated consultation timeline.
- January 4, 2023 NOAA Fisheries, Service, Bureau, and Bureau contractors met to discuss the progress of the Plan EIS alternatives development and the Consultation Agreement development, and to share information to support the Biological Assessment development. The group decided to develop two Biological Assessments for the Plan: one for the NOAA Fisheries and one for the Service.
- February 1, 2023 NOAA Fisheries, Service, Bureau, and Bureau contractors met to discuss the initial species lists to evaluate in the Plan Biological Assessment. The group agreed to analyze candidate species in the Biological Assessments. The Action Area was agreed upon with the understanding that future actions under the Plan that are on or near the Action Area boundary would further evaluate effects on federally-listed species with the potential to occur nearby.
- March 17, 2023 The Consultation Agreement between Bureau and Service was signed.
- April 5, 2023 NOAA Fisheries, Service, Bureau, and Bureau contractors met to discuss the signed Consultation Agreement, review agreed-upon Action Areas for both Biological Assessments, and review initial species lists for species that do not need to be evaluated and species that would be analyzed in detail.
- September 22, 2023 Bureau contractor submitted a draft Biological Assessment outline to the Bureau and Service. The outline contained the draft Proposed Action, an outline with headings for sections and species to be analyzed, and two example analyses and determinations.
- October 4, 2023 Bureau and Service discussed determinations for candidate, proposed and listed species and proposed and final critical habitats.
- October 10, 2023 The Service received a draft Biological Assessment.

- November 2, 2023 Bureau and Service complete Action Deconstruction to understand and define activities that may be implemented to achieve the goals of the Plan.
- November 6, 2023 The Service provided comments on the draft Biological Assessment.
- March 1, 2024 The Service received a revised Biological Assessment.
- April 3, 2024 The Service provided comments on the draft Biological Assessment.
- April 12, 2024 The Service received the final Biological Assessment.

Concurrence

The Bureau determined that the Proposed Action, described below, may affect but is not likely to adversely affect six listed species and three designated critical habitats. We concur with your determination based on the rationale provided in your Biological Assessment for the Service and summarized below.

Gray Wolf

The gray wolf is known to occur within the Action Area. Noise and other human activity may cause short-term disturbances to gray wolf dens or rendezvous sites in the project area during implementation of Vegetation and Forestry, Wildlife, Livestock and Grazing, Lands and Realty Management, and Travel and Transportation Management and Recreation activities as proposed. The Proposed Action would not result in meaningful changes to wolf habitat or how wolves use the Action Area, as wolf territories are large, and wolves are habitat and prey generalists. Similarly, wolf abundance and distribution are not expected to change as a result of implementation of the Proposed Action. Finally, while there is potential for wolves to den within the Action Area, the Bureau will coordinate with the Service to implement seasonal restrictions to minimize the potential effects to wolves during denning and early rendezvous site use. Implementation of these measures will render effects to gray wolves as insignificant or discountable and therefore, the Proposed Action may affect but is not likely to adversely affect gray wolves.

Giant Garter Snake

The giant garter snake is known from the planning area and suitable habitat exists in the Action Area; however, it is not known to be present on the Action Area. This species is a habitat specialist that is strongly associated with freshwater areas, including aquatic areas and nearby uplands. Human activity associated with Riparian Management Areas, Vegetation and Forestry, Wildlife, Wildland Fire Management, Renewable Energy, Minerals, and Travel and Transportation Management and Recreation may affect the giant garter snake. The primary effects would be the potential for disturbance to the species from human presence, equipment, and noise causing individuals to disperse from or avoid project areas disrupting feeding, breeding and sheltering.

Many activities that may be implemented to achieve management goals of the Plan, such as wetland and grassland restoration, habitat management, and predator management, would improve habitat conditions for giant garter snake in the Action Area. The Bureau will implement the Best Management Practices described in Appendix B to minimize potential effects to species,

including giant garter snake. Implementation of these measures and lack of occupancy of the Action Area will render effects to giant garter snake as insignificant or discountable and therefore, the Proposed Action may affect but is not likely to adversely affect giant garter snake.

California Red-legged Frog

The California red-legged frog is known from the planning area and suitable habitat exists in the Action Area; however, this species is not known to be present on the Action Area. Human activity associated with Riparian Management Areas, Vegetation and Forestry, Wildlife, Wildland Fire Management, Renewable Energy, Minerals, and Travel and Transportation Management and Recreation may affect the California red-legged frog. The primary effects would be the potential for disturbance to the species from human presence, equipment, and noise during project implementation. Riparian vegetation could be temporarily altered or reduced in cover, temporarily altering physical habitat characteristics until vegetation becomes reestablished.

To avoid or minimize adverse effects, when projects are proposed in potentially suitable habitat areas for these species, the Bureau would conduct habitat evaluations and surveys to determine their presence, where appropriate. Depending on evaluation and survey results, avoidance and minimization measures would be developed as needed. Many activities that may be implemented to achieve management goals of the Plan, such as riparian restoration and predator management, would improve habitat conditions for California red-legged frog in the Action Area. Implementation-level actions would be evaluated in a separate project-level consultation. During project-level consultation, conservation measures would be developed that would minimize the potential for effects during such projects. Implementation of these measures and lack of occupancy of the Action Area will render effects to California red-legged frog as insignificant or discountable and therefore, the Proposed Action may affect but is not likely to adversely affect California red-legged frog.

Conservancy Fairy Shrimp and Critical Habitat

Conservancy fairy shrimp and critical habitat are present in the vernal pool habitats on a small amount of Bureau-administered subsurface mineral estate in the Action Area. Mining claims on these lands are very unlikely due to the sensitivity of the habitat and presence of listed species and would require additional section 7 consultation. If mining claims are granted individual conservancy fairy shrimp could be killed, populations could be extirpated, and habitat could be removed.

Due to the lack of occupied habitat within Bureau-administered surface lands and the Bureau's commitment to the conservation of the species, we do not anticipate that the Proposed Action will reduce the rangewide distribution of conservancy fairy shrimp. Many activities that may be implemented to achieve management goals of the Plan, such as vernal pool grassland restoration and management, would improve habitat conditions for conservancy fairy shrimp in the Action Area. The Bureau will implement the Best Management Practices described in Appendix B to minimize potential effects to species, including conservancy fairy shrimp. Implementation of these measures and lack of occupancy of the surface lands of the Action Area will render effects to conservancy fairy shrimp as insignificant or discountable and therefore, the Proposed Action may affect but is not likely to adversely affect conservancy fairy shrimp.

Butte County Meadowfoam and Critical Habitat

This species is present in the planning area in Butte County and a portion of southern Tehama County. This species also presumably is located in portions of the Action Area; there are approximately 85 acres of critical habitat for Butte County meadowfoam on 2 parcels of Bureau-administered subsurface mineral estate in northern Butte County. This area is assumed to support Butte County meadowfoam individuals, but surveys to confirm this have not been carried out due to the private landownership.

Bureau-administered surface lands in the Action Area includes numerous vernal pools in northern Tehama County and Shasta County, but these pools are outside of the range of Butte County meadowfoam. No Butte County meadowfoam individuals have been detected during intensive surveys of these vernal pools. There are no Bureau-administered surface lands containing vernal pool habitat in the Action Area within the range of the species, though it's possible that continued surveys could detect the species. There is no critical habitat on Bureau-administered surface lands in the Action Area.

Due to the lack of occupied habitat within Bureau-administered surface lands and the Bureau's commitment to the conservation of the species, we do not anticipate that the Proposed Action will reduce the rangewide distribution of Butte County meadowfoam. Many activities that may be implemented to achieve management goals of the Plan, such as vernal pool grassland restoration and management, would improve habitat conditions for Butte County meadowfoam in the Action Area. The Bureau will implement the Best Management Practices described in Appendix B to minimize potential effects to species, including Butte County meadowfoam. Implementation of these measures and lack of occupancy of the surface lands of the Action Area will render effects to Butte County meadowfoam as insignificant or discountable and therefore, the Proposed Action may affect but is not likely to adversely affect Butte County meadowfoam.

Sand Dune Phacelia and Critical Habitat

The primary threat to sand dune phacelia is the invasion of non-native species. There is no occupied habitat on surface lands administered by Bureau in the Action Area. There are some subsurface lands within the range of sand dune phacelia. The likelihood of mining claims in this area is very low, but if granted mining activities could impact sand dune phacelia by displacing, crushing, or killing individual plants and removing habitat.

Designated critical habitat for sand dune phacelia occurs on subsurface Bureau administered lands in the Action Area. As mentioned above, the likelihood of mining claims being granted in this area is low, but mining activities have the potential to adversely modify critical habitat by removing physical and biological features including sandy coastal dune habitat above the high tide line that provides a high light environment, room for growth, and adequate moisture, and a sufficiently abundant pollinator community for pollination and reproduction.

Due to the lack of occupied habitat within Bureau-administered surface lands and the Bureau's commitment to the conservation of the species, we do not anticipate that the Proposed Action will reduce the rangewide distribution of sand dune phacelia. Many activities that may be implemented to achieve management goals of the Plan, such as dune habitat restoration, would improve habitat conditions for sand dune phacelia in the Action Area. The Bureau will implement the Best Management Practices described in Appendix B to minimize potential

effects to species, including sand dune phacelia. Implementation of these measures and lack of occupancy of the surface lands of the Action Area will render effects to sand dune phacelia as insignificant or discountable and therefore, the Proposed Action may affect but is not likely to adversely affect sand dune phacelia.

This concludes our informal consultation on the actions described in your Biological Assessment received on April 12, 2024, that may affect gray wolf, giant garter snake, California red-legged frog, conservancy fairy shrimp, Butte County meadowfoam, sand dune phacelia or critical habitat for conservancy fairy shrimp, Butte County meadowfoam or sand dune phacelia. It will be necessary to contact our office if: (1) new information reveals effects of the agency action that may affect these species in a manner or to an extent not considered in this consultation; (2) the agency action is subsequently modified in a manner that causes an effect to the species or critical habitat not considered in this consultation; (3) the status of these species change.

BIOLOGICAL OPINION

For the purposes of this biological and conference opinion, the Service is analyzing the Plan as a framework document to conduct a jeopardy and adverse modification determination for 19 listed species, eight designated critical habitats, and three proposed species. Consequently, because the general nature, geographic scope and site-specific information of individual projects are not yet identified, the Service through this consultation is not exempting incidental take of wildlife species or prescribing measures to reduce take because such take cannot be effectively identified at this time. Proposals for individual projects will require future section 7 consultation to determine project impacts and whether exemptions for incidental take, reasonable and prudent measures, and terms and conditions may be provided. Such future individual project consultations may, if applicable, tier off existing programmatic biological opinions or projects may consult individually outside of existing programmatic consultations.

Description of the Proposed Action

The Plan provides general direction for the management of natural resources on Bureau administered lands. The Plan does not approve any specific project-level actions. The Plan will be implemented on a project-by-project basis through a second-level decision-making process. Project level planning will be completed prior to implementation of any projects as appropriate. This will include analysis of the environmental consequences of specific Proposed Actions and Section 7 consultations at the project scale as needed. The Bureau has committed to conducting surveys for listed species when suitable habitat is present in project areas. Projects and activities implemented to achieve management goals will be performed by qualified personnel. Qualified personnel may be Bureau employees or other professionals who have the trainings, qualifications, and experience to implement the projects, surveys, and activities.

The Bureau reviewed the resource programs that it administers within the Action Area. Those that may affect one or more listed species and designated critical habitat are described in the following sections. Presented in this section is a summary of the potential management activities; that is, the activities the Bureau may implement to achieve the management goals and objectives of the Plan. For more information on the management goals and objectives, management direction, best management practices, and minimization measures, please see the Biological Assessment. The full list of best management practices that the Bureau would include under the Proposed Action is in Appendix B.

The following sections are based upon the resources analyzed in the Bureau's Plan Final EIS and the Biological Assessment. The resource sections include broad categories of activities that may be implemented by the Bureau to achieve management goals. The sections, below, describe the types of activities that the Bureau may implement to achieve the management goals of the Plan. The activities in the sections were discussed with the Bureau during an action deconstruction meeting on November 2, 2023. Because there are no specific projects proposed in the Plan, however, the activities described merely illustrate the type of projects the Bureau may implement. The Proposed Action of this Opinion is the same as the Proposed Action of the Biological Assessment, Plan, and EIS. Due to considerable overlap in activities to achieve the goals for different resources, activity categories are referenced if already discussed.

There are additional resource programs discussed in the Plan Final EIS: Air and Atmospheric Values, Cultural Resources, Paleontological Resources, Visual Resources, Cave and Karst, Coastal Resource Management, Climate Change, Socioeconomic and Environmental Justice, Tribal Interests, Public Health and Safety/Hazardous Materials, and Education and Interpretation. These resource programs may not result in changes to land, water or air and have no effect on species and critical habitats, or the resource programs may not be discretionary actions by the Bureau. These are not discussed further in this Opinion; please see the Biological Assessment for more information.

Soils

Specific management activities for soils would include the use of standard road maintenance equipment including dump trucks, graders, and excavators for activities including resurfacing, promoting drainage, and upgrading and replacing culverts. Other activities could include planting vegetation using seeds or plugs to stabilize areas prone to run-off or erosion. Postfire burned area emergency rehabilitation would include additional activities like the installation of water bars and the spreading of hay and other materials to reduce run-off and stabilize soils affected by high severity fire. See the Roads and Trails, Invasive Plant Removal, and Terrestrial Habitat Restoration and Management sections for more information on those activities.

Erosion Control

Erosion Control may be part of many of the Bureau's activities throughout the Action Area. Erosion control activities may be needed in response to catastrophic weather events such as wildfire or severe rainstorms. While erosion control activities will be implemented to protect water quality, aquatic resources and other habitats, implementing these activities may affect species or habitats. The Bureau may implement the following activities:

- **Water Bars:** Water bars are a type of diversion structure used primarily on dirt roads in areas of slopes. To minimize road damage of overland water flows, the Bureau may create elevated bars similar to speed bumps that collect and divert water off the road surface. These water bars are likely to be constructed using heavy equipment.
- **Mulching:** Mulching may be implemented around fuel breaks, in restoration areas or in other locations as needed to reduce erosion. The Bureau is likely to use local material to create the mulch unless there are other concerns such as disease or pest infestation that require the use of non-infected material. Mulch may be used to slow the velocity of water to increase percolation and protect the soil surface. Creating mulch will generally require a woodchipper, and mulching may be spread by hand or using heavy equipment. The

depth of mulch applied will likely depend upon the goals of the project and available materials.

- **Netting:** Erosion control nets are used primarily on slopes to reduce erosion prior to vegetation establishment. Nets may be made with a variety of natural materials that eventually decompose and may have an open weave, or a more closed weave. Nets may be applied to a large area and are likely to be installed by hand. Best practices will be implemented as feasible to minimize entrapment and encourage vegetation growth.
- **Hydroseeding:** Hydroseeding is the planting method to minimize erosion. Seeds, mulch, and occasionally other additives are mixed with water to create a slurry that is sprayed on cleared ground. Tank trucks or aircraft may be used to transport the slurry. Hydroseeding may be used in areas where erosion potential is high due to natural or man-made disturbance such as wildfire, mass wasting events, and trail or road maintenance activities.

Water Resources

The Bureau may implement management activities to preserve water quality and function of watercourses on Bureau-administered lands. These activities may include implementing in-stream logs and beaver dam analogs for natural habitat creation, conducting invasive plant removal, strategically removing levees, and performing targeted levee breaches to restore natural water flow. Using low-tech structures, conducting off-channel and side channel restoration, removing log jams, and planning for native species would contribute to overall habitat protection. Low-tech structures can often be assembled and installed by hand using common hand tools and pounding stakes into the streambed. Heavy equipment may be used in some cases to excavate off-channel habitat or create structures to improve water quality and ecosystem function.

Aquatic Habitat Restoration and Management

Habitat Restoration and Management may be implemented throughout the Action Area. Activities may need to be implemented repeatedly to achieve the management goals. See the Invasive Plant Removal, Planting Native Plants, Timber Harvest, and Species Conservation and Recovery (Species Reintroduction activity) sections for more information. The Bureau may implement the following activities aquatic habitat restoration:

- **Levee Removal and Targeted Levee Breach:** Levee removal or breaching will likely require the use of heavy equipment to remove material and haul material off-site. A whole levee or just sections may be removed, depending on site-specific needs.
- **Low-Tech Structures:** Low-tech structures are installed in-stream to support and process-based restoration of aquatic systems. Low-tech structures include things like beaver dam analogs, logs, and other natural features that slow water flow and help restore natural processes. Low-tech structures may require hand tools, or heavy equipment to install large features.
- **Weir Management:** Maintenance and management may be needed for weirs installed in stream systems throughout the Action Area. Weir management may require in water work and the use of heavy machinery.
- **Off and Side Channel Restoration:** Off-and-side channel restoration are used to create refugia and more complex habitats. Off-and-side channel restoration may require

excavation of accumulated sediments, installation of cobbles to support reeds, and riparian habitat velocity through the channel. Off-and-side channels will likely be constructed during the dry season and the main channel may be diverted away from the work area. Existing off-and-side channels may be restored by similar techniques of deepening the pools, adding cobbles, installing low-tech structures, and restoring riparian vegetation.

- **Removing Log Jams:** Log jams are frequently natural occurrences in small to moderate tributaries. Log jams form when trees and logs fall into streams and form a barrier to fish movement and trap sediments. Log jams may be removed by hand tools or heavy equipment if they inhibit restoration goals.

Riparian Management Areas

The primary management activities within riparian management areas would be aquatic habitat restoration projects and forest health treatments, as described in the Water Resources and Vegetation (Including Special Status Species and Invasive, Nonnative Species) and Forestry sections. Categories of vegetation treatments would broadly include forest thinning and prescribed burning to promote late-seral conditions and improve riparian health and removing encroaching conifers from oak woodlands and prairies. In some cases, forest health objectives may be accomplished with handwork only, with all thinned material left on-site (i.e., lop and scatter). However, in cases where fuel loading is a concern, pile or broadcast burning may be necessary. Prescribed fire would be limited to burn windows that account for weather and site conditions to minimize burn severity. Mechanized equipment may be used for in-stream restoration and forest health projects when it is necessary to accomplish project objectives, which must be consistent with Aquatic Conservation Strategy objectives (U.S. Department of Agriculture Forest Service [Forest Service] 1993). Temporary equipment access routes may be necessary and will be decommissioned upon project completion. For all projects within riparian management areas, the Bureau would use equipment that results in the least amount of ground disturbance necessary to achieve project objectives.

In-stream restoration projects would include prescriptions such as the placement of large wood and boulders, reconnection of floodplains and off-channel habitats, removal of invasive plants, and planting of native species. In areas where riparian areas are well stocked, on-site trees may be used as a source for in-stream wood (for example, accelerated recruitment or post-assisted wood structures).

Planting Native Plants

Restoration or enhancement activities that include establishing native plants may be implemented throughout the Bureau-administered lands to meet management goals for species recovery, restoration, and vegetation management. Planting may occur following a catastrophic event that damages the landscape, following invasive plant removal as part of remediation efforts, or to supplement areas in natural succession. More than one of the following activities may be implemented, and those activities may be implemented multiple times to achieve management goals. The Bureau may implement the following activities:

- **Disking and Tilling:** Disking and tilling are site preparation techniques that use heavy machinery to break up the topsoil to disrupt existing unwanted vegetation (i.e., invasive species) and prepare the soil for seeding or planting use primarily to restore former agricultural lands.

- **Drill seeding:** Drill seeding involves mechanically pressing seeds into the ground (NRCs citation). Hand tools or larger equipment may be used. Additional planting methods may be used.
- **Mechanical Planting:** Mechanical planting is the use of a planting machine. These machines can plant more rapidly than humans and can plant seedlings and may have higher seedling survival rates. Mechanical planting can only be implemented when soils are not too wet and can speed up the revegetation and restoration process.
- **Berming:** As part of site preparation, some areas may need beaming to create an elevated planting location or to slow the velocity of overland water flows.
- **Floating:** Floating is a technique used in wetland vegetation restoration. Mats or small platforms are created with emergent aquatic plants. This allows the vegetation to grow and become established in areas where the water may be too deep for planting.
- **Temporary Irrigation:** Irrigation may be needed to support native plantings reach establishment. Irrigation lines would be placed on the soil surface and connected to a water source likely outside of the planting area.
- **Plugs:** Planting with plugs involves planting a seedling into a shallow hole. The holes are typically dug with hand tools and may require watering.
- **Seed Collection:** Collecting native seeds is essential to support native planting efforts. Seeds will be collected within the appropriate ecoregion whenever feasible to ensure the correct phenotype is used and will be collected from several individuals to include a suite of genetic variation. Seeds may be propagated, and native seeds may be bought commercially if available.

Invasive Plant Removal

Invasive plant removal may be implemented throughout Bureau-administered lands within any habitat type to accomplish management goals related to fire and fuels, forestry, restoration, and vegetation management. Treatments may be implemented multiple times over many years in one area to manage invasive plants, and more than one treatment type may be necessary to achieve management goals. The Bureau may use the following treatment methods to remove or control invasive species:

- **Hand Removal:** Personnel remove invasive species by hand or with hand tools (e.g., loppers, weed whackers, chainsaws, etc.).
- **Mechanical Removal:** Plants removed by larger equipment such as mowers or masticators.
- **Chemical Removal:** Under the Plan, herbicide and pesticide use would be consistent with programmatic guidance included in the Final Programmatic Statement and Record of Decision for Vegetation Treatments Using Herbicides on Bureau Lands in 17 Western States (Bureau 2007b); the Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (Bureau 2016); and applicable subsequent instruction memoranda (e.g., CA IM-2009-030) and applicable subsequent programmatic guidance. The Bureau would adhere to design features in these documents, which include measures to reduce potential effects of herbicide use on listed plants and wildlife.

- **Burying:** Burying invasive plants is only used in Coastal Dune habitat. Heavy machinery is used to bury invasive plants under sand to such a depth that the plants do not survive.
- **Biocontrol:** Approved biocontrol agents may be used for target species removal according to best management practices.
- **Weed Mat:** Weed mats may be used to inhibit germination and plant growth. Weed mats are installed primarily in open habitats.
- **Prescribed Burns:** see Prescribed Burns section for more information.

Fuels Management

Fuels management is critical to land management in California to manage the risk of catastrophic wildfires. Fuels management may be implemented across most habitat types throughout the Action Area and may be implemented once or repeatedly in an area depending upon the goals and specific conditions. See the Livestock and Grazing, Timber Harvest, Prescribed Burns, and Roads and Trails sections for more information about those activities. The Bureau may implement the following actions for fuels management:

- **Mowing:** Mowing may be used to reduce low-growing vegetation such as grasses and forbs, especially invasive grasses. While grasslands may be mowed to accomplish management goals, mowing is more likely to be used to maintain fuel road and trail edges, and fuel breaks.
- **Brush Removal:** Brush removal may occur throughout the Action Area in any habitat type to reduce shrubby material and ladder fuels. Brush removal may be piled for burning, chipped, and left onsite, or hauled offsite.
- **Thinning:** Thinning is the removal of specific trees to reduce stocking rate, improve growth in the remaining trees, encourage understory growth, and reduce the risks of a crown fire during wildfires. Trees will likely be removed using heavy equipment. Removed trees may be hauled off-site for commercial uses, restoration, or another suitable disposal. Slash may remain spread or chipped onsite, piled and burned, or hauled offsite.
- **Terminal Leader Thinning:** Terminal Leader Thinning is the removal of root sprouts of trees and may be done with hand tools or heavy equipment.

Prescribed Burns

Similar to fuels management, prescribed burning is an important technique in California as it can address the wildlife crisis. Prescribed burning is essential for achieving fire and fuels management goals, and it is also important for vegetation management, forestry, and habitat restoration goals. Prescribed burns may be implemented in a variety of habitat types throughout the Action Area, and in more than one particular area to maintain specific conditions. See the Roads and Trails and Fuels Management (Brush Removal activity) sections for more information. The Bureau may implement the following activities for prescribed burning:

- **Fuel Break:** Fuel breaks are created to protect sensitive resources in the burn area, and to control the burn. Fuel breaks may be created by removing brush, mowing, and, in some cases, removing all vegetation to have bare soil. Brush may be piled within the burn area or landing, chipped or hauled off-site. Removing all vegetation may require the use of heavy equipment.

- **Felling Snags:** Hazardous snags may need to be felled prior to prescribed burning to prevent fire from reaching the canopy. Snags may be removed using hand tools or heavy equipment and will often be left onsite to provide downed woody debris in the burned area.
- **Ladder Fuels Removal:** Ladder fuel removal is a part of site preparation where vegetation that could carry a fire from low-growing vegetation to the canopy is removed. Ladder fuels may be removed with hand tools or heavy equipment.
- **Burn Pile:** Burn piles are piles of flammable material such as brush, branches, and other flammable material. Piles may be as small as 216 cubic feet (6ft x 6ft x 6ft) to more than 1000 cubic feet. Burn piles may be in landings away from desired vegetation or may be within a burn area (see Jackpot Burn, below). Brush piles may be left on the landscape for a while to dry before being ignited during favorable weather conditions. Burn piles may be created with hand tools or heavy equipment.
- **Broadcast Burning:** Broadcast burning involves fires across a burn area to achieve a somewhat uniform, low fire. Burns may be ignited at several locations depending on the burn plan.
- **Jackpot Burn:** Jackpot burns are similar to broadcast burns, but they also have piles scattered throughout the burn area that results in a mosaic of burn intensity.
- **Cultural Burns:** These burns may be implemented on the Action Area by Tribes using traditional techniques and Indigenous knowledge. Cultural burns may contain some elements described above, and there may be unique methods implemented by Tribes.

Vegetation (Including Special Status Species and Invasive, Nonnative Species) and Forestry
Vegetation management serves various objectives for ecological restoration, timber harvest, reforestation, fuel treatments to reduce fire hazards, forest health enhancement, range land improvement, watershed restoration, and enhancement of wildlife habitats. Potential treatments for vegetation management include mechanical and manual treatments that would vary based on site-specific conditions and goals but would involve hand pulling and the use of mechanical tools, such as plows, chainsaws, mowers, masticators, and harrows. When conducting restoration or reclamation efforts for a variety of vegetation cover types, planting of native seed may occur through temporary irrigation, berming, broadcast seeding, disking, drill seeding, tilling, mechanical planting, planting tree plugs, and performing seed collection.

Invasive plant removal may occur through a variety of methods, including biocontrol (i.e., the use of approved insects or organisms), burying of plants, approved application of herbicides, fencing off areas from use, and hand or mechanical means of removal. Targeted grazing by sheep or goats or terminal leader thinning may also be employed to reduce invasive plant species.

To reduce soil erosion and promote seed growth when performing vegetation management activities, straw wattles, silt fences, and weed mats may be used. Monitoring would be performed to determine if additional treatments are needed to achieve the identified objectives for vegetation treatments or to determine if seed growth is successful. When conducting monitoring efforts and visual inspections, installing cameras to remotely view progress, and undertaking research to be up to date with the latest methods and science could be performed to better achieve project objectives on a case-by-case basis.

Commercial timber harvesting to thin overstocked stands and dead and dying trees may also take place to promote forest health. Various timber harvest methods could be used and may involve the installation of temporary roads and landings, cutting and falling of trees, skidding, yarding or forwarding, and decking.

Helicopters may be used in unique circumstances to assess forest health and monitor tree populations or to employ selective logging in difficult-to-reach or environmentally sensitive areas. Reforestation may take place in a variety of vegetation communities, particularly in conifer stands where timber harvesting has occurred, to improve stand heterogeneity and improve wildlife habitat diversity. Activities here may include preparing sites to remove excess fuels and competing vegetation through mechanical means or manual piling, tree planting, applying biochemical or herbicide treatments to reduce competing vegetation, and managing stands to thin or replant specific areas gradually in areas that are recovering from wildfire.

Terrestrial Habitat Restoration and Management

Habitat Restoration and Management may be implemented throughout the Action Area. Some activities may be implemented only in certain habitat types. Many activities may be implemented to achieve the management goals of the restoration, and activities may need to be implemented repeatedly to achieve the management goals. See the Planting Native Plants and Species Conservation and Recovery sections for more information for those activities. The Bureau may implement the following activities for terrestrial habitat restoration:

- **Oyster Shell Installation:** Oyster shells may be used in Beach and Coastal Dune habitats to improve nesting habitats for the Western Snowy Plover. Installing oyster shells may require invasive plant removal, heavy equipment and hand tools.
- **Orchard Removal:** Orchard removal may be required to restore former agricultural lands. Trees may be removed with heavy equipment. Logs may be hauled off-site or used for restoration, and may be slashed, burned, or chipped.

Timber Harvest

Timber harvest and thinning may be implemented in forested landscapes throughout the Action Area. Timber harvest will likely be implemented once at any one location due to the time required for trees to reach commercial size (i.e., more than 40 years) or more frequently to thin overstocked stands. See the Roads section for more information on access. See section Fuels Management (Thinning activity) for more information. The Bureau may implement the following activities for timber harvest:

- **Felling Timber:** Felling is the first step to timber harvest and is cutting trees down. This may be done by chainsaws or heavy machinery. Once trees are cut down, they may be bucked (i.e., cut to a specific length) for transportation, which would also be completed with chainsaws or heavy machinery. Branches may be removed where trees are felled.
- **Skidding:** Skidding is done by dragging or pulling trees to a central location. Skidding generally requires heavy equipment.
- **Yarding:** Yarding is moving trees from the stump to an accessible central location using a skidder, forwarder, or cable yarder. There are three main types of yarding currently used: ground, cable, and aerial. Ground yarding involves dragging the logs to the landing by heavy machinery or loading logs onto a trailer and driving to the landing. Cable yarding

is typically used in terrain too steep for ground yarding. A cable is connected from a truck in the landing to the edge of the harvest. Trees are hoisted to the landing on the cable such that there is minimal ground disturbance. Aerial yarding is completed with helicopters or, less commonly, balloons. Logs are connected to the helicopter via cable and flown to the landing. An additional temporary landing is usually needed for the helicopter.

- **Decking:** Decking is arranging processed trees in a pile at a landing after being harvested. Decking usually requires heavy equipment to lift and orient large logs.

Wildlife (Including Special Status Species and Invasive, Nonnative Species)

Wildlife species recovery and prelisting conservation may include a variety of treatments to minimize effects and improve upon habitat for special status species. The Bureau may implement a range of initiatives, including the capture, handling, and marking of endangered species for scientific study and management. Fencing and signage installation may be undertaken to protect sensitive habitats, while fuels management aims to mitigate the risk of wildfires that can threaten wildlife habitats. Gate installation, habitat restoration, predator control (e.g., exclosures, lethal control, and hazing) are potential components of Bureau efforts to create and maintain safe environments for sensitive species. Invasive plant removal, prescribed burning, and monitoring surveys also play roles in preserving ecosystems. Reintroductions of species into their natural habitats, along with seed collection and planting, contribute to biodiversity conservation. Targeted grazing, vegetation thinning, and habitat restoration measures such as fish food production, in-stream logs, and beaver dam analogs would be implemented to enhance ecosystems. Additional activities for habitat restoration may include levee removal and targeted levee breaches, installation of low-tech structures, planting native species, logjam removals, selective tree thinning, promotion of off-channel restoration, and oyster shell utilization.

Species Conservation and Recovery

Activities to support species conservation and recovery have some overlap with management for habitat restoration and vegetation management, but several activities are unique to this management goal (i.e., conservation and recovery). Some activities may be implemented throughout the Bureau's ownership while other activities may only be implemented in some habitats or for specific species. Additionally, some activities may be implemented one or many times over a long duration. See the Invasive Plant Removal, Prescribed Burns, Fuels Management, Aquatic Habitat Restoration and Management, Terrestrial Habitat Restoration and Management, Planting Native Plants, Livestock and Grazing, and Fuels Management sections for more information on those activities. The Bureau may implement the following activities:

- **Surveys and Monitoring:** Surveys and monitoring are implemented throughout the Action Area to track the status and distribution of species. Surveys and monitoring are typically non-invasive (i.e., observational) but may cause disruption to species. Monitoring efforts may involve camera traps, canine tracking teams, or call-back surveys. Some plant surveys may require collection of parts or whole individuals. Surveys and monitoring are implemented by qualified personnel and in accordance with any required permits.
- **Capture, Handling, Marking, and Telemetry:** These elements used in survey and monitoring are more invasive and labor intensive. Appropriate capture and handling methods will be used for species, depending on the goals of these efforts. Depending on

the research or management goal, individuals may be captured once or multiple times. Best management practices (Bureau 2024a) will be followed to protect species and personnel from injury and disease. Species individuals that enter work sites may be captured by qualified personnel and released or held until work is completed.

- **Reintroductions:** The Bureau may pursue reintroductions of plant and animal species within the Action Area. Reintroductions may require substantial coordination depending on the species. Generally, the Bureau will use best practices to improve likelihood of success. Source populations will be selected to protect genetic diversity and phenotypic plasticity. Reintroductions may require quarantine periods, veterinary healthy checks, captive propagation, and other efforts.
- **Predators Exclosures:** Predator exclosures may be used to protect the vulnerable life stages of listed and at-risk species. Exclosures may be used primarily for western snowy plover nests but may be appropriate for other species in the future as well. Predator exclosures will be constructed and installed according to best practices for that species and predator. Predator exclosures may be implemented once or twice around a particular resource for a brief time or for the duration of the sensitive period. Predator exclosures may be used annually at some locations to address continuing predation pressure.
- **Predator Hazing:** Predator hazing may be needed to discourage predators from an area where they are causing management issues. Hazing techniques will be selected to appropriately harass the predator while minimizing effects to other species when possible. Hazing techniques may include the use of bait, Pyrotechnics, loud noises (e.g., bull horns), or other appropriate techniques and equipment. Hazing is likely to be concentrated in an area for a moderate length of time.
- **Lethal Predator Control:** Lethal predator control may be used throughout the Action Area when predation is preventing the achievement of a management goal, or non-lethal control methods have been shown to be unsuccessful. Best practices will be implemented to avoid or minimize impacts to non-target species.
- **Bat Management:** Bat management efforts may be implemented to protect bats associated with caves. The Bureau may block access to caves or may install bat gates to allow bats to access caves safely.

Fish (Including Special Status Species and Invasive, Nonnative Species)

The Bureau may implement a variety of activities to restore sensitive fish and aquatic species populations and their habitats. These activities would promote natural processes to enhance the aquatic ecosystem and may include installation of in-stream wood structures and beaver dam analogs to create natural habitats, invasive plant removal to mitigate threats to fish habitats, floodplain reconnection and restoration, and levee breaching or removal to restore natural water flow and thereby enhance fish habitats. Through a comprehensive approach, the Bureau aims to protect and restore the ecosystems that support endangered fish and other aquatic species.

See the Aquatic Habitat Restoration and Management and Species Conservation and Recovery sections for more information on activities the Bureau may implement to manage fish.

Wildland Fire Management

Potential treatments related to wildland fire could include prescribed burning, manual treatments, mechanical treatments, biological treatments, and chemical treatments to manage fuel conditions.

Methods may include building slash piles, conducting broadcast burning, using masticators, using heavy equipment, constructing temporary roads and staging areas, hauling materials off site, using airplanes, and planting native species. Invasive plant species removal could also be implemented and could include mechanical or hand removal, grazing, biocontrol, burying, and herbicide application. Fencing, the use of straw wattles, and weed mat installation are also potential activities.

Potential fuel break activities could include the use of heavy equipment or hand lines. Site preparation could include the creation of slash piles and ladder fuel management. Burning activities could include broadcast burning, pile burning, jackpot burning, and the use of drip torch fuel. Native species planting, invasive species removal (tree removal), fencing, terminal leader thinning, the use of plugs, broadcast seeding, and the identification of fire exclusion areas (e.g., hand line construction, heavy equipment use, and water) are potential fire management activities.

See the Fuels Management, Prescribed Burns, Invasive Plant Removal, Planting Native Plants, Roads and Trails, and Erosion Control sections for more information on those activities.

Emergency Support Activities

Emergencies will occur throughout the Action Area and will vary in scope, intensity, duration and location. While the location and duration future emergencies are unknowable, emergencies will occur. This framework consultation does not include emergency response, nor does it change the Bureau's obligation to notify the Service of an emergency and the need to initiate emergency consultation. The Bureau's emergency response will be evaluated within a reasonable time after the emergency is resolved. Considered here are supportive actions the Bureau may utilize when responding to an emergency:

- Helipads: Helipads will likely require open areas and may be located anywhere in the Action Area. The Bureau may mow, remove brush, or remove trees as needed to create a large enough space for a helicopter. Vegetation removal may require hand tools or heavy equipment.
- Basecamps: Basecamps may be required for ongoing emergency response. Similar to helipads, open areas are likely to be prioritized that require minimal vegetation cleaning. Basecamps will likely need to be accessible by vehicles or helicopter. Basecamps may include temporary structures and may require generators and temporary lighting. Basecamps are expected to be temporary and last for the duration of the emergency and possible during any remediation after the emergency.

Lands and Realty – Land Tenure and Use Authorizations

Management activities, including issuing rights-of-way, designating communication sites, and acquiring or disposing of Bureau-administered lands, have the potential to create impacts on listed species. As described in the Management Direction for Lands and Realty – Land Tenure and Use Authorizations, the protection of sensitive plant and wildlife habitat would be a primary criterion in evaluating the location and specifications of rights-of-way and other authorized uses. Additionally, the protection of ecological corridors and habitat would be a primary consideration in all potential acquisitions and disposals. The acquisition and disposal of lands does not affect listed or at-risk species; rather, the change in land ownership may change the management of the lands. However, the Act will continue to apply to all lands and will not change any take

prohibitions or the obligations to consult with the Service if a project may affect or take a species or critical habitat.

Renewable Energy

The potential for renewable energy projects within the Action Area is low. The Bureau may oversee the development and management of renewable energy projects on public lands to ensure sustainable development while protecting natural and cultural resources. All activities would be determined and reviewed for impacts at the project-specific implementation level. For small hydropower projects, the Bureau may oversee the installation and maintenance of facilities, addressing concerns related to water resources and ecosystem impacts. Biomass projects may involve the management of vegetation removal and sustainable harvesting practices to promote forest health and reduce fire risk. Geothermal projects would be managed by the Bureau to balance energy extraction with the preservation of geothermal features and ecosystems. Wind development would be carefully monitored to address potential impacts on wildlife and visual landscapes. All conduit and transmission infrastructure would be managed to minimize environmental impacts and ensure responsible construction practices. Additionally, road construction and maintenance would be supervised by the Bureau to provide access to renewable energy sites while minimizing ecological disruption.

Renewable Energy Development

Renewable energy development may occur within the Action Area where appropriate as not all locations within the Action Area can support renewable energy. All types of renewable energy will require roads, installation, and vegetation management; see the Roads and Trails, Facilities, and Erosion Control sections for more information. Further, transmission lines may be required to conduct electricity from the point of generation to substation.

- **Site Access and Preparation:** Accessing a suitable location for renewable energy may require new roads and landings if there are not existing roads. Staging areas may be needed during site preparation and development. Generally, vegetation will be cleared using hand tools and heavy equipment, and the area may be graded with heavy equipment prior to installation. Fencing may be needed to control access and protect infrastructure.
- **Transmission Infrastructure:** Some renewable energy development may be near existing transmission infrastructure, but it is possible there may be a need to connect new generation locations to a substation. New transmission lines require vegetation clearing through the line corridor, installing new towers or poles, and stringing the lines between the towers. Ongoing vegetation management is required to maintain safe conditions. It is possible that some transmission lines may be installed underground using trenching, boring, or other techniques.
- **Hydropower:** Microhydropower usually generates about 100 kw of electricity, enough to support small, local operations. Microhydropower may require an in-stream structure or a diversion to the turbine or pump. The microhydropower equipment may require installation, and installation may require hand tools or heavy equipment.
- **Geothermal:** Geothermal power development generally requires high-temperature (300°F to 700°F) hydrothermal resources from dry stream wells or hot water wells. Heavy equipment may be required to drill and well infrastructure would need to be installed.

- Biomass: Biomass energy uses vegetation such as trees and shrubs to create energy. Products for biomass energy are harvested using timber harvest techniques (see Fuels Management and Timber Harvest) and hauled offsite to a biomass facility.
- Solar: Solar energy development typically requires grading and contouring the land prior to installation. Once the site is prepared, solar panels are installed across the area. Vegetation is removed or maintained at a short height to minimize blocking the solar panels. Solar panel installation requires heavy equipment and hand tools. Solar panels may need to be washed occasionally to remove dust build up.
- Wind: Wind turbines may be installed in the Action Area. Wind turbines require the installation of the base and significant space, but the development footprint of each turbine may be relatively small. However, turbines may take significant air space where much of the impacts occur. Wind turbine installation requires significant heavy equipment and transportation.

Minerals – Development Leasable Minerals (Including Fluid and Nonenergy Minerals), Locatable Minerals, and Mineral Materials

Potential management activities that could be associated with mineral development include drilling, surface sampling, and remediation.

Mining

Mining may occur in designated areas throughout the Action Area. Mining may be done recreationally by individuals or at a commercial scale. Mining may be exploratory to determine the presence of important mineral resources, or extraction of those resources. The Plan (Bureau 2024b) identifies restrictions and best practices for mining. Depending on the scope (i.e., individual versus commercial), mining may be implemented more than once at a particular location in the Action Area, and more than one activity may be implemented at one location. The Bureau may implement the following activities:

- Surface Sampling: Surface sampling involves removing material from the surface with minimal ground disturbance. This can involve collecting samples to determine if there is evidence of a desired mineral deposit.
- Drilling: Drilling involves boring into the ground to different depths to take samples or collect material. Drilling may be used to sample for mineral deposits. These drill bores are likely small with some ground disturbance. Drilling requires heavy machinery that can cause noise and vibrations.
- Remediation: Mining remediation and reclamation may be implemented at closed mining locations to minimize the impacts of mining and restore the landscape. Remediation may require different actions depending on the type and intensity of mining. Remediation may require actions like removing contaminated soil from historic mining locations, recontouring the lands to pre-project conditions, invasive species management, and habitat restoration. Remediation may take many years and a variety of tools and equipment.

Remediation and Hazardous Materials

Remediation and Hazardous Material Containment and Clean Up (Hazardous Material Control) may occur throughout the Action Area in response to public safety and environmental health concerns. These activities may be implemented during normal operations or emergency

conditions. Emergency response cannot be constrained by this consultation and is not included here. Remediation and Hazardous Material control may require prolonged management at a particular location and monitoring into the future. Remediation may be needed to remove illegal recreation trails and to remove illegal cannabis grows. Hazardous Material Control includes both containment and clean-up activities, and these activities may occur in terrestrial and aquatic habitats. See the Roads and Trails, Planting Native Plants, and Erosion Control sections for information on those activities. The Bureau may implement the following activities for remediation:

- **Coffer Dam:** A coffer dam may be used to contain hazardous materials in an aquatic ecosystem. A coffer dam could be installed around a hazardous material to allow the Bureau to implement clean-up activities. Heavy equipment may be needed to install coffer dams.
- **Water Diversions:** Water diversions may be needed to contain a hazardous material or keep sensitive resources away from that hazardous material. Water diversions may require installing a barrier around an area or installing a temporary pipe to bypass an area. Heavy equipment may be needed to install diversions.
- **Cap Contamination:** In some cases, it may be necessary to cap contaminated soil or sediment. If capping is needed, clean material will be hauled to the site and installed to cover the area of contamination. Installation likely requires heavy equipment.
- **Contaminated Soil Removal:** Contaminated soil may be removed when needed to protect public safety or natural resources (e.g., water quality). Contaminated soils may be removed with hand tools or heavy equipment, hauled offsite and disposed of according to federal regulations. Clean fill (i.e., uncontaminated) soil may be hauled to the site to replace the contaminated soil and native plants restored.
- **Contouring/Grading:** Recontouring may be required if an area was (illegally) graded during illegal cannabis cultivation or the creation of unauthorized trails. Recontouring may be required anywhere within the Action Area where illegal cannabis cultivation or unauthorized trails are operating. Recontouring may be completed using hand tools or heavy equipment and may require clean fill if soil has been removed or contaminated. Some locations may require prolonged effort to fix or may need repeated efforts if illegal uses are repeated.

Travel and Transportation Management and Recreation

Specific management activities related to travel management and recreation that could have effects on listed species may include the construction of temporary roads to facilitate vegetation management treatments. New road construction, primarily designed to facilitate recreation access, would be limited and would avoid sensitive habitat to the extent possible. Standard road maintenance activities would include the use of graders and dump trucks to harden and resurface roads and promote drainage. Excavators could be used to upgrade or replace culverts.

Other specific recreation related activities could include the construction of new trails, parking lots, and campgrounds. These activities all require the use of light to heavy equipment, ranging from hand tools and chainsaws to heavy equipment like dozers and excavators in some circumstances.

Additional activities would include sign installation and activities conducted by the public when utilizing public lands. These activities could include hiking, bicycling, boating, kayaking, and paddle boarding. The public may conduct activities like collecting minerals, foraging, and geocaching. Other common recreation activities include hunting and fishing, off highway vehicle use on approved routes, paragliding, and drone use. Research and education projects would be generally allowed with a permit that regularly includes special stipulations to protect natural resources.

Roads and Trails

Road work may encompass many activities throughout the Action Area. Road work may include establishing new temporary or permanent roads, buildings or replacing water crossings, maintaining roads, managing vegetation on road edges, and decommissioning roads. Trail work may involve many of the activities needed for roads, through often at a smaller scale. The Bureau may establish new trails, upgrade or maintain existing trails, or decommission trails. These activities may require the use of hand tools or heavy equipment. Water crossings may need to be installed, maintained or upgraded and improved. Vegetation clearing may be needed to maintain trail access or to improve trail safety. Some activities may occur once in a particular area in the Action Area, while other activities may be ongoing. The Bureau may implement the following activities:

- **New Roads and Trails:** New roads and trails may be needed to access resources, project sites, or to meet management objectives. Roadways will have vegetation removed through hand tools and equipment, the roadbed will be graded and compacted to make a stable driving bed with heavy equipment and may have gravel or pavement placed depending on the anticipated road use and lifetime. Either culverts or bridges will be constructed over water crossings and will be sized appropriately for peak flows. Erosion control measures (see Erosion Control) may be used as needed when constructing new temporary and permanent roads.
- **Road and Trail Maintenance:** Road and trail maintenance is an ongoing activity for roadways. While most road maintenance is routine, it may occur under emergency situations. Maintenance may include re-grading the road surface, re-paving permanent roads, filling potholes, replacing or improving water crossings, or removing hazardous vegetation on or next to the road. Most road maintenance will require heavy equipment, but some hand tools may be used.
- **Decommissioning Roads and Trails:** The Bureau may decommission temporary or permanent roads and trails throughout the Action Area. Strategies to decommission roads may vary depending on the site-specific conditions. Some roads may be decommissioned by blocking access and allowing natural processes to remove the road. In other situations, the roadbed may be buried under dirt from road embankments and slash to restore a more natural land contour and accelerate recovery while reducing potential erosion. In rare cases, roads may need to be ripped using heavy machinery before other techniques are utilized to remove pavement. Culverts and bridges will also need to be removed using heavy machinery.
- **Stairs:** Stairs may be installed on trails by burying rocks or pre-cut logs in the trail surface on direct and gravel trails, or with prefabricated concrete on paved trails. Installing stairs requires heavy equipment.

- **Site Access:** Access may be by vehicle, off-highway vehicles and horses may be used when there are not roads available. Off-highway vehicles and horses may be used on trails when available.
- **Hazard Tree Removal:** Hazard tree removal typically occurs after a wildfire along roadways. During this activity, trees killed or severely damaged by the fire are removed within a specified distance of a roadway or facility to prevent those trees from causing damage to people or property. Trees are usually removed with heavy equipment. Merchantable timber may be sold or otherwise removed from the site. Slashes and chipped logs may be spread on site to minimize erosion.
- **Vegetation Removal:** Vegetation adjacent to the roadway may be removed to improve visibility and safety on the road, reduce fire risk, and to improve the roads function as a fuel break. Vegetation removal may be completed using hand tools or heavy equipment.
- **Fencing, Gate, and Sign Installation:** Fencing, gate, and signage may be installed to protect species and their habitats during sensitive life history stages. Fencing, gates, and signage may be temporary or permanent. Fencing and gates will generally be used to control a threat or impact such as controlling vehicles around western snowy plover breeding areas, or to direct management (e.g., cattle grazing). Signs may be installed to inform the public of instructions. Fencing, gates, and signs may be installed using hand tools or with larger equipment such as gas-powdered augers to dig holes. Permanent fence and gate posts may be buried with concrete.
- **Upgrades:** Road upgrades are made to existing roadways and may include widening the roadbed, changing the surface type, or improving water crossing structures. Upgrades generally require heavy equipment and may change vegetation adjacent to roadways.

Facilities

Facilities may be installed throughout the Action Area to support access, safety management, or other goals. Facilities may include physical structures or vegetation removal to allow certain uses. Facilities are generally permanent but may be temporary or short-term for some activities. There is some overlap between facilities, roads, renewable energy development, and trails. While hand tools may be adequate for some things, heavy equipment is likely to be needed for most activities. Multiple facilities may be sited in one location rather than spreading facilities across a greater area. Some facilities may be linear projects that cover a large distance with a narrow footprint such as a hiking trail. See the Roads and Trails (Vegetation Removal and Fencing) and Erosion Control section for more information on those activities. The Bureau may implement the following activities:

- **Installation:** The exact techniques or tasks will depend on what needs to be installed. For signs, gates or fenceposts, holes will generally be dug using an auger or shovel and concrete may be used to secure the post. Other times, a cement foundation may need to be laid using heavy equipment to support a structure. Installing structures may take several days to several months, and temporary structures may be needed during construction.
- **Lighting:** Temporary or permanent lighting may be needed at facilities for public safety. Installing lighting is unlikely to require heavy machinery or take an extended period of time. However, lighting will be a continued use wherever installed and may affect listed and at-risk species. Lighting will be installed using best practices as feasible. Lighting

will likely only be located where there are existing disturbances like parking, trails and roads.

- **Maintenance:** Maintenance is required for all facilities. Facilities may require both frequent small tasks as well as more infrequent and substantial maintenance. Maintenance may require hand tool repairs and upgrades or could require heavy equipment to fix major repairs.
- **Emergency Equipment (part of installation):** Some equipment for emergency alert and response may be installed throughout the Action Area for public safety. The Bureau may have limited discretion in determining the location of emergency equipment.
- **Target Shooting:** The creation of new target shooting areas may require some site development. A new target shooting area may need vegetation cleaning and creation of a backstop. Vegetation clearing may require hand tools or herbicides. Heavy equipment may be needed to move dirt into a large pile. The pile may be several feet tall and wide to ensure rounds fired at targets do not escape the target shooting area.

Livestock and Grazing

There are a few potential management activities that are associated with livestock grazing, including the construction of fencing, corrals, temporary structures, and water sources. The presence of livestock in the different allotments may be associated with impacts as they graze on vegetation. Grazing may be implemented as a tool in vegetation management or as land use. Some other potential activities associated with livestock grazing could include animal herding, all-terrain vehicle use, and equestrian use.

Grazing

Grazing is likely to be used in compatible habitat types with sufficient forage for livestock. Different types of livestock such as cattle or goats may be used depending upon the land management goals. Grazing may require equipment such as fencing, paddocks, and off-road vehicles to manage the intensity and duration of grazing. See the Roads and Trails section for more information about access and fencing. The Bureau may implement the following activities:

- **Corrals:** Corrals may need to be built to support grazing. Corrals may be temporary but are likely permanent. If an open area is not available, brush and trees may be removed to accommodate the corral. Installing the corral will likely require heavy equipment and cause ground disturbance and habitat loss.
- **Water Trough Installation:** Water troughs may be needed in some areas to support grazing and minimize impacts to sensitive resources. Water troughs are usually installed above ground with either a well or a water storage tank. Installation and maintenance will require heavy equipment.
- **Temporary Structures:** Other temporary structures may be needed to support grazing. These structures may be placed in an already disturbed location or in a new area. Some structures may require vegetation removal, grading, and ground disturbance.
- **Herding Animals:** Herding animals- frequently dogs- are trained to collect and move livestock. Herding animals may be used to assist grazers/ranchers to round up livestock and move them to a new location off the Action Area. Herding animals are typically focused on the task and are not present unless performing that task.

- Targeted Grazing: Livestock grazing may be implemented to control or eradicate infestations. Livestock species, stocking rate, and timing will be adjusted for specific projects. Commonly used species include sheep, goats, and cattle. Fencing may be installed to control grazing, see Fencing section for more information.

Conservation Measures

The Plan proposes to inventory and monitor special status species and their habitats to better understand their abundance and distribution and to facilitate implementation of conservation and recovery actions within the planning area. Under the Plan, wildlife and habitat would be monitored to determine population and habitat trends.

The Bureau included their best management practices in Appendix D of the Biological Assessment (Bureau 2024a, included as Appendix B). The Bureau will apply these best management practices to projects as appropriate to minimize impacts to resources, including listed and at-risk species. The best management practices are grouped by category (e.g., Restoration Activities and Road Construction and Reconstruction). Although the implementation of these best management practices will minimize project effects to species and critical habitats, there may be residual effects to species. The Bureau and the Service may work to develop additional conservation measures during consultations for specific projects implemented under this Plan. Those additional measures will further minimize impacts from individual projects.

The following is a list of the best management practices from the above-mentioned Appendix D of the Biological Assessment referenced in this Opinion (included in full as Appendix B). This is not an exhaustive list and future conservation measures will be developed in coordination with the Service at a project level.

Water Quality

- AQ 1 For Bureau-permitted activities, no hazardous materials storage with 0.25 mile of centerline of designated Wild and Scenic Rivers, within Riparian Management Areas and near permanent water sources.
- AQ 2 For short term projects (up to 2 weeks), small amounts of fuel (up to 20 gallons) for staging activities associated with restoration activities may be stored outside the Riparian Management Areas. If fuel over 20 gallons is left at staging area, ensure proper signage is present and provide secondary containment to prevent accidental movement of fuel over the surface to a stream or water body. Fuel and service equipment used for instream, Riparian Management Areas, or riparian work (including chainsaws and other hand power tools) only in designated areas more than 300 feet from stream or another aquatic habitat. On a case-by-case basis, fueling inside the Riparian Management Areas could occur (i.e., when a road is present so that during the dry season that location might be the safest place to refuel). A Spill kit must be present when fueling within 300 ft of a stream.
- AQ 3 Fuels, chemicals, or fertilizer shall not be stored on the active floodplain or Riparian Management Areas of any waterbody. All hazardous materials and petroleum products will be stored in durable containers located at least 500 feet from streams, springs, and wetlands. Spill kits will be present. Secondary containment would be required to prevent fuel or other materials from moving down slopes into streams.

- AQ 4 Conduct equipment maintenance outside Riparian Management Areas, wetlands, or stream to avoid contamination of water. Locate equipment washing sites in areas with no potential for runoff into wetlands, Riparian Management Areas, floodplains, and Waters of the State. Do not use solvents or detergents to clean equipment on site.
- AQ 5 Use non-oil-based dust suppressants such as water, within Riparian Management Areas to prevent contamination of surface and groundwater water quality.
- AQ 6 Locate all new high recreational use sites outside Riparian Management Areas to protect water quality.
- AQ 7 Plan, locate, design, construct, operate, inspect, and maintain sanitary facilities to minimize water contamination. Sanitation facilities should not be placed within the 100- year floodplain or Riparian Management Areas.
- AQ 8 Require self-contained sanitary facilities when long-term camping (greater than 14 days) is involved with permit or contract implementation.
- AQ 9 Provide self-contained sanitary facilities when there is high recreational use (campgrounds or dispersed camp areas, temporary camp for an OHV recreational activity, temporary camp due to horse roundup) inside Riparian Management Areas.
- AQ 10 Locate pack animal and riding facilities outside Riparian Management Areas to protect water quality.
- AQ 11 Water Sources: when locating proposed water developments for livestock or other uses, evaluate feasibility of use; and techniques for protecting original water source. Springs used for water source should retain enough water for riparian vegetation and water for rare plant species. Water sources designed for permanent installation, such as piped diversions to off-site trough, are preferred over temporary, short-term-use developments especially when wildlife friendly fences are built to protect the original source.
- AQ 12 Basins shall not be constructed at culvert inlets for the purpose of developing a waterhole for drafting, as these can exacerbate plugging of the culvert.

Restoration

- RST 1 Confine work in the stream channels to the in-water work period. Construct new stream crossings when streams are dry or when stream flow is at its lowest. These times may vary if sensitive aquatic species are present or in differing parts of the state. This may be extended if no precipitation is forecast over the following three days and mulch and erosion control materials are stockpiled onsite to be deployed in the event of rainfall occurring.
- RST 2 In meadows and other aquatic habitat (e.g., meadow streams), do not drive heavy equipment in flowing channels and floodplains when wet. Do not drive heavy equipment in the Riparian Management Areas in wet conditions when such use could

result in soil compaction and displacement. Prohibit heavy equipment from entering flowing water, unless at a preapproved crossing. Avoid and minimize heavy equipment passage at crossings where water is flowing.

- RST 3 In well-armored channels that are resistant to damage (e.g., bedrock, small boulder, and cobble dominated), consider conducting the majority of heavy- equipment work from within the channel, during low streamflow, to minimize damage to sensitive Riparian Management Areas.
- RST 4 Design access routes for individual work sites to reduce exposure of bare soil and to minimize compaction and soil disturbance to wet meadows and floodplains.
- RST 5 Limit the number and length of equipment access points through Riparian Management Areas. Locate equipment storage areas outside of Riparian Management Areas, including machinery used in stream channels for more than one day, following BMPs in the Spill Prevention and Abatement section.
- RST 6 Limit the amount of stream bank excavation to the minimum necessary to ensure stability of enhancement structures. Avoid working in the wetted channel by diverting flow around work site. Excavated material should be removed and placed where it cannot reenter the stream during precipitation or flood events. If materials will remain on site, they should have permanent stabilization measures applied (such as regrading to match surrounding and revegetation).
- RST 7 Rehabilitate head cuts and gullies. Use large wood in preference to rock weirs if available. Enter these areas during the driest time to minimize soil compaction and diversion of flows.
- RST 8 Prior to the wet season, stabilize disturbed areas where soil will support seed growth, with the potential for sediment delivery to wetlands and streams. Apply native seed and certified weed-free mulch or erosion control matting in steep or highly erodible areas, or within Riparian Management Areas. Adjust techniques if amphibians present due to entanglement in matting.
- RST 9 Implement measures to control turbidity. Measures may include installation of turbidity control structures (e.g., isolation, diversion, and silt curtains) immediately downstream of instream restoration work areas. Remove these structures following completion of turbidity-generating activities. Ensure that sediment trapped does not discharge into watercourse and dispose of in location where sediment will not move after precipitation into the waterbody.
- RST 10 When replacing culverts, consider using larger culverts and embedding the culvert to 30 percent bedload. Use bridges on high-gradient stream channels.

Roads

- R 1 Implement an approved Best Management Practices checklist, operating or erosion control plan that covers all disturbed areas, including borrow areas and stockpiles used during road management activities. Follow operations for wet weather (below). The

need for an Erosion Control Plan will be set by the scope and complexity of the project and its potential to cause erosion and deposition in streams.

- R 2 Maintain erosion-control measures to function effectively throughout the project area during road construction and reconstruction, and in accordance with the approved Best Management Practices and erosion control plan.
- R 3 When new roads or reconfigurations of old roads are necessary, locate roads and landings to reduce total transportation system mileage. Relocate roads and landings outside of Riparian Management Areas wherever possible. Renovate or improve existing roads or landings when it would cause less adverse environmental impact. Where roads traverse land in another ownership, investigate options for using those roads before constructing new roads. Locate temporary (see definitions p. 48) and permanent roads and landings on stable locations, e.g., ridge tops, stable benches, or flats, and gentle-to-moderate side slopes to minimize erosion impacts. Minimize road construction on steep slopes (> 50 percent).
- R 4 Confine new roads to the construction limits of the permanent roadway to reduce the amount of area disturbed and do not design for deposition in wetlands, Riparian Management Areas, floodplains, and Waters of the State.
- R 5 Avoid road or landing locations in Riparian Management Areas. If no other feasible options exist, prevent and minimize discharges of sediment to surface waters. Do not put landings in Riparian Management Areas.
- R 6 Avoid locating landings in areas that contribute to runoff and erosion. Use methods to minimize erosion. Hydrologic connectivity between landings and waterbodies should be kept to an absolute minimum or completely reduced. Install temporary drainage, erosion, and sediment control structures to route runoff from the road to a stabilized area (i.e., vegetated area, sediment basin or riprap lined ditch), and away from watercourses. In unstable areas, stabilize slopes with straw wattles or rock. When on steep or unstable slopes in order to avoid erosion from road surfaces. Storm proof or close roads under construction or reconstruction prior to the onset of the wet season.
- R 7 Design (prior to building) temporary roads to either avoid or access sensitive areas at specific locations. Decommission temporary roads upon completion of use. Storm proof before the wet season if project is not completed. Subsoil (i.e., rip) temporary roads where needed to lessen detrimental soil conditions, minimize surface runoff, improve soil structure, and water movement through the roadbed. See also Road Maintenance section for Road Closure and Decommissioning BMPs.
- R 8 Design roads to the minimum width needed for the intended use as referenced in BLM Manual 9113 – 1 – Roads Design Handbook (USDI BLM 2011). Where in-sloped roads are proposed, design inboard ditches to reduce hydrologic connectivity and maintenance requirements.
- R 9 Design road cut and fill slopes with stable angles, to reduce erosion and prevent slope failure. Locate and designate waste areas before operations begin.

- R 10 Design and construct sub-surface drainage (e.g., trench drains using geo-textile fabrics and drainpipes) in landslide-prone areas and saturated soils. Minimize or eliminate new road construction in these areas.
- R 11 To protect Waters of the State from sedimentation and other pollutants from roadways: Locate roads and landings away from wetlands, Riparian Management Areas, floodplains, and other Waters of the State. Minimize roads within Riparian Management Areas, use only for stream crossings. Locate temporary and permanent road construction or improvement to minimize the number of stream crossings. Do not fill wetlands, do not design roads through meadows. If a wetland or meadow must be crossed use a bridge design that does not block floodplain flows. If a road must go through a Riparian Management Areas, use bridges or spans, and elevate the road over drainages to minimize disruption of floodplain flows in Riparian Management Areas.
- R 12 Excavated material should be removed and placed where it cannot reenter the stream or water bodies during precipitation or flood events. Do not place such materials on slopes with a high risk of mass failure, in areas subject to overland flow or seasonally saturated areas, or within 100 feet of perennial streams or wetlands, floodplains, and unstable areas to minimize risk of sediment delivery to Waters of the State. Apply surface erosion control prior to the wet season. Deposit and stabilize excess and unsuitable materials only in designated site where there are no potential for sediment to discharge to a watercourse. Provide adequate surface drainage and erosion protection at disposal sites. Construct road fills to prevent fill failure using inorganic material, compaction, buttressing, subsurface drainage, rock facing, or other effective means.
- R 13 Use controlled blasting techniques to minimize loss of material on steep slopes or into wetlands, Riparian Management Areas, floodplains, and Waters of the State. Restrict blasting after intense storms when soils are saturated.
- R 14 Schedule operations when rain, runoff, wet soils, snowmelt, or frost melt are less likely. Follow seasonal restrictions, as outlined in an approved Best Management Practices checklist, operating or erosion control plan. Stabilize project area during normal operating season when the National Weather Service predicts a 30 percent or greater chance of precipitation, such as localized thunderstorm or approaching frontal system. Complete all necessary stabilization measures prior to predicted precipitation that could result in surface runoff. Close roads during wet weather conditions when ground conditions could result in excessive rutting (greater than 2 inches), soil compaction (except on the road prism or other surface to be compacted), or runoff of sediments directly to streams.
- R 15 Use temporary sediment control measures (e.g., check dams, silt fencing, bark bags, filter strips, and mulch) to slow runoff and contain sediment from road construction areas. Remove any accumulated sediment and the control measures when work or haul is complete. When long-term structural sediment control measures are incorporated into the approved Best Management Practices checklist, operating or erosion control plan, remove any accumulated sediment to retain capacity of the control measure.

- R 16 Do not permit sidecasting within or close to streams or wetlands. Prevent stockpiled excavated materials from entering water ways or within 100 feet of perennial or intermittent streams.

Livestock Grazing and Wildhorse Management

- G 1 Fence water developments near springs and seeps when feasible, unless other methods are effective. Pipe overflow away from the developed source where feasible and in cooperation with permittees.
- G 2 Protect and maintain the physical, biological, and chemical integrity of perennial, intermittent streams and Waters of the State using fencing, seasonal rotations, and other methods. When water quality is threatened by bank trampling or other disturbances fence areas to keep large animals out of the riparian corridor (Riparian Management Areas).
- G 3 Locate new permanent livestock handling or management facilities (corrals, pens, or holding pastures) outside Riparian Management Areas or 200 feet from waterbodies and on level ground where drainage would not enter surface waters. Make changes to existing facilities within Riparian Management Areas to meet water quality standards and regulations. Encourage cattle to obtain water away from riparian area.
- G 4 Adjust forage utilization levels, improved livestock distribution, and management through fencing, vegetation treatments, water source developments, or changes in season of use or livestock numbers to recover degraded waterbodies.
- G 5 Apply specific livestock grazing strategies for riparian wetland areas, including timing, intensity, or exclusion for maintenance of proper functioning condition. Use one or more of the following features: Include the waterbodies, floodplains, and wetlands within a separate pasture. Fence or herd livestock out of waterbodies, floodplains, and wetlands for as long as necessary to allow vegetation to recover. Control the timing and intensity of grazing to keep livestock off stream banks when they are most vulnerable to damage and to coincide with the physiological needs of target plant species. Add more rest to the grazing cycle to increase plant vigor, allow stream banks to re-vegetate, or encourage more desirable plant species composition. Limit grazing intensity to a level that will maintain desired species composition and vigor. Permanently exclude livestock from those waterbodies, floodplains, and wetlands areas that are at high risk and have poor recovery potential, and when there is no practical way to protect them while grazing adjacent uplands.
- G 6 Locate salting areas outside Riparian Management Areas, and further than 400 feet from permanent or intermittent streams and Waters of the State.
- G 7 Use practices of best management practices from the Operations in or near Aquatic Ecosystems, Spill Prevention and Abatement, Restoration Activities, and Stream Crossings sections (Appendix B) when designing range improvement activities that involve Waters of the State and when developing water sources for livestock watering or temporary access or gather areas.
- G 8 Minimize fencing for livestock and make existing and needed fences wildlife friendly.

- G 9 Establish off-spring, creek, and river watering sites for livestock.
- G 10 Livestock crossings and off-channel livestock watering facilities shall not be located in areas where compaction and/or damage may occur to sensitive soils, slopes, or vegetation due to congregating livestock. If livestock fords across streams are rocked to stabilize soils/slopes and prevent erosion, material and location shall be subject to the approval of the Authorized Officer.
- G 11 Design and locate parking and staging or wild horse or burro gather areas of appropriate size and configuration to accommodate expected vehicles and horses /burros and prevent damage to adjacent water; aquatic, and riparian resources. When gathering wild horses and burros avoid sensitive areas such as Riparian Management Areas, wetlands, meadows, bogs, fens, inner gorges, overly steep slopes, and unstable landforms to the extent practicable. For staging areas for wild horse and burro gathers, designate specific locations for fueling so that water-quality impacts are minimized.

Wildlife and Vegetation, Including Pollinators

- Wild 1 Discourage the spread of invasive species by removing unneeded roads.
- Wild 2 Complete activities at individual project sites in a timely manner to reduce disturbance and/or displacement of wildlife in the immediate project area.
- Wild 3 Use existing roadways or trails for access to project sites.
- Wild 4 Employ post restoration monitoring following project completion to determine efficacy and/or impacts of treatment.
- Wild 5 Native shrubs, trees, and erosion control seed mixes from local ecotypes shall be used where needed for restoration of disturbed sites. Seedlings, cuttings, and other plant propagules for restoration shall be sourced from local ecotypes.
- Wild 6 Avoid accumulating or spreading slash in upland draws, depressions, intermittent streams, and springs to eliminate or reduce debris flows. Spreading slash would be allowed in drainages where debris placement is recommended for erosion control.
- Wild 7 Native shrubs, trees, and erosion control seed mixes from local ecotypes shall be used where needed for restoration of disturbed sites. Seedling, cuttings, and other plant propagules for restoration shall be sourced from local ecotypes.
- Wild 8 New facilities shall be sited in previously disturbed areas, to the extent feasible, and shall be designed to avoid sensitive habitats and affect the least amount of native vegetation.
- Wild 9 Retain existing snags for wildlife use in areas where they will not create a human hazard.
- Wild 10 Utilize food and waste management programs in recreation areas and at facilities that utilize bear proof containers and trash receptacles.

Wildland Fire Management

- WF 1 Small unit sizes, wind direction, fuel load and type, and distance to receptors will be considered to mitigate adverse effects of prescribed burns.
- WF 2 Fire lines shall be located outside of highly erosive slopes, intermittent streams, riparian areas, vernal pools, wetlands, and sensitive plant and animal habitat.
- WF 3 Whenever consistent with safe, effective suppression techniques, natural barriers will be used as fire breaks as extensively as possible.

Migration/Movement Corridors

- MC 1 Identify wildlife migration and movement corridors that cross Bureau lands.
- MC 2 Where data is present mitigate vehicular collisions with wildlife on Bureau-managed roads that bisect essential movement corridors, including decommissioning where possible.
- MC 3 Identify and mitigate barriers such as highways, canals, fencing, and man-made dams that inhibit movement routes for mule deer and other wide-ranging wildlife.
- MC 4 Where corridors cross jurisdictional boundaries, coordinate management of the corridor with all relevant agencies, governments, landowners, and other entities.

Late Successional Forest

- LSF 1 Manage forest stands for late successional characteristics such as uneven-aged and multilayered canopy.
- LSF 2 Snags greater than 12 inches diameter at breast height shall be retained on project sites for cavity dependent wildlife species whenever possible.
- LSF 3 Large trees with large cavities, mistletoe clumps, broken tops, deformed branches, and long lateral branches will be maintained for nesting, resting, and roosting sites.
- LSF 4 Maintain a minimum of 60 percent canopy closure with patches exceeding 80 percent canopy closure.
- LSF 5 Maintain and enhance connectivity of continuous blocks of habitat for fishers and martens including retaining increased stand complexity, understory shrubs and trees, snags, and downed woody debris.

Riparian and Wetland Habitats, and Vernal Pools

- WRH 1 If human disturbance is a problem, consider closure of trails through and around wetlands during waterfowl breeding season.
- WRH 2 Prioritize water allocation to breeding habitat (e.g., brood ponds and semi-permanent wetlands) during extended droughts, or when water is otherwise limited.
- WRH 3 Bank stabilizing vegetation removed or altered because of restoration activities shall be replanted with native vegetation and protected from further disturbance until new growth is well established.

- WRH 4 Maintain watershed to provide seasonal water to the pools.
- WRH 5 Natural, undisturbed buffers approximately 300 yards wide around pools should help protect animal movements to and from the pools.
- WRH 6 Corridors connecting pools should be preserved.
- WRH 7 Avoid equipment operation and motorized recreation in pools.
- WRH 8 Avoid adding water to pools during dry phase of year.
- WRH 9 Debris or fill should not be dumped into vernal pools.
- WRH 10 Habitat alterations that must take place should be carried out during the dry season to minimize disturbance to breeding and resident animals.

Action Area

The Action Area is defined as all areas that would be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02). The Decision Area of the Plan and EIS is a subset of Bureau-administered lands within the larger planning area for which the Bureau has the authority to make land use decisions. The Decision Area is approximately 382,200 acres of surface estate and 295,100 subsurface acres or mineral estates for an approximate total of 689,100 acres of Bureau-administered lands. The Decision Area is shown on Map 12 in Appendix A, which shows surface estate, and Map 1-3 in Appendix A, which shows mineral estates. Additional details can be found in the Plan Final EIS. The Action Area includes the Decision Area and a one-mile buffer surrounding the Decision Area. Lands within this buffer are generally private lands managed for industrial timber production, ranching, agriculture, and home development, although some lands are adjacent to national forests and other state and federal lands (lands administered by the Bureau of Reclamation, the National Park Service, and the Service). The Action Area spans from the Pacific coast to the Oregon border, to the western foothills of the Sierra Nevada and Cascade Range. Diverse vegetation communities are represented, including coastal dunes, coniferous forests, wetlands and riparian areas, chaparral, grasslands, and oak woodlands.

Vegetation Cover Types in the Action Area and General Management Direction

The Bureau classified vegetation cover types in the decision area based on habitats described in the California Department of Fish and Wildlife (Department) California Wildlife Habitat Relationship database (Department 2023a). Additional unique vegetation types that are not included in the California Wildlife Habitat Relationship database but are an important component of vegetation communities in the Decision Area are also included.

Vegetation in the Action Area is driven by the area's Mediterranean climate with warm, dry summers and cool, wet winters. Rain is the predominant precipitation type, though higher-elevation areas have a winter snowpack that is important in sustaining streamflow – and associated riparian vegetation cover types – during the dry season. Along the coast, the maritime climate promotes milder temperatures compared with inland areas. Distinct shifts in vegetation

types are apparent between coastal and inland areas and lower- and higher-elevation areas, given the unique climate conditions associated with each.

The acres of each vegetation cover type in the Action Area are summarized in Table 3, Vegetation Cover Types, and shown on Map 2-1, Vegetation Cover Types, in Appendix A. A general description of each vegetation cover type is provided below, with additional details and relevant references provided in the Plan Final EIS.

For all vegetation cover types in the Action Area, the Bureau would manage vegetation to support fish and wildlife habitat, identify the desired composition and range of conditions, and manage vegetation relative to their associated landforms to optimize plant community health and resilience to landscape-wide impacts.

Table 3. Vegetation Cover Types in the Action Area. Acres of habitat are rounded to the nearest hundredth. Geographic information system (GIS) data do not exist for the knobcone and rare cypress vegetation cover types. The category of Other are areas that cannot be classified or that are riparian reserves per the Aquatic Conservation Strategy from the 1994 Northwest Forest Plan.

Vegetation Cover Type	Action Area (acres)	Action Area (percent)
Chaparral Shrubland	72,700	19
Coastal Forests	<100	<1
Coastal Prairies	500	<1
Douglas Fir- and Tanoak-Dominated Forest	59,600	16
Dunes	400	<1
Fallow Fields and Croplands	700	<1
Foothill Pine and Oak Woodland	91,300	24
Grasslands, Vernal Pools, and Wetlands	22,200	6
Juniper and Sage	7,800	2
Knobcone	N/A	N/A
Late-Successional Forest	500	<1
Mixed Conifer	103,900	27
Oak Savannas and Open Woodlands	17,600	5
Rare Cypress	N/A	N/A
Other	4,400	1
Valley-Foothill Riparian	500	<1
Total	382,200	100

Source: Bureau GIS 2023

Analytical Framework for the Jeopardy Determination

Section 7(a)(2) of the Act requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. “Jeopardize the continued existence of” means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

The jeopardy analysis in this biological opinion considers the effects of the proposed federal action, and any cumulative effects, on the rangewide survival and recovery of the listed species. It relies on four components: (1) the *Status of the Species*, which describes the current rangewide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which analyzes the current condition of the species in the Action Area without the consequences to the listed species caused by the Proposed Action, the factors responsible for that condition, and the relationship of the Action Area to the survival and recovery of the species; (3) the *Effects of the Action*, which determines all consequences to listed species that are caused by the proposed federal action that are reasonably certain to occur in the Action Area; and (4) the *Cumulative Effects*, which evaluates the effects on the species of future, non-federal activities that are reasonably certain to occur in the Action Area.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the current status of the covered species, taking into account any cumulative effects, to determine if implementation of the Proposed Action is likely to reduce appreciably the likelihood of both the survival and recovery of the covered species in the wild by reducing the reproduction, numbers, and distribution of that species.

Analytical Framework for the Adverse Modification Determination

Section 7(a)(2) of the Act requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to destroy or to adversely modify designated critical habitat. Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.

The destruction or adverse modification analysis in this Opinion relies on four components: (1) the *Status of Critical Habitat*, which describes the current rangewide condition of the critical habitat for the listed species; (2) the *Environmental Baseline*, which analyzes the current condition of the critical habitat in the Action Area without the consequences to designated critical habitat caused by the Proposed Action, the factors responsible for that condition, and the value of the critical habitat in the Action Area for the recovery of the listed species; (3) the *Effects of the Action*, which determines all consequences to critical habitat that are caused by the proposed federal action that are reasonably certain to occur; and (4) *Cumulative Effects*, which evaluate the effects of future non-federal activities that are reasonably certain to occur in the Action Area.

For the section 7(a)(2) determination regarding destruction or adverse modification of critical habitat, the Service begins by evaluating the effects of the proposed Federal action and any cumulative effects. The Service then examines those effects against the condition of all critical habitat described in the listing designation to determine if the Proposed Action's effects are likely to appreciably diminish the value of critical habitat as a whole for the conservation of the species.

Status of the Species

The Status of the Species describes the current rangewide condition of the species, the factors responsible for that condition, and its survival and recovery needs.

Mammals

Pacific Marten, Coastal DPS

The coastal DPS of Pacific marten (marten) was listed as threatened under the Act on October 8, 2020 (85 FR 63806). There have been no status reviews or recommendations for change in the species' listing status since the time of the Final Rule. Marten are medium-sized carnivores in the weasel family that are associated with mature complex forests in coastal northern California and coastal Oregon. Martens primarily prey upon small mammals and birds but will seasonally take advantage of other food sources such as insects and berries (Eriksson et al. 2019, Slauson et al. 2019). Primary prey species are associated with habitat structures found in mature and late-successional forests and ericaceous shrub habitats. Coarse woody debris such as large snags and logs are a particularly important feature for both prey and marten denning, resting, and foraging habitat. Denning begins in March and ends in May or June when the weaning process begins.

Female survival is an important demographic parameter determining marten population stability (Service 2023a). Marten are central-place foragers and kits are dependent on the female for up to 3 months after parturition (Delheimer et al. 2021). Marten have a high metabolic rate and a limited ability to store substantial body fat reserves (Buskirk and Harlow 1989). Additionally, female energetic expenditures of the closely related fisher (*Pekantia pennanti*) while rearing kits may be 2 to 3 times greater than expenditures during non-reproductive periods (Powell and Leonard 1983) and marten are likely similar. During the denning season, females are less mobile due to their need for den trees and caring for kits. If females are caring for young at the time of a disruption, their ability to move elsewhere to avoid the disruption is limited because they have to carry or lead kits that are less mobile. In mid-late July, kits become more mobile and no longer have to be carried. Consequently, females and kits are less likely to be adversely impacted by nearby disruptions. Activities that cause significant noise or habitat alteration in areas immediately adjacent to active dens during the denning season could lead to reproductive failure.

Male and female home ranges were estimated to comprise about 400 hectares (ha), or about 740 acres (ac), and male and female home ranges overlap with one another (Slauson et al. 2019). More recently, the mean area of marten home ranges in northwestern California managed landscapes have been described: female home ranges average 240 ha (2.4 square kilometers [sq km] or 593 ac) with a range of 80-590 ha and male home ranges average 420 ha (4.2 sq km or 1,037 ac) with a range of 230-780 ha (Moriarty and Delheimer 2019). Rest and active locations used by females in a northern coastal California study population were in found in older forests and home range sizes averaged 3-4 sq. km (740-988 ac) (Service 2023a). More information pertaining to the life history of the marten is described in Service (2023a) and Slauson et al. 2019.

Marten in northern California were found to select mature and older conifer dominated stands with dense shrub cover in the oldest developmental stage; these habitats typically provide important structural features associated with prey populations and resting and denning (e.g., large logs and snags) (Slauson et al. 2007). Mixed conifer and mesic habitats typically consist of mature and older conifer-dominated forests containing dense, evergreen shrub layers, and an abundance of large, downed logs, and large, decadent live trees and snags (Slauson 2003). Mature hardwoods are an important habitat component for marten and their prey including tanoak (*Notholithocarpus densiflorus*) or golden chinquapin (*Chrysolepis chrysophylla*) (Service 2023a). Moriarty et al. (2019) found marten within the Oregon central and south coast to be

associated with habitats characterized with high shrub cover and generally smaller tree sizes, shorter tree heights, and fewer large trees than those more complex mature mesic forests, however this has not been described for northern California.

Within serpentine habitats, marten selected stands with sparse tree cover and those characterized as ‘shrub’ and ‘old seral stages’ (Slauson et al. 2007). Use areas have been found to contain tree canopy closures ranging from 20 to 70 percent and include shrubs of any seral stage (Slauson and Zielinski 2009, Slauson et al. 2019). Serpentine habitats contained fewer large logs but included more boulder piles and rocky outcrops which provide protective chambers that martens use as resting structures (Slauson et al. 2007, Slauson and Zielinski 2009).

One study in northern California found that almost all resting and active locations of females occurred in older forests and that home ranges averaged 3 to 4 sq km (740-988 ac) (as cited in Service 2023a). Telemetry data and habitat selection analysis at marten detection sites in northern California and southern Oregon suggest that home ranges are associated with large patches (median >1.5 sq km) of older forests and serpentine habitats (Slauson 2003, Slauson et al. 2007). Cover provided by ericaceous shrubs appears to be an important component (Service 2023a). At the landscape scale, home range occupancy, successful dispersal, survival and population dynamics are influenced by the availability and distribution of habitats. Habitat connectivity and cover is important for predator avoidance and dispersal movement as well as maintaining viable meta-populations (Service 2023a).

Population Status

For the most recent comprehensive information of the species’ rangewide status, please refer to the species status assessment (Service 2023a), the Humboldt marten Conservation Assessment and Strategy (Slauson et al. 2019), and the Final Listing Rule (85 FR 63806).

The species appears absent from the northern and southern ends of its historical range and is now thought to occupy about seven percent of the historical range in four small extant population areas (EPA) in Oregon and California as follows: Central Coastal Oregon EPA; Southern Coastal Oregon EPA; California-Oregon Border EPA; and the Northern Coastal California EPA (Service 2023a). Currently, suitable coastal marten habitat persists in less than 15 percent of the historical range and that about 90 percent of known detections occur in these areas (Slauson et al. 2019). This suggests that these occupied areas are very important to the species persistence.

Population estimates have been conducted in the Central Coastal Oregon and Northern Coastal California EPAs, but populations trends are unknown at this time. It has been estimated that there are approximately 71 adults (Linnell et al. 2018) in the Central Coastal Oregon and 60-80 adults in the Northern Coastal California EPA (Slauson et al. 2009). Systematic surveys have not been completed yet for the Southern Coastal Oregon nor California-Oregon Border EPAs; however, it is estimated that between 12-100 adults are present in each. The total number of marten is estimated to be less than 400 individuals rangewide.

Birds

Marbled Murrelet

The marbled murrelet (murrelet) was listed as threatened in Washington, Oregon, and northern California on September 28, 1992 (57 FR 45328). The Service published a recovery plan for the murrelet in September 1997 (Service 1997).

Murrelets are long-lived seabirds that spend most of their life in the marine environment, with breeding adult birds annually nesting in the forest canopy of mature and old-growth forests. Because of their small body size, cryptic plumage, crepuscular activity, fast flight speed, solitary nesting behavior, and secretive behavior near nests, murrelet nests have been extremely difficult to locate (Hamer and Nelson 1995). In California, breeding occurs from about March 24 through September 15, is asynchronous, and spread over a more prolonged season than for most temperate seabirds. Data from murrelet populations throughout North America show that approximately 84 percent of murrelet young fledge from their nests by August 18 (Nelson and Hamer 1995). The latest published fledging date was a record of a fledgling found on September 21 in Oregon (Nelson and Hamer 1995).

The distance inland that murrelets breed is variable and influenced by a number of factors; however, the Service considers 50 miles (mi.) as the maximum inland distance for determining habitat suitability and amount of habitat within the listed range (Service 2009a). Murrelets have a naturally low reproductive rate; they lay just one egg per year and supposedly first breed at age 3. Chicks fledge 27 to 40 days after hatching (Nelson 1997). Flights by adults are made from ocean feeding areas to inland nest sites at all times of the day, but most often at dusk and dawn (Hamer and Cummins 1991, Nelson and Hamer 1995). Murrelets are known to be opportunistic feeders, diving after small schooling fish and large pelagic crustaceans (e.g., euphausiids, mysids, amphipods). They will carry a single energy-dense fish to their chick: typically, larger sand lance, immature herring, anchovy, smelt, and occasionally salmon smolts (Carter and Sealy 1987, Burkett et al. 1995, Nelson 1997).

Population Status

Limited information is available on murrelet historical distribution and abundance; however, most summaries give indications that the distribution of murrelet populations was significantly reduced as habitat was removed throughout its range. Populations likely declined as a result. In some areas, murrelets have been locally extirpated, or only small numbers persist, risking maintenance of the species' distribution. These areas were identified as "areas of concern" (Service 1997). The areas included distribution gaps in central California, northwestern Oregon, and southwestern Washington, where very little suitable habitat remains, and what habitat does remain occurs in small patches.

Murrelet abundance during the early 1990s in Washington, Oregon, and California was estimated at 18,550 to 32,000 birds (Ralph et al. 1995). Based primarily on results from the Northwest Forest Plan's (Forest Service 1993) marbled murrelet monitoring program, the 2021 murrelet population for all Conservation Zones (Service 1997) was estimated at 18,000 birds (14,000 to 21,900). The estimate for Conservation Zone 4 in 2021 is 5,132 birds (3,739 to 8,243) which is fewer than those observed in 2019, which estimated 6,822 (5,576 to 11,063) (McIver et al. 2023).

The rate of change across all Conservation Zones for years 2001 through 2021 had a positive linear slope of 0.1 percent per year (-0.8 to 0.9 percent) but because the confidence interval is small and includes zero, there is no evidence of trend. At the conservation zone scale, Conservation Zone 4 showed a 2.8 percent increase per year (0.9 to 4.6 percent) for years 2000 through 2021 (McIver et al. 2023). Conservation Zone 4 was not surveyed in 2022.

California Spotted Owl, Sierra Nevada DPS

The Sierra Nevada distinct population segment of the California spotted owl (CSO) was proposed listed as threatened Act on February 23, 2023 (Service 2023b). We use the term “spotted owl” to indicate that the information applies to both CSO and northern spotted owl. Otherwise, we refer to the specific subspecies.

CSO are considered to be long lived (approximately 16 to 23 years) with high adult survival and low reproductive output (Seamans and Gutiérrez 2007). CSO form monogamous pair bonds, although occasionally pairs may separate due to circumstances such as the death of a mate or low reproductive output with a previous mate (Gutiérrez et al. 1995). Pairs will defend a territory from neighboring pairs and vagrant owls, and they exhibit high territory fidelity (Gutiérrez et al. 1995).

Pairs do not necessarily breed every year, but they can breed in consecutive years. Spotted owls have a bet hedging reproductive strategy, in which owls may postpone reproduction until temporarily poor environmental conditions improve (Franklin et al. 2000; Gutiérrez et al. 2017). In a study conducted from 1990 to 2005, the number of California spotted owl young fledged annually per territorial female ranges from 0.478 to 0.988 (Blakesley et al. 2010). The probability of occupancy and successful reproduction by owls depends on whether owls successfully reproduced at the site the previous year, is higher at lower elevations, and is likely the result of differences in topographic and vegetation conditions (Hobart et al. 2019a).

In general, CSO live in mature, multistoried forests with complex structure, large trees, multi-layered high canopy cover, coarse woody debris, and species richness (Gutiérrez et al. 2017). This habitat provides structures and characteristics required for nesting, roosting, and foraging. It is believed that multi-layered canopy cover and presence of large trees provide young CSO with protection from predators and from high temperatures. CSO have a low heat tolerance in comparison to other bird species, beginning to show heat stress at 30 to 34 degrees Celsius (°C) (88 to 94 degrees Fahrenheit [°F]). The cooler microclimates that multi-layered high canopy cover provides are important for both juveniles and adults during warm summers (Barrows 1981, Weathers et al. 2001). Additionally, multistoried forests with multilayer canopy cover also provides protection from predators (Franklin et al. 2000). In the Sierra Nevada, a majority of CSO occur within mid-elevation ponderosa pine, mixed-conifer, white fir, and mixed-evergreen forest types, with few CSO occurring in the lower elevation oak woodlands of the western foothills (Gutiérrez et al. 2017).

Home range sizes are highly variable (1,500 to 5,400 ac), and estimates vary by study, latitude, elevation, diet, and individual (Forest Service 2019). Within a home range, a territory is more vigorously defended by the resident single or pair of CSO. A territory is consistently used for nesting, roosting, and foraging and contains essential habitat for survival and reproduction (Gutiérrez et al. 1995, Blakesley et al. 2005). CSO home ranges are smaller in the southern Sierra Nevada than in the northern and central Sierra Nevada (Gutiérrez et al. 2017).

Nest stands have fine-scale habitat features important for breeding, including high canopy cover (in general, at least 70 percent), abundant large trees (typically more than 24 inches [in] diameter at breast height [dbh], multiple canopy layers dominated by medium-sized trees (12 to 24 in dbh) and higher-than-average basal area (185 to 350 square feet per acre) (Verner et al. 1992, North et al. 2000, Blakesley et al. 2005). Like other bird species, some spotted owls do not occupy a home range and may move within home ranges of other birds to wait for opportunities to join

other breeding pairs that may die or desert their territory. These birds are often called “floaters” and their role in spotted owl populations is considered to be critical (Verner et al. 1992).

California spotted owl nest and roost in areas that are generally characterized as mature forest with multistoried or complex structure and that have larger and taller trees, higher canopy cover, and larger amounts of coarse woody debris (i.e., fallen dead trees and the remains of large branches on the ground) than other sites available for use within the territory. Nesting habitat contains high canopy cover, typically 70 percent or higher, and trees with potential nest structures such as cavities, platforms, and deformities. Spotted owl foraging habitat is composed of a diversity of vegetation types and seral stages (Roberts et al. 2017). Spotted owls do not build their own nests but rely on old, large trees or snags with many defects like cracks, decay, open cavities, broken tops, and platforms. Most nest trees are a minimum of 30 inches diameter at breast height and average 45 inches diameter at breast height (Verner et al. 1992, North et al. 2000, Gutiérrez et al. 2017).

Foraging habitat may include the habitat characteristics described above for nesting and roosting habitat, but may also include younger forests, areas with medium-sized trees (11 to 24 inches quadratic mean diameter), and small open areas. A mosaic of mature closed-canopy forest intermixed with open-canopy patches may promote higher prey diversity and abundance (Franklin et al. 2000, Tempel et al. 2014a). CSO dispersal habitat is essential to maintaining stable populations by filling territorial vacancies when resident CSO die or leave their territories, and to providing adequate gene flow across the range of the species. At a minimum, dispersal habitat, contains stands with adequate tree size and canopy closure to provide roosting opportunities, protection from avian predators, and at least minimal foraging opportunities (Forest Service 2019).

Occupancy, colonization, adult survival, and reproductive success are all positively associated with the proportion of structurally complex forests at multiple scales (Franklin et al. 2000, Blakesley et al. 2005, Tempel et al. 2014b, Tempel et al. 2016). Areas of high canopy cover provided by large (and tall) trees are important, especially near the nest site and within the core use area (Blakesley et al. 2005, North et al. 2017, Jones et al. 2018). Areas with canopy cover greater than 70 percent are considered optimal for CSO nest sites and occupancy sharply declines when canopy cover is less than 40 percent (Blakesley et al. 2005, Seamans and Gutierrez 2007, Tempel et al. 2014b, Tempel et al. 2016).

Population Status

The CSO is one of three subspecies of spotted owls, along with the northern spotted owl (NSO) and the Mexican spotted owl. The Sierra Nevada DPS of the CSO is distributed throughout the forests of the western Sierra Nevada Mountains from Shasta County south to Tehachapi Pass (Gutiérrez et al. 2017a), and sparsely distributed on the eastern side of the Sierra Nevada Mountains into western Nevada (Great Basin Bird Observatory 2010). The distribution of the NSO transitions to the range of the CSO south of the Pit River to just north of Lassen Peak and interbreeding between the two subspecies occasionally occurs (Haig et al. 2004, Barrowclough et al. 2011, Hanna et al. 2018). CSO live from about 1,000–7,700 feet (ft) in elevation in the Sierra Nevada mountains, and up to 8,400 ft in southern California (Verner et al. 1992).

Information on CSO population trends in the Sierra Nevada largely comes from four long-term studies that span the latitudinal range, three of which occur primarily on National Forest System lands (Lassen, Eldorado, and Sierra) and one which occurs on the Sequoia-Kings Canyon

National Park. Although there is no information regarding either historical population sizes or estimates for minimum viable population sizes, CSO populations declined in the study areas from the 1990s to 2013 in three national forests in the Sierra Nevada but not in the Sequoia-Kings Canyon National Parks study area (LaHaye et al. 2004, Conner et al. 2013, Tempel et al. 2014b, Conner et al. 2016). While these demography studies have been the main source of empirical data about population trends to date, they may not be entirely representative of forest, ecological province, or rangewide trends for the CSO. Passive acoustic surveys throughout the western slope of the Sierra Nevada range began in 2021 and show that CSO, while rare, were well distributed across the study area (Kelly et al. 2023). Population size for the western Sierra Nevada in 2021 was estimated to be 2,218 (SE = 278) or 2,328 (SE = 489) CSO, depending on modeled occupancy criteria (Kelly et al. 2023). The Service found that currently most CSO populations in the Sierra have low or moderate resiliency due to high severity fire, tree mortality, drought, climate change and other threats described below (Service 2022a).

Northern Spotted Owl

The NSO was listed as threatened on June 26, 1990, due to widespread loss and adverse modification of nesting, roosting, and foraging habitat across the species' entire range and the inadequacy of existing regulatory mechanisms to conserve the owl (55 FR 26114). In 2019, the species' 5-year review documented its declining status (Service 2019a). After this review, the Service concluded that uplisting the NSO to endangered was warranted, but precluded, by higher priority actions to amend the List of Endangered and Threatened Wildlife and Plants (85 FR 81144).

Northern spotted owl are territorial; however, home ranges of adjacent pairs can overlap (Forsman et al. 1984; Solis and Gutiérrez 1990) suggesting that the core area defended is smaller than the area used for foraging. They will actively defend their nests and young from predators (Forsman 1975; Gutiérrez et al. 1995). Territorial defense is primarily carried out by hooting, barking and whistle type calls. Some NSO are not territorial but either remain as residents within the territory of a pair or move among territories (Gutiérrez 1996). These birds are referred to as "floaters." Floaters have special significance in NSO populations because they may buffer the territorial population from decline (Franklin 1992). Little is known about floaters other than they exist and typically do not respond to calls as vigorously as territorial birds (Gutiérrez 1996).

The NSO is relatively long-lived, has a long reproductive life span, and invests significantly in parental care (Forsman et al. 1984, Gutiérrez et al. 1995). They are sexually mature at one year of age, but rarely breed until they are two to five years of age (Miller et al. 1985, Franklin 1992, Forsman et al. 2002). In northwestern California, courtship behavior usually begins in February and females typically lay eggs in late March or April. The timing of nesting and fledging varies with latitude and elevation (Forsman et al. 1984). After they leave the nest in late May or June, juveniles depend on their parents until they can fly and hunt on their own. Parental care continues after fledging into mid-September (Forsman et al. 1984, Service 1990, Service 2004). During the first few weeks after the young leave the nest, the adults often roost with them during the day. By late summer, the adults are rarely found roosting with their young and usually only visit the juveniles to feed them at night (Forsman et al. 1984). Hybridization of northern spotted owls with CSO and barred owls (*Strix varia*) has been confirmed through genetic research (Hamer et al. 1994, Gutiérrez et al. 1995, Dark et al. 1998, Kelly 2001, Funk et al. 2008).

Population Status

There is little information regarding the total number of NSO existing throughout their range. Existing field surveys are not extensive enough nor consistent enough to produce reliable estimates of the rangewide population size. Since the mid-1990s, rangewide demographic data from 11 long-term monitoring areas has been used as a surrogate to evaluate population trends. Based on the demographic data, the most recent population meta-analysis found:

1. Populations experienced significant annual declines of 6-9 percent on six study areas and annual declines of 2-5 percent on five other study areas.
2. Annual declines translated to a 35 percent reduction in the number of NSO populations remaining within seven study areas since 1995.
3. Barred owl presence in NSO territories is the primary factor negatively affecting apparent survival, recruitment, and ultimately, rates of population change.
4. The NSO will likely decline to extirpation in the northern extent of its range in the next decade where population declines have been greatest (over 60 percent). Additionally, NSO population simulations indicate that without a reduction in barred owls in NSO territories and habitat, the populations in Washington and the Oregon Coast Ranges have a greater than 50 percent probability of extirpation (Franklin et al. 2021).

Population estimates were modeled in 2012, utilizing data from 2006. The model simulations found there were an estimated 6,662 NSO rangewide in 2006. Assuming all females are part of a pair, this projected a steady-state rangewide population size of roughly 3,074 females. If we simplistically assume there were 3,074 females present in the rangewide population in 2006, and that the number of females has declined by 5.3 percent per year since then (based on monitoring in the demographic study areas), we expect there will be 1,358 females in the 2021 rangewide population. More realistically, it is not clear how well the steady-state population estimates approximated the actual population in 2006 and the rangewide rate of population change between 2006 and 2021 has likely been steeper than 5.3 percent, given barred owl and wildfire impacts (Service 2019a). Based on adjustments to earlier estimates of the number of sites and females in the population, we hypothesize there are likely 3,000 or fewer individuals present in the rangewide population as of 2021.

Additionally, the actual number of currently occupied locations across the NSO range is unknown because many areas remain un-surveyed (Service 2011a). Many historical sites are also no longer occupied because NSO have been displaced by barred owls, timber harvest, or wildfire. However, displaced owls are also known to survive and colonize new territories as they shift in response to wildfire effects. Nonterritorial owls (or floaters) are also still presumed present in the population.

In the most recent meta-analysis, 26 years of survey and capture-recapture data from long-term demographic study areas (study areas) across the range were used to analyze demographic traits, rates of population change, and occupancy parameters for NSO territories. The most recent annual rate of decline (5.3 percent) indicates its extinction risk has significantly increased since the time of listing (Franklin et al. 2021). The populations in the study areas have declined from by as much as 80 percent since the early- to mid-1990s.

If this rate continues into the future, the NSO will likely decline to extirpation in the northern portion of its range in the near future where population declines have been greatest (over 60

percent). Additionally, population simulations indicate that without a reduction in barred owls in northern spotted owl territories and habitat, populations in Washington and the Oregon Coast Ranges have a greater than 50 percent probability of extirpation.

Western Snowy Plover, Pacific Coast Population DPS

The Service listed the Pacific coast population DPS of the western snowy plover (plover) as threatened on March 5, 1993 (58 FR 12864). The Service issued 5-year reviews in 2006 (Service 2006a) and 2019 (Service 2019b), and a recovery plan in 2007 (Service 2007a).

The plover is a small shorebird in the family Charadriidae. When listed in 1993, the Western snowy plover was considered a subspecies of the Kentish plover (*Charadrius alexandrinus nivosus*). In 2011, the International Ornithological Congress and the American Ornithologists' Union determined the snowy plover as a separate species *C. nivosus*, and the western snowy plover as the subspecies *C. nivosus nivosus*. In July 2024, The North American Check-list Committee of the American Ornithological Society placed snowy plover in the genus *Anarhynchus* after genetic research discovered the genus *Charadrius* was paraphyletic (Chesser et al. 2024). We continue to refer to the listed entity as *C. n. nivosus* until the scientific name is updated in the list of threatened species (50 CFR 17.11).

Plovers nest from early March through late September. Fledging of late-season broods may extend into the third week of September throughout the breeding range (Service 2007a). Plover nests consist of a scrape or depression, sometimes lined with beach debris (e.g., small pebbles, shell fragments, plant debris, mud chips). Driftwood, kelp, and dune plants provide protective cover for chicks to avoid predators.

Average clutch size is three eggs with a range from two to six eggs (Page et al. 2009). Both sexes incubate the eggs, with the female tending to incubate during the day and the male at night (Warriner et al. 1986). Plover chicks are precocial, leaving the nest with their parents within hours of hatching (Service 2007a). Chicks are nonvolant (i.e., incapable of flight) for approximately one-month post-hatching. Broods rarely remain in the nesting area after hatching (Warriner et al. 1986, Lauten et al. 2010). Casler et al. (1993) reported broods will generally remain within a one-mile (1.6 km) radius of their nesting area; however, in some cases broods will travel as far as four miles (6.4 km). Adult plovers frequently will attempt to lure people and predators from hatching eggs and chicks with alarm calls and distraction displays.

Coastal habitats used for nesting include sand spits, dune-backed beaches, beaches at creek and river mouths, and salt pans at lagoons and estuaries (Wilson 1980, Page and Stenzel 1981). Plovers nest less commonly on bluff-backed beaches, dredged material disposal sites, salt pond levees, dry salt ponds, and gravel river bars (Wilson 1980, Page and Stenzel 1981, Tuttle et al. 1997, Powell et al. 2002).

In winter, plovers are found on many of the beaches used for nesting, as well as beaches where they do not nest. They also occur around man-made salt ponds and on estuarine sand and mud flats. In California, most wintering plovers concentrate on sand spits and dune-backed beaches. Some also occur on urban and bluff-backed beaches, which they rarely use for nesting (Page and Stenzel 1981, Page et al. 1986). South of San Mateo County, California, wintering plovers also use pocket beaches at the mouths of creeks and rivers on otherwise rocky substrates (Page et al. 1986). Roosting plovers will sit in depressions in the sand made by footprints and vehicle tracks, or in the lee of kelp, driftwood, or low dunes in wide areas of beaches (Page et al. 2009).

Population Status

The plover breeds primarily on coastal beaches from southern Washington to southern Baja California, Mexico. Historical records indicate that nesting plovers were once more widely distributed and abundant in coastal Washington, Oregon, and California (Service 2007a). In Washington, plovers formerly nested at five coastal locations (Washington Department of Fish and Wildlife 1995) and at over 20 sites on the coast of Oregon (Service 2007a). In California, by the late 1970s, nesting plovers were absent from 33 of 53 locations with breeding records prior to 1970 (Page and Stenzel 1981).

The first abundance estimates for coastal populations of the plover in California came from surveys conducted during the 1977 to 1980 breeding seasons by Point Reyes Bird Observatory (Page and Stenzel 1981), where surveyors recorded a total of 1,566 adult plovers during the 4-year survey period. The results of the surveys suggested that the plover had disappeared from significant parts of its coastal California breeding range by 1980 (Service 2007a).

In 2019, the Service detected 2,223 adult plovers range wide during breeding season surveys conducted in all six recovery units (Service, unpublished data). Most breeding adults were from California (1,744), followed by Oregon (381) and Washington (98). During winter window surveys in 2020, the Service detected 4,613 plovers range wide. As with breeding season surveys, most wintering plovers were from California (4,154), followed by Oregon (384) and Washington (75).

Yellow-billed Cuckoo, Western DPS

The Service listed western DPS yellow-billed cuckoo (cuckoo) as threatened on October 3, 2014 (79 FR 59992). On September 16, 2020 (85 FR 57816), the Service published a not-warranted 12-month finding on a petition to delist the cuckoo.

The species breeds only during mid-summer presumably due to a seasonal peak in large insect abundance (Rosenberg et al. 1982). Chick development is very rapid with a breeding cycle of 17 days from egg-laying to fledging. Following a relatively short period of post-fledging juvenile dependency, cuckoos migrate south from approximately mid-August to early September. The species migrates to South America during the nonbreeding season.

The cuckoo is a riparian obligate species. Its primary habitat association is willow-cottonwood riparian forest, but other species such as alder (*Alnus glutinosa*) and box elder (*Acer negundo*) may be an important habitat element in some areas, including occupied sites along the Sacramento River (Laymon 1998). Nests are primarily in willow trees; however, other species are occasionally used, including cottonwood and alder. Along the Sacramento River, English walnut trees and more rarely prune, plum, and almond trees in adjacent orchards have also been reportedly used for nesting (Laymon 1980). Several nests on the Sacramento River were draped with wild grape (Gaines and Laymon 1984, Laymon 1998). Nest site height in willow trees average 4.3 meters (m) (14.1 ft), but those in cottonwood trees have been reported at 30 m (98.4 ft). Canopy cover is typically dense (averaging 96.8 percent at the nest) and large patch sizes (generally greater than 20 ha [49.4 ac]) are typically required (Laymon 1998).

While cuckoos nest primarily in willow (*Salix* spp.) trees, cottonwood (*Populus fremontii*) trees are important as foraging habitat, particularly as a source of insect prey. All studies indicate a highly significant association with relatively expansive stands of mature cottonwood-willow forests, especially dynamic riverine habitats where the river is allowed to meander, and willows

and cottonwoods can regenerate on point bars and stream banks (Grecco 2008). However, cuckoos will occasionally occupy a variety of marginal habitats, particularly at the edges of their range (Laymon 1998). Continuing habitat succession has also been identified as important in sustaining breeding populations (Laymon 1998). Meandering streams that allow for constant erosion and deposition create habitat for new rapidly-growing young stands of willow, which create preferred nesting habitat conditions. Channelized streams or levied systems that do not allow for these natural processes become over-mature and presumably less optimal (Grecco 2008).

Along the Sacramento and Feather Rivers, primary factors influencing nest site selection include the presence of cottonwood and willow riparian forest, patch size, and density of understory vegetation. Laymon and Halterman (1989) found a significant trend toward increased occupancy with increased patch size. In California, except for the population along the Colorado River, cuckoos occupied 9.5 percent of 21 sites 20 to 40 ha in extent, 58.8 percent of 17 sites 41 to 80 ha in extent, and 100 percent of 7 sites greater than 80 ha in extent (Laymon and Halterman 1989). On the Sacramento River, Halterman (1991) found that the extent of patch size was the most important variable in determining occupancy.

Population Status

The cuckoo's population has declined significantly in recent decades due to habitat loss and degradation, and the species' conservation status remains threatened (Service 2020b). The bird's range has become more fragmented, and its populations have become more isolated and vulnerable to environmental stressors. Recovery efforts for the yellow-billed cuckoo include habitat restoration, management, and protection, as well as research and monitoring to improve understanding of the species' ecology and population dynamics (Service 2020b).

In California, where much of its historical range has been greatly reduced, cuckoos still occur in isolated sites in the Sacramento Valley from Tehama to Sutter Counties, along the South Fork of the Kern River, and in the Owens Valley, Prado Basin, and Lower Colorado River Valley (Gaines and Laymon 1984, Laymon 1998). Studies conducted since the 1970s indicate that there may be fewer than 50 breeding pairs in California (Gaines 1977, Laymon and Halterman 1987, Halterman 1991, Laymon et al. 1997). While a few occurrences have been detected elsewhere recently, including the Eel River, the only locations in California that currently sustain breeding populations include the Colorado River system in Southern California, the South Fork Kern River east of Bakersfield, and isolated sites along the Sacramento River in Northern California (Laymon and Halterman 1989, Laymon 1998).

Reptiles

Northwestern Pond Turtle

In July 2012, the Service was petitioned to list 53 species of reptiles and amphibians, including the western pond turtle (*Actinemys marmorata*), as threatened or endangered under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531). The Service published a substantial 90-day petition finding on April 10, 2015 (80 FR 19262). After publication of the 90-day finding, the western pond turtle was split into two separate species: the northwestern pond turtle (*Actinemys marmorata*) and southwestern pond turtle (*Actinemys pallida*). The Service published a proposed rule to list both species as threatened, with a Section 4(d) rule, on October 3, 2023 (88 FR 68370).

Turtles are semi-aquatic, having both terrestrial (hereafter “upland”) and aquatic life history phases. Eggs are laid in upland habitat, and hatchlings, juveniles, and adults use both upland and aquatic habitat. The amount of time spent on land varies by location and aquatic habitat type. Upland environments are required for nesting, overwintering and aestivation (i.e., warm season dormancy), basking, and movement and dispersal. Aquatic environments are required for breeding, feeding, overwintering, sheltering, basking, and movement and dispersal. The turtle can be found in perennial or intermittent water bodies including streams, rivers, irrigation ditches, ponds, lakes, and reservoirs.

The historical range of the turtle extends along the Pacific Coast from British Columbia, Canada, south to southern California. In Washington the turtle occurs mainly in the vicinity of the Puget Sound and in Oregon the turtle occurs throughout the state west of the Cascade Range. In California, the turtle range includes the entire northern two-thirds of the state except in the Sierra Nevada and the central coast. A small portion of the range extends east into Nevada in the Lake Tahoe region (see range maps in Ernst and Lovich 2009 and Stebbins and McGinnis 2018). The congeneric southwestern pond turtle (*Actinemys pallida*) occurs along the central and southern California coast south into Baja, Mexico.

Turtles have been found at sites from brackish estuarine waters at sea level up to 2,048 meters (Ernst and Lovich 2009) but mostly occur below 1,371 m (Stebbins and McGinnis 2018). Populations in the vicinity of Puget Sound, the Columbia Gorge, and the Carson and Truckee Rivers in Nevada are considered to be isolated from other populations (Holland 1994).

Population Status

Historical accounts from Vancouver Island and mainland British Columbia, Canada in the lower Fraser River watershed may represent transplanted individuals; no reports of the species are known from either region since 1966 (Gregory and Cambell 1984 in Ernst and Lovich 2009), and turtles are considered extirpated from British Columbia, Canada (Ministry of Environment 2012). Single records from southwestern Idaho and Grant County, Oregon (Nussbaum et al. 1983 in Ernst and Lovich 2009) are likely introduced (Ernst and Lovich 2009), and other isolated populations within the turtle’s native range may also represent introductions (Thomson et al. 2016).

Manzo et al. (2021) collated rough estimates of turtle population sizes from available peer-reviewed literature, reports, and unpublished data sets and found that population size averaged 20.7 individuals (range = 1 to more than 100 individuals): sites with the highest population estimates occurred along the Trinity River in Trinity County, California, and in parts of California’s Central Valley (Fresno and Kern counties). While there were several populations estimated over 100 individuals in California and one site with over 100 individuals in Nevada, there was only one population estimated to be over 50 individuals in Oregon (Manzo et al. 2021). Two sites with a mean annual capture of less than 1 individual per year were both in arid Kern County, California (Manzo et al. 2021).

In Washington, current population estimates are derived from mark-recapture efforts, population models, and the minimum numbers of northwestern pond turtles observed during surveys at all six turtle sites (Hallock et al. 2017, Bergh and Wickhem 2022, Washington Department of Fish and Wildlife 2022). The total minimum estimated population of northwestern pond turtles in Puget Sound and Columbia Gorge was approximately 481 and 281, respectively (although this total involves summing population sizes across years).

Amphibians

Foothill Yellow-legged Frog, North Feather River DPS

The foothill yellow-legged frog (frog) was listed as distinct population segments in 2023. The North Feather DPS of foothill yellow-legged frog was listed as threatened (88 FR 59698).

Throughout the range of the species, breeding typically takes place between late March and early July (Zweifel 1955, Yarnell et al. 2013), during the transition from wet season to dry season. Onset and duration of the frog breeding season is plastic and closely linked to the natural hydrologic cycle (Wheeler and Welsh 2008) and water temperature (Kupferberg 1996, Wheeler et al. 2018). Initiation of breeding activity and oviposition (i.e., egg-laying) is extremely variable among years and by geography, but in general the initiation of breeding occurs during a gradual decrease in stream flow rate while water temperatures rise above 50°F (Kupferberg 1996, Wheeler and Welsh 2008, Yarnell et al. 2013, Hayes et al. 2016, Wheeler et al. 2018). Breeding may occur earlier during low base-flow years and later during high base-flow years (Kupferberg 1996 (Eel River); Wheeler and Welsh 2008 (Hurdygurdy Creek); Yarnell et al. 2013 (North Fork American)). However, studies in some locations also suggest that initiation of breeding activity is more closely linked to photoperiod (i.e., day of the year) than to interannual variations in streamflow (Gonsolin 2010). Male frogs begin breeding vocalizations when water levels and flow rates decrease following rain and snowmelt runoff events (Wheeler et al. 2018). Temporary cessation of breeding activity has been observed when rain events increase stream flow (Wheeler and Welsh 2008, Gonsolin 2010). This may occur because higher flows submerge male calling sites and underwater velocities would be too high for oviposition (Wheeler and Welsh 2008). In Oregon, larger populations (i.e., those with more than 100 breeding adults) consistently had longer periods of breeding activity than smaller populations and researchers potentially attributed the longer breeding season duration to the influence of population abundance (unpublished data cited in Hayes et al. 2016).

During the breeding season, frogs exhibit different movement strategies with some individuals moving very little (“sedentary” individuals that appear to establish home ranges or defend territories) and others moving greater distances without appearing to establish home ranges (“mobile” individuals). Many male frogs establish small calling territories at lek sites during the breeding season (Wheeler and Welsh 2008).

Food habit studies indicate that post-metamorphic frogs are generalist predators, primarily of insects; they eat mostly terrestrial but also aquatic invertebrates. Stomach contents have included grasshoppers, beetles, mosquitoes, hornets, bees, wasps, termites, ants, water striders, other flies, moths, aquatic snails, true bugs, and spiders (Fitch 1936, Haggarty 2006, Storer 1925, Van Wagner 1996). Haggarty (2006) found no differences in the selection of prey by age class.

The frog is a stream-obligate species that typically occurs from sea level to approximately 5,000 feet elevation (pers. comm. cited in Department 2019). The frog occurs in a wide variety of vegetation types including valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, mixed chaparral, and wet meadow (Hayes et al. 2016). The extensive range of the frog demonstrates the species’ non-specificity in vegetation type and macroclimate of the species’ terrestrial habitat component. Frogs are primarily observed in or along the edges of streams (Zweifel 1955; Kupferberg 1996). Most frogs breed along mainstem water channels and overwinter along smaller tributaries of the mainstem channel (Kupferberg 1996, GANDA 2008). Stream morphology is a strong predictor of breeding habitat

because it creates the microhabitat conditions required for successful oviposition, hatching, growth, and metamorphosis. Frogs that overwinter along tributaries often congregate at the same breeding locations along the mainstem each year (Kupferberg 1996, Wheeler and Welsh 2008). During the non-breeding season, the smaller tributaries provide refuge while the larger breeding channels may experience overbank flooding and high flows (Kupferberg 1996). Habitat elements that provide both refuge from winter peak flows and adequate moisture for frogs include pools, springs, seeps, submerged root wads, undercut banks, and large boulders or debris at high-water lines (van Wagner 1996, Rombough 2006b).

Unless disturbed, hatchling tadpoles remain with the egg mass remnants for several days, and then disperse into the interstices of the local gravel bed, often moving downstream in areas of moderate flow (Ashton 2007). Following metamorphosis, Twitty et al. (1967) observed an upstream bias in movement; >90 percent of recently metamorphosed frogs moved upstream. Data on post-metamorphic frog movements come primarily from mark-recapture and radiotelemetry investigations in the Coast Range and Sierra Nevada. In general, adult frogs moved their greatest distances in the spring, when moving to and away from breeding sites (Van Wagner 1996, Wheeler et al. 2006). Several studies found that females moved greater distances than males; females have been reported to move thousands of meters (Bourque 2008; GANDA 2008; Gonsolin 2010; Wheeler et al. 2006), with a maximum observed distance of 4.35 miles (Bourque 2008). Movement was more restricted during the nonbreeding season (Van Wagner 1996), and males may remain near the breeding area for months after breeding activity ends (Wheeler et al. 2006). Movements in the spring were not associated with weather variables; however, fall and winter movements were associated with increasing rain and humidity (Bourque 2008).

Although frogs typically remain near the stream channel (less than 39.4 ft) and use watercourses as movement corridors (Bourque 2008), juveniles and adults have been observed moving into upland habitats, off-channel pools, or smaller tributary streams during the nonbreeding season (GANDA 2008). Young-of-the-year metamorphs have been recaptured in upland traps during the fall (Twitty et al. 1967) and adults have also been observed moving upslope during fall rains (Jennings 1990). Frog movement away from the river channel may be a behavioral response to avoid high discharge.

Population Status

There is substantial evidence that the frog is biogeographically divided into multiple clades with little or no gene flow between the clades. Earlier studies provided strong evidence that there are deep genetic divisions in this taxon (Lind et al. 2011, Peek 2010). Subsequent, more in-depth and rangewide genetic studies (McCartney-Melstad et al. 2018, Peek 2018) confirmed the certainty and depth of the phylogenetic divisions using population genomics (study of genome-wide patterns of DNA sequence variation). The two rangewide genomic studies revealed that there are six discrete genetic clades within the range of the frog (McCartney-Melstad et al. 2018, Peek 2018).

The historical distribution of the frog extended from the Willamette River drainage in Oregon south to at least the Upper San Gabriel River in Los Angeles County, California. The current distribution of the frog generally follows the historical distribution of the species except with range contractions in the southern and, to a lesser extent, northern parts of the species' range. The predicted range of the frog is represented by the boundaries of the distinct population

segments (Department 2019, Service 2021a). The North Feather frog is located primarily in Plumas and Butte counties. This DPS occupies the transition zone between the northern Sierra Nevada, Southern Cascades Foothills, and Tuscan Flows ecoregions. The Tuscan Flows is an ecoregion that is geologically related to the Cascades but also has similarities to the Sierra Nevada Foothills ecoregion, as described by the Environmental Protection Agency's Level IV Ecoregions (Omerick and Griffith 2014, Griffith et al. 2016). The North Feather frog differs from the surrounding watersheds in terms of geology and aspect (Peek et al. 2019 as cited in Service 2021b) and is the only known area where the frog and Sierra Nevada yellow-legged frog currently coexist (Peek et al. 2019 as cited in Service 2021b). As expected by its position at the northern end of the Sierra Nevada Range, the North Feather frog averages cooler and wetter than the DPSs to the south (PRISM Climate Group 2012, 30-year climate dataset in Service 2021b).

Western Spadefoot, Northern DPS

The western spadefoot (spadefoot) was analyzed as two different distinct population segments: northern and southern. The Service published a proposed rule to list both DPS as threatened, with a Section 4(d) rule, on December 5, 2023 (88 FR 84252), but did not propose designation of critical habitat due to a lack of sufficient data from which to perform an analysis.

Spadefoots are primarily terrestrial and inhabit underground burrows. Radio tagged individuals in southern California were found in underground burrows from 1 cm to 18 cm (0.4–7 in.) depth below the surface during the breeding season (Baumberger et al. 2019). It is estimated that spadefoot individuals can burrow approximately 1 m (3 ft) below ground during the dry season to avoid temperature extremes and desiccation (Stebbins and McGinnis 2012). During a majority of their life cycle, spadefoot remains in a torpor state in underground burrows in upland areas surrounding their aquatic (breeding) habitat (Ruibal et al. 1969). Spadefoots emerge from their burrows to forage and breed in ephemeral pools following seasonal rains in winter and spring (Dimmitt and Ruibal 1980, Jennings and Hayes 1994, Thomson et al. 2016). Emergence is likely related to a sound or vibration cue from the rain (Dimmitt and Ruibal 1980). Most surface activity is nocturnal, presumably to reduce water loss (Morey 2000). Depending on temperature and annual rains, spadefoot breeding and oviposition generally occurs from October to May, most often in temporary pools and non-flowing drainage areas from winter or spring rains (Stebbins 1985, Thomson et al. 2016). Radio tagged individuals, both male and female, have been found at breeding pools in consecutive years, indicating it is likely that individuals can breed consecutive years (Baumberger et al. 2020). Laboratory experiments have found that water temperatures in pools must be between 9 and 30°C (48–86°F) for spadefoot embryos to successfully develop (Brown 1967).

Field observations suggest breeding calls are audible at great distances and serve to bring individuals together at suitable breeding sites (Stebbins 1985). During breeding, highly vocal aggregations of more than 1,000 individuals may have historically formed (Jennings and Hayes 1994). Females deposit eggs in numerous, small, and irregular cylindrical clusters of 10 to 42 eggs, with an average of 24 eggs (Storer 1925, Stebbins and McGinnis 2012). Females may lay 300–500 eggs in one season (Morey 2005). Eggs are deposited on plant stems or pieces of detritus in temporary rain pools, or sometimes in the pools that form as ephemeral streams dry (Storer 1925, Stebbins and McGinnis 2012). Eggs hatch in less than 1 day to 6 days depending on the temperature (Brown 1967). Field observations have found that at relatively high-water temperatures, approximately 21°C (70°F), spadefoot eggs may fail to develop, possibly due to a fungus that thrives in warmer water temperatures and invades spadefoot eggs (Storer 1925,

Brown 1967). Larval (tadpole) development can be completed in 3 to 11 weeks depending on food resources and temperature and must be completed before the pools dry (Burgess 1950, Feaver 1971, Morey 1998). Larval development occurs more rapidly in warming pools (Feaver 1971, Morey 1998). The turbid water sometimes found in the aquatic pools provide cover for larvae (Morey 2005). Metamorphosing larvae may leave the water while their tails are still relatively long (greater than 1 cm (0.4 in.)) and move toward suitable terrestrial burrowing habitat (Storer 1925).

Age of sexual maturity is unknown but considering the relatively long period of subterranean dormancy (8 to 10 months) individuals may require at least 2 years to mature (Jennings and Hayes 1994, Thomson et al. 2016). Based on laboratory studies, increased food availability may cause males to reach sexual maturity sooner (~one year from metamorphosis) than males that receive lower amounts of food (Morey and Reznik 2001). Regardless of food levels, females have not been found to reach sexual maturity by one year based on the presence or absence of eggs, therefore females likely do not reach sexual maturity until the second breeding season after metamorphosis (Morey and Reznik 2001). Longevity of spadefoot is unknown, but experts estimate it to be about 5 to 6 years (Service 2023c).

Spadefoot habitat is primarily open treeless grasslands, scrub, or mixed woodland and grassland where aquatic breeding habitat is available (Stebbins and McGinnis 2012). Spadefoots require both aquatic and terrestrial habitat components in close proximity, within the dispersal distance of the species, to meet all life history requirements. Spadefoots are primarily terrestrial and require upland habitats for feeding and for constructing burrows for long dry-season dormancy. Spadefoots have been found to favor areas with grassland cover for burrow sites (Baumberger et al. 2019, Rose et al. 2020, Rose et al. 2022). Aquatic habitat is used for breeding and developing larvae and typically includes temporary vernal pools, sand or gravel washes, and small streams that are often seasonal (Stebbins and McGinnis 2012). However, eggs and larvae of spadefoot have been observed in a variety of permanent and temporary wetlands, both natural and altered, including rivers, creeks, artificial ponds, livestock ponds, sedimentation and flood control ponds, irrigation and roadside ditches, roadside puddles, tire ruts, and borrow pits, indicating a degree of ecological plasticity (Diversity Database 2019). Although spadefoot has been observed to inhabit and breed in wetlands altered or created by humans, survival and reproductive success in these pools has not been evaluated relative to that in unaltered natural pools. Temporary wetlands may be optimal aquatic breeding habitat due to reduced abundance of both native and nonnative predators, many of which require more permanent water sources (Jennings and Hayes 1994, Stebbins and McGinnis 2012, Thomson et al. 2016). Climate tends to differ throughout the range of spadefoot.

Little is known regarding the land surface types spadefoot are able to move across or distance that western spadefoot may range from aquatic resources for dispersal. A study looking at movement of spadefoot individuals in an Orange County, California, population found that the mean distance individuals moved away from breeding pools was 40 m (± 37) (131 ft), with the longest movement of an individual being 262 m (860 ft), however the study was done during a dry year (Baumberger 2013). A study in the same population of spadefoot in Orange County, California, found that the maximum upper 95 percent limit posterior predictive distribution for distance to breeding pool was 460 m (1509 ft), and the maximum distance a spadefoot dispersed was 605 m (1985 ft) (Service 2023c) during a wet year, highlighting the difference that precipitation makes in maximum movement distances recorded (Baumberger et al. 2020).

Population Status

Within the planning area spadefoot occur in the Northwestern and Northeastern Sacramento Valley vernal pool regions. The Northwestern Sacramento Valley vernal pool region extends from the Redding area of Shasta County south to the Williams area of Colusa County, also including parts of Glenn and Tehama counties. The overall condition of the Northwestern Sacramento Valley region is estimated to be low (Service 2023c). Out of five pools that were surveyed in the Northwestern Sacramento Valley region in 2019, only one had western spadefoot present (U.S. Geological Survey 2021).

The Northeastern Sacramento Valley vernal pool region extends from the Millville Plains to the Sutter Buttes, including parts of Butte, Shasta, Sutter, Tehama, and Yuba counties. It is adjacent to the Northwestern Sacramento Valley vernal pool region, but the two regions differ in soil type. The overall condition of the Northeastern Sacramento Valley region is estimated to be low (Service 2023c). Out of eight pools that were surveyed in the Northeastern Sacramento Valley region in 2019, only one had western spadefoot present (U.S. Geological Survey 2021). The threats that are likely impacting both regions reducing the condition of individual and population needs include a combination of development on unprotected areas, overabundant vegetation, nonnative predators, drought, noise disturbance, wildfire, and the effects of climate change.

Fish

Tidewater Goby

Tidewater goby (*Eucyclogobius newberryi*) (goby) was listed as endangered on February 4, 1994 (59 FR 5494).

The goby is endemic to California and lives exclusively in brackish water coastal lagoons, estuaries, and marshes in California (Swift et al. 1989). Goby habitat is characterized by still, but not stagnant, brackish water (< 0.5 ft/second). Gobies are absent from areas where the coastline is steep, and streams do not form lagoons or estuaries. Adult gobies can withstand a wide range of habitat conditions, including ranges in temperature and salinity (Irwin and Soltz 1984, Swift et al. 1989). They have been documented in waters with temperatures ranging from 46 to 77°F (8 to 25°C), and depths of 10 to 79 in (25 to 200 cm) (Irwin and Soltz 1984, Swift et al. 1989, Smith 1998). Gobies have also been detected at depths of 15 ft (4.6 m) during trawl surveys (Newell 2015). Gobies are typically found in salinities of less than 10 parts per thousand (ppt) (Swift et al. 1989), although they have been observed in water with salinity levels ranging from 0 to 65 ppt (Swift et al. 1989, Swenson 1999, Spies pers. comm. 2020). Adults can withstand sudden increases in salinity, but sudden salinity increases are lethal to larvae and juveniles (Hellmair and Kinziger 2014).

Gobies are generally found over substrate that has a high percentage of sand and fine gravel (Worcester 1992), but they are also found over mud or gravel substrates (Swenson 1995). Tidewater gobies use emergent and submergent aquatic vegetation for shelter and refuge from predators and high-water flows (Worcester 1992, Moyle 2002). Tidewater gobies often migrate upstream and are commonly found up to 0.5 mi (1 km) up from a lagoon or estuary (Service 2005a); however, they have been recorded as far as 3 to 7.3 mi (5 to 11.7 km) upstream of tidal lagoon areas (Irwin and Soltz 1984, Swift et al. 1997).

Gobies feed on small invertebrates, including amphipods, ostracods, snails, mysids, and aquatic insect larvae, particularly chironomid larvae (Swift et al. 1989). Predators of gobies include

staghorn sculpin (*Leptocottus armatus*), prickly sculpin (*Cottus asper*), starry flounder (*Platichthys stellatus*), largemouth bass (*Micropterus salmoides*), other predatory fish, and native birds (Swift et al. 1989, Swift et al. 1997).

The goby is primarily an annual species (Swift et al. 1989, Hellmair and Kinziger 2014), although there is some variation in life history and some individuals have lived up to 3 years in captivity (Swenson 1999). If reproductive output during a single year fails, few if any gobies survive into the next year. Goby reproduction can occur year-round with spawning typically peaking in the spring and summer (Goldberg 1977, Swift et al. 1989). Gobies are repeat spawners (Goldberg 1977, Swenson 1995). In captivity, researchers have observed males and females breeding approximately 4 to 6 times, with one extreme instance of 12 times, within their 1-year life span (Swenson 1995, Swenson 1999). Reproduction occurs in waters with no to low salinity (0 to 20 ppt) and mild temperatures ranging from 59 to 77°F (15 to 25 °C) (Swift et al. 1989, Spies and Steele 2016).

Male gobies select coarse sandy substrate for breeding and dig burrows at least 3 to 4 in (7 to 10 cm) apart (Swift et al. 1989, Swenson 1995). Both males and females engage in courtship displays, but unlike most gobiid species, females compete more intensely than males for access to mates (Swift et al. 1989, Swenson 1997). Once chosen by a male, females deposit eggs into burrows (Swift et al. 1989, Swenson 1995). Swift et al. (1989) conducted egg counts in gravid female tidewater gobies that ranged from 179 to 594 eggs and determined egg number is positively correlated with female body size. Swenson (1999) counted 362 to 1010 mature eggs in gravid females (mean 607, n = 23). Clutches collected in the field in artificial burrows (PVC tubes) ranged from 100 to 1000 fertilized eggs (mean 407, n = 163) (Swenson 1999). Males remain in the burrows to guard the eggs and fan the eggs to circulate water, frequently foregoing feeding (Moyle 2002).

Goby larvae emerge approximately 9 to 11 days after eggs are laid and are approximately 0.16 to 0.24 inch in standard length (Swift et al. 1989, Swenson 1997, Service 2005a). Larval traits (larval duration, size at settlement, and growth rate) are correlated with water temperature, which varies considerably in the seasonally closed estuaries that tidewater gobies inhabit (Spies and Steele 2016). Larval gobies inhabit vegetation in the mid-layers of the water column for 18 to 31 days, growing to lengths of 0.39 to 0.71 in (10 to 18 mm) (Swift et al. 1989, Spies et al. 2014). Upon entering the juvenile and adult life stages, gobies become substrate-oriented, spending most of their time on the bottom rather than in the water column (Swift et al. 1989). Vegetation remains important for adult gobies because it provides refuge from high water flows over winter and goby densities are greatest among emergent and submerged vegetation (Moyle 2002).

Because gobies typically live for approximately 1 year and inhabit a seasonally changing environment, population sizes vary greatly spatially and seasonally, with recorded density estimates ranging from zero to 198 individuals per square meter (11 sq ft) within a single population (Swenson 1999). However, when present, tidewater gobies are frequently the most abundant fish species found at a site (Lafferty et al. 1999a). After the spring spawning season, there is typically an annual die-off of adults (Swenson 1995, Swift et al. 1989). While there is, in general, a seasonality to increases and declines, not all localities synchronously follow the same pattern because of locality-specific differences in lagoonal processes and the number and type of predator and competitor species. When habitat conditions are favorable, repeat spawning can allow tidewater gobies to undergo a 10 to 100 times increase over several months. Similarly, a

change in habitat conditions or the arrival of predators in a lagoon can substantially reduce even sizable tidewater goby populations, over weeks or potentially in as short as a few hours (such as when a highly perched lagoon rapidly de-waters after a sandbar breach).

Population Status

The goby's range extends from the entire California coast (Service 2005a). Swift et al. (2016) estimates that the southernmost localities of gobies from Aliso Creek in Orange County south through San Diego County have been separated from northern tidewater goby lineages for 2 to 4 million years, and it has been recognized by researchers as a distinct species (*Eucyclogobius kristinae*, the southern tidewater goby) (Swift et al. 2016). However, as of July 2024, the northern and southern tidewater goby remain listed under the Act as one entity.

Across the northern portion of its range (North Coast Recovery unit), populations of gobies are considered fully isolated from one another, because dispersal is extremely rare and post-extirpation recolonizations are almost nonexistent (Kinziger et al. 2015). Local populations of gobies in the remaining southern portion of the range are best characterized as metapopulations (Lafferty et al. 1999a, Holland et al. 2001, Jacobs et al. 2005). The key processes in goby metapopulation dynamics are that some individual lagoon populations may become extirpated during poor climatic conditions but will be subsequently recolonized by nearby stable populations when lagoons are open to the ocean (Lafferty et al. 1999a). Dispersal between lagoons is important for genetic diversity and recolonization of localities after extirpations.

Goby localities, primarily lagoons, are distributed linearly along the California coast, physically separated from each other by areas of land and ocean. Gobies can only disperse by swimming through the nearshore marine environment (the littoral or sublittoral zones in the ocean or, in some cases, marine bays) when localities are open to the ocean. Rocky headlands and stretches without sandy substrate in the nearshore marine environment serve as naturally occurring barriers to dispersal for gobies (Dawson et al. 2001, Barlow 2002). Additionally, manmade structures that alter the natural littoral zone, such as breakwaters and jetties, may reduce the likelihood of successful dispersal by gobies and can also serve as barriers (Earl et al. 2010; Swift et al. 2016). Currently, the most stable populations are in lagoons and estuaries of intermediate size (5 to 124 ac) are relatively unaffected by human activities (Service 2007b).

Gobies enter the marine environment when sandbars are breached during storm events. Lafferty et al. (1999b) demonstrated that gobies were able to disperse at least 5.6 mi (9 km); however, maximum dispersal distances are unknown. The species' tolerance of high salinities for short periods of time enables it to withstand marine environment conditions of approximately 35 ppt salinity, thereby allowing the species to re-establish or colonize lagoons and estuaries following flood events (Swift et al. 1997). Genetic studies indicate that the tidewater goby population is highly geographically structured, indicating that there is low gene flow (Dawson et al. 2001, Dawson et al. 2002) and thus natural recolonization events are likely infrequent.

The North Coast Recovery Unit extends from Smith River in Del Norte County, California to the southern end of Mendocino County, California. The North Coast Recovery Unit forms a discrete clade in phylogenetic analyses (Dawson et al. 2001) and is also differentiated from other units in that all fish observed have complete supraorbital canal structures (Ahnelt et al. 2004).

Kinziger et al. (2015) analyzed temporal genetic variation across 14 goby populations within the North Coast Recovery Unit and failed to recover genetic change expected with extinction—

colonization cycles. Similarly, analysis of site occupancy data from field studies (94 sites) indicated that extinction and colonization were very infrequent. They found strong genetic differentiation between populations and a high degree of within-site temporal stability as consistent with a model of drift in the absence of migration, at least over the past 20 to 30 years, indicating that the gobies within the North Coast Recovery Unit probably exhibit two different population-structuring mechanisms across their geographic distribution. Gobies exhibit a more classic extinction–colonization dynamic in the southern portion of the Unit as compared to a drift in isolation (in the absence of migration) in the northern portion. These data indicate that for goby populations in the North Coast Recovery Unit, natural dispersal is too infrequent to be considered a viable approach for recolonizing extirpated populations, suggesting that conservation and artificial translocation in this portion of their range may be necessary to effectuate recolonization.

The North Coast Recovery Unit is comprised of 6 sub-units in the recovery plan (Service 2005a). In the North Coast sub-units: NC1, 2 of 2 localities are extant (100%); NC2, 3 of 5 localities are extant (60%); NC3, 12 of 20 localities are extant (60%); NC4, 1 of 1 locality is extant (100%); NC5, 2 of 2 localities are extant (100%); and NC6, 1 of 1 locality is extant (100%). In the North Coast Recovery Unit, 9 localities of 31 localities (29%) have been extirpated within the last 5 years (Sutter and Kinziger, 2019).

Insects

Franklin's Bumble Bee

The Service listed Franklin's bumble bee (bumble bee) as endangered on August 24, 2021 (Service 2021c). The species status assessment contains a detailed account of the species and viability assessment through an analysis of its resiliency, representation, and redundancy.

The bumble bee is in the *Bombus* genus and is corbiculate (females have pollen baskets on their hind legs) (Williams et al. 2008). It is short-tongued with a short head, an adaptation for extracting nectar from flowers with short corollas (Koch et al. 2012, Williams et al. 2014). Franklin's bumble bee can also “rob” nectar from flowers with longer corollas by biting holes in the corolla base to access nectar.

The specific life history characteristics, habitat, and behavior of this rare and difficult to find species has not been studied. While little is known about their reproductive biology, specific habitat needs, or unique behavior, this information is available for the *Bombus* genus and some closely related species. These include western bumble bee (*B. occidentalis*), rusty patched bumble bee (*B. affinis*), and yellow-faced bumble bee (*B. vosnesenskii*). As such, we rely on these closely related species, including those that co-occur with the bumble bee, to inform its biological characteristics.

The bumble bee is primitively eusocial, living in colonies made up of a queen and her offspring of non-reproductive female workers, reproductive males, and reproductive new queens (gynes). Colonies may contain 50 to 400 workers, in addition to the founding (foundress) queen (Plath 1927, Thorp et al. 1983, MacFarlane et al. 1994). Their nesting biology is unknown (Xerces Society and Thorp 2010), but they likely nest underground in abandoned rodent burrows or similar cavities which provide resting and sheltering places, food storage, and room for the colony to grow (Plath 1927, Hobbs 1968, Thorp et al. 1983, Thorp 1999). It may also

occasionally nest on the ground (Thorp et al. 1983) or in rock piles (Plowright and Stephen 1980).

The active flight period is from mid-May through the end of September (Thorp et al. 1983) though a few individuals have been encountered in October (Service 2018a). Colonies have an annual cycle, initiated each spring when solitary queens emerge from hibernation and seek suitable nest sites (Thorp, pers. comm., 2017). Access to blooming flowers and a suitable nest site enables the queen to rear the first workers of a new colony on her own. A “continuous supply of floral resources is required to support the nest-founding stage...because each queen must forage for food as well as tend the nest, potentially limiting her mobility” (Lanternman et al. 2019). In the early stages of colony development, the founding queen (foundress) is responsible for all food collection and care of eggs and larvae. As the colony grows, workers assume food collection duties, colony defense, nest construction, and larval care while the foundress remains in the nest and produces eggs.

Near the end of the colony cycle, gynes and fertile males are produced. Males patrol selected territories and mark them with queen-attracting scent. After mating, queens feed to build up fat before entering hibernation. At the end of the colony cycle, all workers and males die along with the founding queen; only the inseminated hibernating gynes are left to carry on the line into the following year (Duchateau and Velthuis 1988).

Colony survival and productivity relies on continual access to blooming plant species throughout the spring, summer, and early fall, as well as protection from outside threats. The period of colony establishment, growth, and development before new reproductive individuals are produced and leave the nest may be described as the critical colony period. Prior to this time, protection of the nest is imperative, such that the reproductive potential of the colony (i.e., males and new gynes) for the subsequent season is not reduced. Only the gynes can overwinter to initiate new colonies in the following spring, having mated with a male in the fall and storing the sperm until the next season. The Service considers the critical colony period for Franklin’s bumble bee to be May 15 through August 31. During this period (a subset of the active flight season), the colony is expected to complete most production of fertile males and gynes, as demonstrated by the species’ estimated pattern of seasonal flight activity by caste (Thorp et al. 1983). In other words, after September 1, most males and gynes are expected to have left the nest and be observable in flight. This timing of the critical colony period is similarly represented in the closely related western bumble bee.

Bumble bees are generalist foragers that gather pollen and nectar from a wide variety of flowering plants (Xerces Society 2013). They vibrate their flight muscles when inside a flower, causing pollen to fall from the plant anthers and stick to their abundant body hairs. This behavior of “buzzing” is also known as sonication (Williams et al. 2014).

The bumble bee has been found at a broad elevational range in a wide variety of habitats. Substantial floral resources are required, defined as high-quality forage habitat capable of supporting a colony throughout all life stages. Substantial floral resources include the presence of a diverse and abundant group of insecticide-free native flowering plants that provide both pollen and nectar in sufficient quantity and quality throughout a colony’s active flight season (May 15 through September 30; Xerces Society and Thorp 2010). Since substantial floral resources must be available throughout this period, a varied assortment of plant species with staggered floral senescence must be abundant (i.e., no monocultures). This is typically exemplified by existing

meadow systems (i.e., larger open meadows in proximity to seeps and other wet meadow environments).

Studies of other *Bombus* species typically exhibit foraging distances of less than 1 km (0.62 mile) from their nesting sites (Dramstad 1996, Osborne et al. 1999, Knight et al. 2005, Wolf and Moritz 2008, Rao and Strange 2012, Hatfield, pers. comm., 2017). The bumble bee may have a foraging distance of up to 10 km (6 miles) (Thorp, pers. comm., 2017), but the subgenus' typical dispersal distance is most likely 3 km (2 mi) or less (Goulson 2010, Hatfield, pers. comm., 2017). They have been observed collecting pollen from lupine (*Lupinus* spp.) and California poppy (*Eschscholzia californica*) and collecting nectar from horsemint or nettle-leaf giant hyssop (*Agastache urticifolia*) and mountain monardella (*Monardella odoratissima*) (Xerces Society and Thorp 2010). They may also collect or rob pollen and nectar from vetch (*Vicia* spp.) (Xerces Society and Thorp 2010).

Unsubstantial floral resources consist of an aggregation of floral resources that may include some native flowering plants but is dominated by non-native floral forage or invasive flowering weeds (may also include noxious weeds), or areas where blooming periods of floral resources do not span the entire flight season; thus, such areas are considered low-quality forage habitat. Besides floral availability based on blooming periods, areas with low species richness and diversity will also have limited pollen and nectar availability and resources are likely insufficient to support a colony. Therefore, while these unsubstantial floral resources habitats provide some forage potential, these environments are not expected to support a colony throughout all phases of its life cycle.

Overwintering habitat likely includes micro-habitats such as ground cavities, rotting logs, loose soil, and other protected sites for queens to hibernate. Foundress queens require nearby floral resources and suitable nest sites for emerging queens the following spring. Nesting habitat consists of abandoned rodent burrows, bunch grasses, or rock piles. Nests may occur in substantial floral resources or within 100 m of substantial floral resources habitat. Nesting is not anticipated in locations more than 100 m from substantial floral resources. Overwintering habitat consists of chambers 2-15 cm below the ground's surface, within loose organic material. Overwintering habitat is typically in shaded areas under trees, lacking dense vegetation and with loose, well-drained soil. Overwintering habitat is not reasonably certain to occur in locations beyond 100 meters from substantial floral resources. The species needs consist of substantial floral resources throughout the colony cycle, and areas for breeding, shelter, and overwintering which could consist of underground rodent burrows or similar cavities, the interior of rock piles, or decaying logs (Service 2018a, Service 2021c).

High Priority Zones or HPZs are areas more likely to support the bumble bee. To date, 23 HPZs have been identified and mapped across their range by the Service and species experts. They contain all known historic observations of the bumble bee, in addition to modeled habitat characteristics and floral resources most likely to support the species in its range. Each HPZ includes a 3 km buffer around each historic observation to account for typical dispersal and foraging distances (Service 2018a). Thus, HPZs are meant to encompass the highest quality habitat surrounding each historic observation while accounting for a buffer area the species is most likely to utilize for foraging, nesting, dispersal, and overwintering. While HPZs are not definitive, they are a biologically based decision support tool derived from the best available information for the species to date. They will be updated as additional survey and habitat data is collected (Everett pers. comm. 2022).

Population Status

The bumble bee is restricted to the Klamath Mountain region of southern Oregon and northern California (Frison 1922, Stephen 1957, Plowright and Stephen 1980, Thorp et al. 1983, Williams 1998, Xerces Society and Thorp 2010). Observations occurred at a range of elevations from 162 m (540 feet) to over 2,340 m (7,800 ft). It has been found in an area approximately 306 km (190 miles) from north to south, and 70 miles 113 km (70 mi) east to west, across Douglas, Jackson, and Josephine counties in southern Oregon, and in Siskiyou and Trinity Counties in northern California (Thorp 1999, Thorp 2005c, International Union for Conservation of Nature 2009).

There is a high degree of uncertainty pertaining to the current occurrence of populations. The last sighting of the bumble bee was in 2006 on Mt. Ashland in southern Oregon, and there are no known current populations distributed across any level of ecological conditions or spatial extent, despite numerous survey efforts in high quality habitat in and near historical observations (Service 2018a). The risk of extinction is high, the suspected threats to the species persist, and the number of remaining bumble bees is presumably very small (Service 2021c). However, the species is small, difficult to detect, and there are large areas of habitat that may support the species have not been surveyed. The 2018 species status assessment describes the repeated surveys where the bumble bee was observed in the past but has not been detected since. However, the lack of systematic surveys across its historical range precludes the assumption the species is extinct (86 FR 47221).

Monarch Butterfly

The Service determined that the listing of the monarch butterfly (monarch) was warranted but precluded by higher priority listing actions on December 15, 2020 (Service 2020c). As a candidate species, the monarch's listing status will be reconsidered in 2024, or earlier if warranted. The Service completed a species status assessment for the monarch as part of its evaluation on September 1, 2020 (Service 2020d).

The monarch is a species that is globally distributed throughout 90 countries, islands, and island groups, including within North, Central, and South America; Australia; New Zealand; islands of the Pacific and Caribbean; and elsewhere (Malcolm and Zalucki 1993). Both monarchs and milkweed likely dispersed from North America via human assistance, potentially aided through wind dispersal events (Brower 1996). After careful examination of the literature and consultation with experts, there is no clearly agreed upon definition of potential subspecies of *Danaus plexippus* or where the geographic borders between these subspecies might exist. Given these findings, the Service assumed in the species status assessment that monarchs in locations outside of North America have become naturalized, and thus, these records, along with the North American occurrences, comprise the historical range of the species.

Monarchs lay their eggs on their obligate milkweed host plant (primarily *Asclepias* spp. in North America; *Asclepias* spp., *Gomphocarpus* spp., and *Calotropis* spp. outside of North America) during the breeding season and larvae emerge after 2 to 5 days (Blakley and Dingle 1978, Zalucki 1982, Buden and Miller 2003). The larvae develop through five larval instars (intervals between molts) over a period of 9 to 18 days, feeding on milkweed and sequestering cardenolides as a defense against predators (Parsons 1965). The larva then pupates into a chrysalis before emerging 6 to 14 days later as an adult butterfly.

The monarch life cycle varies by geographic location. Due to the year-round presence of milkweed and suitable temperatures, many of the global monarch populations breed year-round

and repeat the above-referenced life cycle throughout the year. Individual monarchs in temperate climates, such as eastern and western North America, produce multiple generations of monarchs during the summer breeding season, with most adult monarchs living approximately 2 to 5 weeks. In the fall, North American monarchs undergo long-distance migration to their overwintering sites, where the migratory generation of adults suspends reproduction and lives for 6 to 9 months (Cockrell et al. 1993, Herman and Tartar 2001). Surviving monarchs mate at the overwintering sites before dispersing in mid-winter to early spring (January-March) (Leong et al. 1995, van Hook 1996). The same individuals that undertook the initial southward migration begin flying back through the breeding grounds and their offspring start the cycle of generational migration over again (Malcolm et al. 1993).

Migratory individuals in eastern North America predominantly fly south or southwest to mountainous overwintering grounds in central Mexico, resulting in monarchs traveling distances of over 1,864 miles for over 2 months (Urquhart and Urquhart 1978, Brower 1996). Monarchs seek refuge in a variety of roosting trees along the fall migration route. Migratory individuals in western North America generally fly shorter distances south and west to overwintering groves along the California coast into northern Baja California (Solensky 2004). Data from monarchs tagged in the southwestern states in the fall suggest that those in Nevada migrate to California, those in New Mexico migrate to Mexico, and those in Arizona migrate to either Mexico or California (Southwest Monarch Study Inc. 2018).

Adult monarch in many of the global populations do not migrate, due to the presence of milkweed and suitable temperature, and need nectar and milkweed resources year-round. Adult monarch in eastern and western North America, require a diversity of blooming nectar resources to feed on throughout their migration routes and breeding grounds (spring through fall). Monarchs also need milkweed, for both oviposition and larval feeding, throughout this diverse nectaring habitat. The correct phenology of both monarchs and nectar plants and milkweed is important for monarch survival. The position of these resources on the landscape is important as well. In western North America, nectar and milkweed resources are often associated with riparian corridors; and milkweed may function as the primary nectar source for monarchs in more arid regions (Dingle et al. 2005, Dilts et al. 2018, Pelton et al. 2018, Waterbury and Potter 2018).

Migratory monarchs in the western population primarily overwinter in groves a mix of native and nonnative trees along the coast of California and Baja California (Jepsen and Black 2015). There are approximately 400 groves that have been occupied, but only a portion of these sites is occupied in any given year. These sites, typically close to the coast, span approximately 1.225 kilometers of coastline (COSEWIC 2010). These groves are populated by a variety of tree species, including blue gum eucalyptus (*Eucalyptus globulus*), Monterey pine (*Pinus radiata*), and Monterey cypress (*Hesperocyparis macrocarpa*) (Griffiths and Villablanca 2015), all of which act as roost trees. These groves provide indirect sunlight for the overwintering monarchs, sources of moisture for hydration, defense against freezing temperatures, and protection against strong winds (Tusk and Brower 1978, Leong 1990, Leong 1999). The close proximity to the coast (average distance of $2.37 \text{ km} \pm 0.39 \text{ SE}$) also provides a mild winter climate (Leong et al. 2004).

Population Status

The monarch has occurrence records in 90 countries, islands, and island groups. The Service delineated these occurrences into 31 historical populations within 8 geographical units, referred to as adaptive capacity units (ACUs). The eight ACUs are designated as the Australian, New Zealand, and Indo-Pacific Islands; Central America and the Caribbean; South Florida; Hawaii; the Iberian Peninsula; South America and Aruba; eastern North America; and western North America. The species status assessment estimated population sizes of 77,141,600 individuals in eastern North America (based on average of the last 5 years overwintering estimates, assuming a 21.1 million monarch/ha density), 168,365 individuals in western North America (based on average of past 5 years of overwintering counts), 1,424,790 individuals within Australia (based on estimates from M. Zalucki, The University of Queensland (Australia), pers. comm. 2017), and 3-5 million individuals outside of Australia and North America (Zalucki pers. comm. 2017).

The species status assessment determined that 27 of the 31 historical populations are extant and 4 have unknown status. Outside of the 2 migratory North American populations, the health of the remaining 29 populations is undeterminable due to limited information available on population trends and stressors. However, at least 15 of these populations are at risk of extinction due to climate change related sea level rise or unsuitably high temperatures (Intergovernmental Panel on Climate Change 2001, Nail et al. 2015). For the purposes of this document, the term ‘worldwide,’ when used in relation to monarchs, is referring to 29 monarch populations excluding the eastern and western North American populations.

The eastern North American monarch population has been censused annually since 1994 (Vidal and Rendón-Salinas 2014). Although the population varies year-to-year, monarchs consistently numbered in the hundreds of millions throughout the 1990s and early 2000s (assuming a 21.1 million monarch/hectare density) (Thogmartin et al. 2017). There are additional survey data suggesting that monarch populations were as high or higher in the 2 decades prior to standardized monarch monitoring at the Mexican overwintering sites (Calvert and Brower 1986; Vidal and Rendón-Salinas 2014). There has been a steady decline in overwintering area occupied since 1994 with the highest season average of 44.95 acres recorded in 1996-1997 and the lowest season average of 5.19 acres recorded in 2020-2021 (Monarch Watch 2021).

The western North American population has been censused annually since 1997, providing an estimate of annual population size. Similar to the eastern population, data prior to standardized sampling suggest that the western population numbered at least 4 million monarchs in the 1980s (Schultz *et al.* 2017). The western population has been generally declining over the last 23 years, despite an increasing number of sites being counted (Service 2020c). The 2020 data point is the lowest recorded at below 50,000 monarchs (Western Monarch Count 2021, Xerces Society).

Valley Elderberry Longhorn Beetle

The Valley elderberry longhorn beetle (beetle) was listed as threatened on August 8, 1980 (45 FR 52803). Critical habitat was designated for the beetle on August 8, 1980 (45 FR 52803) but no critical habitat is within the Action Area.

The beetle is a habitat specialist and spends almost its entire life history on the sole host plant, blue elderberry (*Sambucus cerulea*). The species is dependent on the blue elderberry plant for larval and adult life stages. Within the range of the species, habitats range from lowland riparian forest to foothill oak woodlands, with elevation ranges from 18.3 to 689 m (60 to 2,260 ft.). It has occasionally been found with these plants in more upland habitats, including scrubland and

chaparral habitats. The range of the species is bounded by the Cascade Range to the north, Sierra Nevada to the east, Tehachapi Mountains to the south, and coastal ranges and San Francisco Bay to the west (Service 2014a, NatureServe 2015). Historically, the riparian forests in the Central Valley consisted of several canopy layers with a dense undergrowth, and included Fremont cottonwood (*Populus fremontii*), California sycamore (*Platanus racemosa*), willows (*Salix* sp.), valley oak (*Quercus lobata*), box elder (*Acer negundo* var. *californicum*), Oregon ash (*Fraxinus latifolia*), and several species of vines (e.g., California grape [*Vitis californica*] and poison oak [*Toxicodendron diversilobum*]).

These plant communities encompass several remaining natural and semi-natural floristic vegetation alliances and associations in the Great Valley Ecoregion of California. Elderberry shrubs have been found most frequently in mixed plant communities and in several types of habitats, including non-riparian locations, as both an understory and overstory plant, with beetle adults and exit holes created by the beetle found most commonly in riparian woodlands and savannas. The species uses moist valley oak woodlands suitable for blue elderberry plants. Shrub characteristics and other environmental factors appear to have an influence on use by the beetle in some recent studies, with more exit holes in shrubs in riparian than non-riparian scrub habitat types (Service 1984a, Service 2014a).

The beetle reproduces through oviparity, with females laying eggs on leaves of the host plant. Females lay eggs singly; the number of eggs are varied, ranging from 8 to 110 in a laboratory setting. In one study, a total of 136 larvae (and an additional 44 eggs that did not hatch) were produced by one captive female beetle. Hatching success has been estimated at 50 to 67 percent of eggs laid, but survival rates of larvae are unknown. Females lay eggs on elderberry leaves and at the junction of leaf stalks and main stems, with all eggs laid on new growth at the outer tips of elderberry branches. Based on observations of females along the Kings River, females laid eggs at locations on the elderberry branch where the probing ovipositor (i.e., the female's egg-laying organ) could be inserted. Eggs are approximately 2.3 to 3.0 mm (0.09 to 0.12 in.) long and reddish-brown in color, with longitudinal ridges. Eggs are initially white to bright yellow, then darken to brownish white and reddish (Service 1984a, Service 2006b, Service 2014a). Individuals are very dependent on their host plant, blue elderberry (*Sambucus* spp.). The first instars larvae bore to the center of elderberry stems, where they develop and feed on the pith. Prior to forming their pupae, the elderberry wood boring larvae chew through the bark and then plug the holes with wood shavings. The larvae crawl back to their pupal chamber, which they pack with grass. In the pupal chamber, the larvae metamorphose into their pupae and then into adults, whereupon they emerge between mid-March and mid-June (peak late April to mid-May) and breed. The short adult life stage, including breeding, coincides with the bloom period of the elderberry. The species needs woodland habitat suitable for growing blue elderberry plants for reproduction. Oviposition occurs on stems with diameters greater than about 2.5 cm (1 in.). The larval stage reportedly often takes 2 years inside the host plant; however, a 1-year cycle has been observed in a laboratory setting. Adults live from a few days to a few weeks after emergence and die within 3 months (Service 1984a, Service 2006b, Service 2014a).

The beetle is an herbivorous specialist that feeds almost exclusively on blue elderberry throughout all stages of its life. Adults feed on the foliage and perhaps flowers (and nectar) of the host plant, which are present from March through early June. Larva feed on the pith, and emergence of the adult beetle from the pith of the host is synchronized with the host plant bloom period. The species' food resources are limited in distribution. Adults are active from March

until June, while larvae are active year-round. California elderberry longhorn beetle (*D. c. californicus*) may compete with the beetle, because they can share food sources and their ranges can overlap. The species may also be preyed upon by insectivorous birds, lizards, European earwigs (*Forficula auricularia*), and Argentine ants (*Linepithema humile*). To serve as habitat, the shrubs apparently must have stems 2.5 cm (1 in.) or greater in diameter at ground level, so that larva may bore into them (Service 1984a, Service 2006b, Service 2014a).

The beetle has very limited dispersal; it usually stays on or near the host plant for the duration of its life. Dispersal distance of an adult beetle from its emergent site is estimated to be 50 m (164 ft.) or less (Service 1984a, Service 2014a).

Population Status

Although the entire historical distribution of the valley elderberry longhorn beetle is unknown, extensive destruction of riparian forests of the Central Valley during the past 150 years strongly suggests that the beetle's range has decreased and become greatly fragmented. Museum records indicate that the beetle has been collected in four central California counties: Merced, Sacramento, Solano, and Yolo (Service 1984a).

When the beetle was listed in 1980, it was known from 10 occurrence records at three locations: the Merced River (Merced County), the American River (Sacramento County), and Putah Creek (Yolo County) of the Central Valley of California. Subsequent surveys throughout the Central Valley discovered more locations and the current presumed historical range is now believed to extend from Shasta County to Madera County below 500 feet in elevation (152.4 meters) (Service 2014a). Although different ranges for the beetle have been proposed in the past, the current presumed range relies only on verifiable sightings or specimens of adult male Valley elderberry longhorn beetles (Service 2014a). Previous iterations of the presumed range used both female sightings and exit holes to determine beetle presence. Both of these metrics are unreliable as female California elderberry longhorn beetle (*D. c. californicus*), and beetles are indistinguishable in the field and exit holes cannot be accurately assigned to either species (Service 2019c).

Occupancy of the beetle within the presumed historical range over the past 16 years has occurred in approximately 18 hydrologic units and 36 geographical locations in the Central Valley. The overall trend of valley elderberry longhorn beetle occupancy was moderately downward when comparing the 1991 and 1997 survey data. The species trend is an overall decline of approximately 90 percent since the 1800s (Service 2014a). With regard to population size, no true estimates have been made due to the cryptic nature of the species. Based on a spatial analysis of valley elderberry longhorn beetle populations in the Central Valley, Talley concluded that the several-hundred-meter distances observed between local aggregations of the species supports a limited migration distance for this species. An integrative approach to all three spatial frameworks (patch, gradient, and hierarchical) best defined a population structure for the valley elderberry longhorn beetle. This population structure can be characterized as patchy-dynamic, with regional distributions made up of local aggregations of populations. These localized populations are defined by both broad-scale or continuous factors associated with elderberry shrubs (e.g., shrub age or densities) and environmental variables associated with riparian ecosystems (e.g., elevation, associated trees) that themselves have patch, gradient, and hierarchical structures (Service 2014a).

Crustaceans

Vernal Pool Fairy Shrimp

The Service listed the vernal pool fairy shrimp (fairy shrimp) as threatened on September 19, 1994 (59 FR 48136).

Fairy shrimp have an ephemeral lifecycle and exist only in vernal pools or vernal pool-like habitats; the species does not occur in riverine, marine, or other permanent bodies of water. The fairy shrimp is endemic to California and the Agate Desert of southern Oregon. It has the widest geographic range of the federally listed vernal pool crustaceans, but it is seldom abundant where found, especially where it co-occurs with other species. The fairy shrimp occupies a variety of different vernal pool habitats, from small, clear, sandstone rock pools to large, turbid, alkaline, grassland valley floor pools (Service 2005b). The fairy shrimp occurs only in cool-water (4.5°C to 24°C [40°F to 75°F]) pools. Although the fairy shrimp has been collected from large vernal pools, including one exceeding 10 ha (25 ac) in area, it tends to occur primarily in smaller pools, and is most frequently found in pools measuring less than 0.02 hectare (0.05 acre) in area. The fairy shrimp typically occurs at elevations from 10 meters (33 feet) to 1,220 meters (4,003 feet), although two sites in the Los Padres National Forest have been found to contain the species at an elevation of 1,700 meters (5,600 feet). The species is typically found in pools with low to moderate amounts of salinity or total dissolved solids. Vernal pools are mostly rain-fed, resulting in low nutrient levels and dramatic daily fluctuations in pH, dissolved oxygen, and carbon dioxide. Although there are many observations of the environmental conditions where fairy shrimp have been found, there have been no experimental studies investigating the specific habitat requirements of this species.

In general, the fairy shrimp has a sporadic distribution in the vernal pool complexes, with most pools being uninhabited by the species (Service 2007c). The thermal and chemical properties of vernal pool waters are two of the primary factors affecting the distributions of specific fairy shrimp species (including the vernal pool fairy shrimp), or their appearance from year to year. Different species may appear in pools from one year to the next, depending on whether the pools fill at a different time of the year. In years with warm winter rains, fairy shrimp do not hatch in at least a portion of their range. In years with low amounts of precipitation or atypical timing of precipitation (or in substandard habitat), vernal pool species may die off before reproducing (Eriksen and Belk 1999). In some cases, fairy shrimp will cease to be found in pools where they were formerly found (Service 2007c).

Since the fairy shrimp's listing, surveys of vernal pools and other temporary waters throughout the western United States have resulted in an increase in the shrimp's known range. In 1998, the shrimp was discovered in two distinct vernal pool habitats in Jackson County, Oregon. The known range of the fairy shrimp was also extended due to its detection in one pool at the Napa Airport at the southeastern edge of the Lake-Napa Vernal Pool Region (Service 2007c). The fairy shrimp is currently found in 28 counties across the Central Valley and coast ranges of California, and in Jackson County in southern Oregon. The species occupies a variety of vernal pool habitats and occurs in 13 of the 17 vernal pool regions and 45 of the 85 core recovery areas identified in California and southern Oregon (Service 2005b).

Population Status

The fairy shrimp is much less restricted in range than other species of fairy shrimp; however, it is not abundant at any site (NatureServe 2015a). Surveys and monitoring of fairy shrimp generally

only record presence and absence in pools and do not provide information on shrimp abundance in pools. At the time of listing in 1994, the populations represented either geographic clusters of occurrence records or single occurrences from areas with extant vernal pool habitat. The 32 extant populations were described for the following counties, with the number of populations in parentheses: Shasta County (1), Tehama County (4), Glenn County (1), Butte County (1), Yuba County (1), Placer County (1), El Dorado County (1), Sacramento County (2), Solano County (1), Contra Costs County (1), Alameda County (1), Merced County (4), Madera County (2), Fresno County (2), San Benito County (1), Tulare County (4), San Luis Obispo County (1), Santa Barbara County (1), and Riverside County (2) (Service 2007c).

Currently, the fairy shrimp is known from 13 vernal pool regions. At the time of listing, 178 extant occurrences were known from 32 putative populations, based on proximity of known occurrences. There are currently 795 recorded occurrences in the Diversity Database (Diversity Database 2023). The Service has information to indicate that the shrimp is still extant in most of the putative populations, although loss and fragmentation of vernal pool habitat has occurred in and around most of the 1994 populations, potentially decreasing their viability. Without species specific monitoring, the Service does not know whether populations of vernal pool fairy shrimp are declining (Service 2007c).

Vernal Pool Tadpole Shrimp

The Service listed the vernal pool tadpole shrimp (tadpole shrimp) as endangered on September 19, 1994 (59 FR 48136).

The tadpole shrimp can be identified by the large, shield-like carapace that covers the anterior half of its body and the paddle-like supra-anal plate located between the paired cercopods (jointed antenna-like appendages). It feeds on both living organisms, such as fairy shrimp, and detritus (Service 2005b). Vernal pool tadpole shrimp have from 30 to 35 pairs of phyllopoes (swimming legs that also function as gills), a segmented abdomen, and fused eyes. Mature tadpole shrimp range from 0.6 to 3.3 inches in length (Service 2005b).

Tadpole shrimp generally take between three to four weeks to mature, and reproduction begins after individuals reach 0.4 inch or more in carapace length and fecundity increases with body size (Service 2007d). Large females, greater than 0.8-inch carapace length, can deposit as many as six clutches, ranging from 32 to 61 eggs per clutch, in a single wet season. The tadpole shrimp may be hermaphroditic (individuals have both male and female reproductive organs) (Service 2007d).

The tadpole shrimp is found only in ephemeral freshwater habitats including alkaline pools, clay flats, vernal lakes, vernal pools, vernal swales, and other seasonal wetlands in California (Service 2007d) that contain clear to highly turbid water, with water temperatures ranging from 10°C to 29°C (50°F to 84°F) and pH ranging from 6.2 to 8.5. Multiple hatchings within the same wet season allow the tadpole shrimp to persist within pools as long as these habitats remain inundated, sometimes for six months or more. Hatching of tadpole shrimp eggs is temperature dependent. Optimal hatching occurs between 10°C to 15°C (50 to 59°F) with hatching rates becoming significantly lower at temperatures above 20°C 68°F (Service 2007d).

Population Status

Although tadpole shrimp are wide ranging, their habitat is highly fragmented, and they are uncommon where they are found (Service 2007d). Several to several hundred individuals can be

found in any given water body (NatureServe 2015a). At the time of listing in 1994, tadpole shrimp were known from 18 populations, extending from east of Redding, Shasta County; southward to the San Luis National Wildlife Refuge in Merced County; and a disjunct population at the San Francisco National Wildlife Refuge, Alameda County (59 FR 48136). A given pool may support several to several hundred individuals within a given water body (NatureServe 2015a). Annual surveys have not occurred at all sites with known tadpole shrimp occurrences. Surveys were conducted for the purpose of determining the presence of species in the areas of proposed development or road projects, and have generally been limited in scope, focusing on a single parcel or occurrence. Surveys are generally not conducted in a manner to facilitate determination of the population trends of this species. No trends either downward or upward have been reported at any of the monitored sites; however, the accelerated loss and fragmentation of tadpole shrimp habitat, particularly in the Southeastern Sacramento Valley Vernal Pool Region, is expected to result in markedly decreased long-term viability of this species. Populations in the Vina Plains in Tehama County may be susceptible, as described in the 1994 final rule, to decreased fecundity due to parasitization by flukes (Trematoda) of an undetermined species (Service 2007d).

Plants

Beach Layia

Beach layia (*layia*) was listed as endangered on June 22, 1992, due to displacement by invasive, non-native vegetation, recreational uses such as off-road vehicles and pedestrians, and urban development (Service 1998). It was reclassified as threatened on March 31, 2022 (87 FR 18722).

Layia is self-compatible and capable of self-pollination and is visited by a variety of insects that may assist in cross-pollination (Sahara 2000). Even if *layia* reproduces mainly by selfing, it is still possible that outcrossed seeds have a higher probability of survival and contribute more to fitness (Sahara 2000), though this has not been tested. It is unclear what the role of pollinators are; however, it has been noted that it is commonly visited by native bees, tachinid flies and small black beetles (Ruiz-Lopez and Mesler 2019).

As a winter annual, *layia* germinates during the rainy season between fall and mid-winter, blooms in spring (March to July), and completes its life cycle before the dry season (Service 1998). Populations tend to be patchy and subject to large annual fluctuations in size and dynamic changes in local distribution associated with the shifts in dune blowouts, remobilization, and natural dune stabilization that occur in the coastal dune ecosystem. (Service 1998). *Layia* plants often occur where sparse vegetation traps wind-dispersed seeds but causes minimal shading. Seeds are dispersed by wind mostly during late spring and summer months (Service 1998).

Layia occurs in the open spaces between the low growing perennial plants in the *Abronia latifolia* – *Ambrosia chamissonis* herbaceous alliance (dune mat) and *Leymus mollis* herbaceous alliance (sea lyme grass patches) (Sawyer et al. 2009). Dune mat is composed of herbaceous low-growing vegetation adapted to the low nutrient soils and drought-like conditions of the dunes. It includes perennials such as yellow sand verbena (*Abronia latifolia*), beach bur (*Ambrosia chamissonis*), beach bluegrass (*Poa macrantha*), coast buckwheat (*Eriogonum latifolium*), beach pea (*Lathyrus littoralis*), dune goldenrod (*Solidago spathulata*), and coastal sagewort (*Artemisia pycnocephala*) (Sawyer et al. 2009). Sea lyme grass (now treated as *Elymus mollis* in the Jepson Manual, Baldwin et al. 2012) is dominant or characteristically present in sea lyme grass patches and co-dominants include the same plants present in the dune mat community

listed above (Sawyer et al. 2009). Typically, the total vegetation cover in both communities is relatively sparse and many annual species, including layia, colonize the space between established, tufted perennials. Layia can also occur in narrow bands of moderately disturbed habitat along the edges of trails and roads in dune systems dominated by invasive species.

Population Status

Layia populations surveyed from Santa Barbara County to Humboldt County were estimated at 300,000 individuals near the time that the recovery plan was written (Service 1998). Of the known historical populations, four are considered extirpated, including the San Francisco population, the Point Pinos population in the Monterey area, and two populations north of the Mad River in Humboldt County. All currently extant populations were known at the time of the recovery plan with the exception of the Freshwater Lagoon population that was discovered in 2000. Based on estimates conducted at the time the recovery plan was written (500,000 plants in 1997 and one million in 1998 at the Lanphere Dunes Subpopulation (Pickart pers. comm.2018)), it is likely that the original estimate of 300,000 plants total was a gross underestimate (Service 2011b).

An estimated 595 acres (240 ha) of near-shore dunes habitat is known to support approximately 30 million layia (Service 2018b). Humboldt and Marin Counties contain approximately 99.6 percent of the occupied habitat rangewide. The populations in Monterey and Santa Barbara counties are much smaller and in danger of extirpation with the Monterey populations supporting less than 3,000 plants on less than two acres and the Santa Barbara populations supporting approximately 5,000 plants on less than one acre (Service 2018b). Federal agencies own or manage about 73 percent of the occupied habitat (433 ac (175 ha), State agencies 2.5 percent (15 ac (6 ha)), local governmental entities 2.5 percent (15 ac (6 ha)) and non-governmental organizations 14 percent (83 ac (34 ha)), and the remaining 8 percent (50 ac (20 ha)) is private ownership.

Gentner's Fritillary

Gentner's fritillary (fritillary) was listed as an endangered species on December 10, 1999 (64 FR 69195) and the recovery plan was finalized in 2003 (Service 2003b). Critical habitat has not been designated for this species.

Flowering fritillary plants have been determined to constitute approximately 3 percent of any given population of all age-classes (Gray et al. 2011, Siskiyou BioSurvey 2011). In some years this has been documented to be as low as 0.5 percent of the population (Gray et al. 2011). Accurate identification of fritillary is only accomplished with flowering individuals.

The fritillary occurs at elevations ranging from 839 to 4,231 feet above sea level, but some variation likely exists, and the species may occur at elevations outside this range. The species is often found in grassland and chaparral habitats within, or on the edge of, dry, open woodlands. It is often associated with shrubs where it is somewhat protected from the effects of wind and sun. Although it often occupies ridge-line ecotones, it is not found on fully exposed sites or extremely dry sites (Service 1999). The overstory habitat for fritillary is open oak, mixed conifer woodland, and forest edges. These habitats are typified by buck brush (*Ceanothus cuneatus*), white-leaved manzanita (*Arctostaphylos viscida*), snow brush (*Ceanothus velutinus*), mountain mahogany (*Cercocarpus betuloides*) and poison oak (*Toxicodendron diversiloba*) in the shrub layer and Pacific madrone (*Arbutus menziesii*), incense cedar (*Calocedrus decurrens*), Oregon white oak

(*Quercus garryana*), California black oak (*Quercus kelloggii*) ponderosa pine (*Pinus ponderosa*), and Douglas-fir (*Pseudotsuga menziesii*) in the tree layer.

The fritillary habitat may be benefitted by some form of periodic disturbance and is best maintained in earlier successional forest vegetation stages. Although expert opinions vary on the importance of disturbance regimes, burning and thinning may benefit the species by dispersing bulbs, creating openings, and reducing encroachment of shrubs and trees (Service 2022b).

Population Status

Fritillary is found primarily in very small, scattered occurrences (Service 1999). Currently the species is known from 166 Oregon Biodiversity Information Center occurrence clusters, or element occurrences (Occurrences) (Oregon Biodiversity Information Center 2020). Eighteen Occurrences are believed to have been extirpated. The Diversity Database records indicate two Occurrences encompassing three locations are present in California (Diversity Database 2020, Service 2022b). Since being listed in 1999, the fritillary has increased from 45 to 274 extant sites and increased from an estimated 24,000 to 303,161 plants (Service 2022b). Fritillary populations in California represent the southernmost extent of their range. While suitable habitat for fritillary exists within the planning area, we have no information on the status of populations that may be affected by project actions.

McDonald's Rock-cress

McDonald's rock-cress (rock-cress) was listed as endangered on September 28, 1978 (43 FR 44810).

The rock-cress is a perennial herbaceous member of the mustard family (Brassicaceae). Flowering typically occurs between April and May. As many as 12 siliques (elongate fruits, dry, and open at maturity) up to 1.6 inches long may be produced, from which very small, slightly winged seed are discharged. This species is distinguished from other rock-cress species by being almost glabrous (without hairs or glands) and having comparatively short, spatulate basal leaves. It occurs on soils derived from ultramafic parent material containing high levels of heavy metals and low levels of nutrients. Its habitat ranges from barren gravel slopes to open scrub and pine woodlands (Service 1984b).

Population Status

At the time of listing, rock-cress was considered to be restricted to a single population at Red Mountain, Mendocino County. The taxonomic treatment of the species was revised in the first edition of the Jepson Manual (Hickman 1993) to include populations of purple-flowered rock-cress located near the Oregon border. Since 1993, the species was thought to occur in Mendocino, Del Norte, and the very western portion of Siskiyou counties in California, and the very southern portion of Curry County in Oregon. Preliminary genetic work conducted in 2012 indicate that rock-cress could be confined to Red Mountain as believed at the time of listing. This taxonomic issue has not been resolved and therefore the range of the species is thought to include southern Oregon and Siskiyou and Del Norte counties (Service 2013).

Menzies' Wallflower

Menzies' wallflower (wallflower) was listed as endangered on June 22, 1992 (50 FR 27848).

Wallflower is a member of the mustard family (Brassicaceae) endemic to coastal dune systems in California. Its life history is that of a monocarpic perennial, meaning that it flowers and produces

fruit only once during its life, after which it dies. Blooming typically occurs from March through April, although it may begin as early as late February. The species is self-compatible; therefore, the reproduction of this species involves selfing and facultative outcrossing (able to produce seed either by self-pollination, or pollination by other plants). The fruits mature by mid-June. However, seeds remain attached to the fruit walls after dehiscence and disperse over a long period, primarily in conjunction with winter storm events that dislodge the mature inflorescences and scatter them by way of a wind-driven tumbling action (Pickart and Sawyer 1998). Germination follows the first rains in fall or early winter. Fecundity is high, with individual plants producing numerous seeds; however, the wallflower does not have a persistent seed bank in the soil (Carothers 1996), and seedling survivorship is low, with 98.3 percent mortality shown to occur in the first year (Pickart and Sawyer 1998). Reproduction may also be hindered by infestation of *Albugo canadensis*, an endemic fungal pathogen that causes white rust disease, at least in some of the populations in the Humboldt Bay area. Disease symptoms are more prevalent on reproductive individuals where they can decrease fecundity by reducing seed number or viability (Pickart and Sawyer 1998).

Wallflower occurs among the low growing perennial plants in the *Abronia latifolia* – *Ambrosia chamissonis* herbaceous alliance (dune mat) and *Leymus mollis* herbaceous alliance (sea lyme grass patches) (Sawyer et al. 2009). Dune mat is composed of herbaceous low-growing vegetation adapted to the low nutrient soils and drought-like conditions of the dunes. It includes perennials such as (but not limited to): yellow sand verbena (*Abronia latifolia*), beach bur (*Ambrosia chamissonis*), beach bluegrass (*Poa macrantha*), coast buckwheat (*Eriogonum latifolium*), beach pea (*Lathyrus littoralis*), dune goldenrod (*Solidago spathulata*), and coastal sagewort (*Artemisia pycnocephala*) (Sawyer et al. 2009). Sea lyme grass (now treated as *Elymus mollis* in the Jepson Manual, Baldwin et al. 2012) is dominant or characteristically present in sea lyme grass patches and co-dominants include the same plants present in the dune mat community listed above (Sawyer et al. 2009). Typically, the total vegetation cover in both communities is relatively sparse.

Population Status

There is a large and healthy population of wallflower on the North Spit of Humboldt Bay and much research and monitoring has occurred on this population. The population-wide total has increased from approximately 20,000 to more than 133,000 individuals. However, there was substantial intrapopulation variability, with the Lanphere Dunes subpopulation exhibiting a much higher rate of increase than all other subpopulations, representing 64% of the total population but only 30% of the occupied habitat. In general, densities have declined over time across the North Spit with some variation between sites, with the only exception being the Lanphere Dunes. The proportion of reproductive plants (number of plants in flower in relation to the total number of plants) in the population has varied by time interval, remaining between 0.4 and 0.5 for the first two intervals, then dropping to 0.3 in 2006 and jumping to 0.6 in 2015. Incidence of symptoms negatively affecting plants caused by white rust (*Albugo canadensis*) increased significantly from 1997 to 2006. The lowest incidence was in 1997 with only 6 percent of plants symptomatic. That increased to 74 percent in 2006 and dropped only slightly to 71 percent in 2015 (Service 2020e).

There is a small population of wallflower on the South Spit of Humboldt Bay. The 2008 5-year review reported a population size of 457 plants in 2006 with a proportion of 0.33 reproductive plants in relation to the total number of plants (Service 2008). This was the peak population size

since it was discovered in 1991. Caging of reproductive plants to prevent herbivory from deer and rabbits occurred regularly until 2009 at which point caging and monitoring lapsed until 2017. In 2017 only 38 plants were counted (0.19 reproductive). The population increased to 76 plants in 2018 (0.32 reproductive). The count in 2020 resulted in 55 plants (0.24 reproductive). This population has historically been small and is threatened by herbivory and lack of available habitat. Both native species such as salt rush (*Juncus brewerii*) and non-native invasive species, including European beachgrass, yellow bush lupine (*Lupinus arboreus*), and Spanish lotus (*Acmispon americanus* var. *americanus*) occur in high densities in the location of the small wallflower population on the South Spit of Humboldt Bay.

A census was conducted at the Elk River spit of Humboldt Bay in 2000 and 3,782 individuals were counted with a proportion of 0.13 reproductive plants (Pickart 2000). In 2019 the census was repeated, and 1,785 individuals were recorded (0.26 reproductive) (Service 2020e). It's likely that the decline in population size is due to increased competition with invasive species, namely European beachgrass.

The wallflower population located in Mendocino County largely occurs on lands owned and managed by the California State Parks. A mapping effort conducted in 2005 estimated 240 acres of occupied habitat, and the repeated analysis in 2011 and resulted in an estimate of 273 acres. A dune rehabilitation project was initiated in 2014 to remove 2.7 miles of remnant road and treat 55 acres of European beachgrass within the foredune and creek habitat types. Monitoring data provided by the State Parks show that wallflower in both compensatory and enhancement plots have increased substantially in density. The compensation plots started with a baseline of 551 plants in 2013-2014 and increased to 5,542 plants in 2020. The enhancement plots had a baseline of 68 plants in 2013-2014 and increased to 1,053 plants in 2020. Restoration efforts are ongoing, and this population has been expanding as invasive species are removed.

Survey information among the Monterey populations of wallflower is patchy and the most recent information stems from ongoing or recently concluded restoration projects. Populations on the Monterey Peninsula in general are stable to declining and are threatened by development, invasive species and recreation. There is no annual monitoring of Menzies' wallflower at the Marina Dunes population. However, it was used as a reference to check for the blooming period of wallflower for the Martin Dunes survey. During the reference site visit, the wallflower population was identified and confirmed to still be present (Wandke pers. comm. 2020). A 10-year dune restoration project concluded in 2015 at the Point Pinos Lighthouse Reservation (Wandke pers. comm. 2020). At the conclusion of the project in 2015, there were 868 wallflower that had been propagated and planted from seed collected on site (Wandke pers. comm. 2020). The Pebble Beach Area includes multiple locations that have historically supported wallflower. The presence of wallflower was confirmed at the Indian Village Dunes in 2019, however the species was not found at the Signal Hill dunes during the same time period (Lemein pers. comm. 2019). Asilomar State Beach conducted a dune restoration and rare plant propagation and monitoring project in 2012 that lasted five years, concluding in 2017 (Gray 2018). As part of this project, seeds of wallflower were collected from onsite locations and propagated in an onsite greenhouse and then planted. The last available count data for wallflower found 2,206 individuals in dune habitat throughout the property (Gray 2016).

Slender Orcutt Grass

Slender Orcutt grass (grass) was listed as threatened on March 26, 1997 (62 FR 14338). Critical habitat was designated for this species on February 10, 2006 (71 FR 7118).

The grass is a member of a small tribe of semi-aquatic grasses that are unique among grasses in exhibiting single-cell C4 photosynthesis, which occurs in only 0.003% of known species of C4 flowering plants. Plants with C4 photosynthesis utilize a more complex biochemical process than most plants (with C3 photosynthesis) in converting carbon dioxide to energy, which increases photosynthetic efficiency at low carbon dioxide concentrations. The species is endemic to California vernal pools. The grass occurs across a wide range of elevations (27-1,856 m, or 90-5,761 ft), but is associated primarily with vernal pool habitat on Northern Volcanic Ashflow and Northern Volcanic Mudflow substrates. The species is typically associated with larger and/or deeper vernal pools (typically ≥ 30 cm, or 11.8 in. deep) that have relatively long periods of inundation. The plant is also restricted to the deepest portion of the pools (Service 2005b). The main habitat requirement for the plant appears to be inundation of sufficient duration and quantity to eliminate most competition and to meet the plant's physiological requirements for prolonged inundation, followed by gradual desiccation (Griggs and Jain 1983). However, pools that normally retain moisture until the end of summer allow out-competition of slender Orcutt grass by marsh vegetation (*Scirpus* spp., *Typha* spp.) (Griggs and Jain 1983).

Population Status

Disjunct occurrences of the species occur in vernal pools on remnant alluvial fans, high stream terraces, and recent basalt flows from the Modoc Plateau in northeastern California, west to Lake County, and south through the Central Valley to Sacramento County. The plant has also been reported from other natural and artificial seasonal wetlands such as creek terraces, stock ponds, and borrow pits; however, occurrence records suggest that most such locations are altered vernal pool habitats (Diversity Database 2006).

Populations of the grass can vary greatly in size from year to year; fluctuations in population size of up to four orders of magnitude have been recorded. The grass germinates even in dry years, but the proportion surviving to maturity varies (Service 2005b). Population trends for this species on managed or protected lands appear to be stable over time, although quantitative monitoring has apparently been discontinued at many sites. Ongoing monitoring of these occurrences does show large, inter-annual fluctuations in the number of living plants at many sites, with some years producing no living plants in some locations (Lentz in litt. 2006 in Service 2009b, Serpa pers. comm. 2006 in Service 2009b).

Recent surveys on the Modoc National Forest have located additional occurrences, thereby increasing the number of occurrences within the Modoc Plateau Vernal Pool Region (Beyer in litt. 2006 in Service 2009b). Few additional occurrences have been discovered in other regions: one new occurrence has been found in the Southeastern Sacramento Valley Region, within Sacramento's urban development boundary. Its size and status are unknown (Sacramento County undated). Most occurrences on private lands were last evaluated in the late 1980s. At this time, the population trends for 61 occurrences are listed as unknown (Diversity Database 2006).

Stebbins' Morning-Glory

Stebbins' morning-glory (morning-glory) was listed as endangered on October 18, 1996 (64 FR 54346).

Prior to 2022, the morning-glory was thought to be restricted to the Pine Hill Preserve and immediate vicinity in El Dorado County and to two sites near Grass Valley in Nevada County (Service 2019d). In 2018, the Carr Fire burned approximately 97 percent of the Whiskeytown National Recreation Area (Park), west of Redding in Shasta County. Since 2021, the post-fire surveys for special status plant species in the Park have documented hundreds of new populations and several new, rare taxa have been recorded. This includes a confirmed population of the morning-glory (National Park Service 2024). The species was located in 2022 during a survey effort for flannelbush (*Fremontodendron* sp.).

The morning-glory is found in gabbro soils and is also known to occur on serpentine soils. Two of the three serpentine sites for the morning-glory in Nevada County are possibly extirpated, but the species continues to persist at one serpentine site in that county and an additional serpentine site near Shingle Springs in El Dorado County (Service 2019d). The new site in Shasta County is approximately 1.63 acres and is restricted to soils formed from the parent material of the Copley Greenstone formation. Greenstone is a type of metamorphosed basalt with a varying degree of mafic mineral composition depending on the conditions imparted by localized lava flows. The Whiskeytown National Recreation area and the surrounding area have a long history of mining these deposits. Populations can be found on Goulding, Boomer, and Neuns soil series, along with colluvial land and rock outcrop mapping units. In some areas, populations will overlay almost perfectly into soil polygons but more often they are imbedded within larger polygons. In these areas, there often appears to be a distinctive transition in soil conditions at the boundary of populations, likely representing unmapped nuances at local scales. This is the case for the single occurrence of the morning-glory in the Park, which is found on Goulding soils (GeE2), but is clearly restricted to a subset within a larger polygon that hosts unique edaphic conditions when compared to the surrounding area (National Park Service 2024).

The species is shade intolerant (Baad and Hanna 1987) and has an extensive root system which seems to survive much longer than aboveground vegetation persists at any one location (Eng in litt. 1999, as cited in Service 2002). Though initially thought to be an obligate seeding species, Ayres (2009) indicates it may have the capability to recruit by seed or resprout after fire or other disturbance. It is clear that seeds require scarification or heat treatment for successful germination (Nosal 1997, Ayres 2011) and that it has a seedbank that may persist for over 60 years (Ayres 2011).

Plants grow from seed rapidly and flower profusely 2-3 years after fire. As the canopy closes during the interfire period, vegetative succession can choke out Stebbins' morning-glory; however, as long as the soil seed bank has been replenished, populations can become established once again after fire (Marsh and Ayres 2002). The morning-glory has stems of up to 3.3 feet in length that generally lie flat on the ground or climb nearby vegetation and rocks. Leaves are palmately lobed with 7 to 9 lobes. White, creamy yellow, and sometimes pink-tinged flowers are on stalks 1 to 5 inches long and bear two leaf-like bracts in addition to being generally glabrous (Brummitt 2012, Service 2002).

Flowering occurs from April through July (Brummitt 2012) and is insect pollinated, primarily by bees (Nosal 1997). Though initially thought to be an obligate seeding species, it seems to have the capability to recruit by seed or rhizomatous resprout after fire or other disturbance. Seeds require scarification or heat treatment for successful germination (Nosal 1997, Ayres 2011). It

has a seedbank that may persist for over 60 years (Ayres 2011). Plants grow from seed rapidly and flower profusely 2-3 years after fire (Marsh and Ayres 2002).

Population Status

At the time of listing, the morning-glory occurred primarily on the Pine Hill formation in western El Dorado County, California, ranging in elevation from 453 to 2,060 feet (Service 2019d). The morning-glory had a few known isolated occurrences in El Dorado, Nevada, and Tuolumne counties (Service 1996). It was discovered in Shasta County in 2022, west of Redding.

Yreka Phlox

Yreka phlox (phlox) was listed as endangered in 2000 (65 FR 5268). Phlox is a perennial, low-growing, flowering plant with a woody base and herbaceous (non-woody) stems. The stems and leaves are densely hirsute or hairy. Yreka phlox blooms from late February to June (Service 2006c).

Phlox is a serpentine endemic, meaning it only grows on soils derived from ultramafic parent rocks, including serpentinite and peridotite. It is found at elevations that range from 2,800 to 4,400 feet. Ultramafic rocks, and hence their derivatives, have high concentrations of magnesium and iron, and often have high concentrations of chromium and nickel, as well. Serpentine soils alter the pattern of vegetation and plant species composition nearly everywhere they occur. These soils are inhospitable for the growth of most plants because of a complex of factors that include excessive magnesium and nickel and low calcium and nutrient (i.e., nitrogen, phosphorus and potassium) levels. Some plants, like the phlox, adapt to these conditions and are wholly or largely restricted to them (Kruckeberg 2002). Phlox is known to occur only on the following five soil types (Soil Conservation Service 1983):

- 178 (ithic Xerorthents-Rock Outcrop Complex, zero to 65 percent slopes);
- 237 (Weitchpec Variant-Rock Outcrop Complex, 5 to 65 percent slopes);
- 143 (Dubakella-Ipish Complex, 5 to 30 percent slopes);
- 144 (Dubakella-Ipish Complex, 30 to 50 percent slopes); and
- 213 (Rock Outcrop-Dubakella Complex, 30 to 50 percent slopes).

Population Status

Phlox has a very limited distribution and is known to occur at only five locations within and adjacent to the city of Yreka, California. A phlox location or occurrence is defined as a group of at least 200 individual plants that is separated from any other phlox locality by at least 0.25 miles. The China Hill occurrence is located on an open ridge and adjacent slopes approximately 1 mile northeast of downtown Yreka. The Soap Creek Ridge occurrence includes at least 14 discrete suboccurrences and is located adjacent to California State Highway 3, approximately 5 to 6 miles southwest of Yreka. The Cracker Gulch occurrence is located in the Yreka Creek drainage, on the south side of State Highway 3. Plants comprising the Greenhorn Creek occurrence are found in several discrete suboccurrences on the north and south sides of Greenhorn Creek, west of the Yreka City limits. The Jackson Street occurrence is located near the west central edge of Yreka, in the Little Humbug Gulch drainage. Collectively, these five locations cover approximately 670 acres and contain between 7,800 to 15,000 individual plants. In addition, the locality information from a single 1930 collection indicates a possible historical location in the vicinity of Etna or in the vicinity of Echo Mill, near Soap Creek Ridge (Department 1986, Service 2006c).

Currently known and potential limiting factors include alteration or destruction of habitat resulting from residential development, logging, fire suppression activities including dozer line construction, ongoing highway maintenance or construction activities, off-road vehicle use, illegal collection, and vandalism; competition with exotic plants; herbicide application; domestic animal grazing; inadequate existing regulatory mechanisms; and potential extirpation as a result of random events.

Status of Critical Habitat

The Status of Critical Habitat describes the rangewide condition of the critical habitat for the species. When discussing critical habitat, the phrases “primary constituent elements” (Elements) and “physical and biological features” (Features) are synonymous. Critical habitat rules published before February 11, 2016, used the term Elements, while critical habitat rules published after that date use the term Features. In cases where a critical habitat rule numbers Elements specifically (e.g., Element 1), we will use the terms as defined in the critical habitat designation to avoid confusion.

Birds

Marbled Murrelet Critical Habitat

Critical habitat for the murrelet was designated in 1996 and revised in 2009 with a final rule published on October 5, 2011 (76 FR 61599). The Service designated 31 critical habitat units encompassing 3,698,100 acres across Washington, Oregon and California. Twenty-two critical habitat units include non-federal lands. Approximately 597,474 acres were designated as critical habitat in California, 333,528 acres of which is on Federal land. Located primarily on Federal land, and to a lesser extent on State, county, city and private lands, the 2011 final critical habitat rule provides protection requirements under section 7 of the Endangered Species Act for federally regulated activities.

The Service determined there are two physical and biological features associated with the terrestrial environment that support nesting, roosting, and other normal behaviors which are essential to the conservation of the murrelet and require special management considerations. Within areas essential for successful nesting:

Feature 1: Individual trees with potential nesting platforms, and

Feature 2: Forested areas within 0.8 kilometers (0.5 miles) of individual trees with potential nesting platforms, and with a canopy height of at least one-half the site-potential tree height.

This includes all such forest, regardless of contiguity. These two features are essential to provide and support suitable nesting habitat for successful reproduction of the murrelet. Within the boundaries of designated critical habitat, only those areas that contain one or more primary constituent element are, by definition, critical habitat.

Northern Spotted Owl Critical Habitat

Critical habitat was revised on December 4, 2012 (77 FR 71875) and the rule became effective January 3, 2013. In response to a stipulated settlement agreement, the Service proposed a new revised critical habitat rule in 2020 (85 FR 48487), that included exclusions to the 2012 rule

limited to approximately 200,000 acres in Oregon. The final rule (86 FR 4820), published in January 2021, included the withdrawal of almost 3.5 million acres of critical habitat with significant modifications occurring in Washington, Oregon, and California. A final revised rule (86 FR 62606) became effective on December 10, 2021, which only included modifications in Oregon. Critical habitat for the NSO now includes approximately 9,577,969 acres in 11 units and 60 subunits in California, Oregon, and Washington. The table below lists the units and subunits of critical habitat for northern spotted owl in California.

Table 4. Designated critical habitat units and subunits for northern spotted owl in California.

Unit Number	Subunit Name
Unit 3	RDC 1
	RDC 2
	RDC 5
Unit 8	ECS 2
	ECS 3
Unit 9	KLW 4
	KLW 5
	KLW 6
	KLW 7
	KLW 8
	KLW 9
Unit 10	KLE 6
	KLE 7
Unit 11	ICC 1
	ICC 2
	ICC 3
	ICC 4
	ICC 5
	ICC 7
	ICC 8

The final rule for critical habitat defines the Elements as the specific elements of the Features that are considered essential to the conservation of the NSO and are those elements that make areas suitable as nesting, roosting, foraging, and dispersal habitat (Service 2012). The Elements should be arranged spatially such that it is favorable to the persistence of populations, survival and reproductive success of resident pairs, and survival of dispersing individuals until they are able to recruit into a breeding population (Service 2012). Within critical habitat units for NSO, the Service has determined that the Elements are:

Element 1: Forest types that may be in early-, mid-, or late-seral stages and that support the northern spotted owl across its geographic range;

Element 2: Habitat that provides for nesting and roosting;

Element 3: Habitat that provides for foraging;

Element 4: Habitat to support the transience and colonization phases of dispersal, which in all cases would optimally be composed of nesting, roosting, or foraging habitat (Elements 2 or 3), but which may also be composed of other forest types that occur between larger blocks of nesting, roosting, or foraging habitat (Service 2012).

Some critical habitat subunits may contain all of the Elements and support multiple life history requirements of the NSO, while some subunits may contain only those Elements necessary to support the species' particular use of that habitat. All of the areas designated as critical habitat, however, do contain Element 1, forest type. As described in the final rule, Element 1 always occurs in concert with at least one other Element (Element 2, 3, or 4; Service 2012). While the designation may overlap, northern spotted owl critical habitat does not typically consist of large meadows, grasslands, oak woodlands, aspen woodlands, or manmade structures and the land upon which they are located (Service 2012).

Western Snowy Plover Pacific Coast Population DPS Critical Habitat

Designated critical habitat was published in 1999 (64 FR 68508). Critical habitat was redesignated in 2005 (70 FR 56970) and revised in 2012 (77 FR 36727). The current critical habitat designation (77 FR 36727) includes 60 units totaling 24,526 acres in Washington, Oregon, and California. The Features of critical habitat for the plover include sandy beaches, dune systems immediately inland of an active beach face, salt flats, mud flats, seasonally exposed gravel bars, artificial salt ponds and adjoining levees, and dredge spoil sites, with:

Feature 1: Areas that are below heavily vegetated areas or developed areas and above the daily high tides.

Feature 2: Shoreline habitat areas for feeding, with little or no vegetation, that are between the annual low tide or low water flow and annual high tide or high-water flow, subject to inundation but not constantly under water, that support small invertebrates, such as crabs, worms, flies, beetles, spiders, sand hoppers, clams, and ostracods, that are essential food sources.

Feature 3: Surf- or water-deposited organic debris, such as seaweed (including kelp and eelgrass) or driftwood located on open substrates that supports and attracts small invertebrates, and provides cover or shelter from predators and weather, and assists in avoidance of detection (crypsis) for nests, chicks, and incubating adults.

Feature 4: Minimal disturbance from the presence of humans, pets, vehicles, or human-attracted predators, which provide relatively undisturbed areas for individual and population growth and normal behavior.

Fish

Tidewater Goby Critical Habitat

The Service originally designated critical habitat for the tidewater goby on November 20, 2000 (65 FR 69693). In January 2008, the Service finalized a revised designation of critical habitat (73 FR 5920). On October 19, 2011, the Service published another proposed revision to critical habitat (76 FR 64996), and on February 6, 2013, the Service published a final rule designating revised critical habitat for the tidewater goby (78 FR 8745).

The Service designated 45 critical habitat units within the geographical area occupied at listing and 20 critical habitat units outside the geographical area occupied at listing that the Service determined are essential for the conservation of the species. The 20 critical habitat units outside the geographical area occupied at the time of listing contain suitable aquatic habitat in coastal lagoons or estuaries, provide connectivity between source populations or may provide connectivity in the future, or may be more isolated but represent unique adaptations to local features (e.g., habitat variability, hydrology, and microclimate). Approximately 12,156 acres fall within the boundaries of the 65 critical habitat units designated by the 2013 final revised critical habitat rule. Revised critical habitat for the tidewater goby now occurs in Del Norte, Humboldt, Mendocino, Sonoma, Marin, San Mateo, Santa Cruz, Monterey, San Luis Obispo, Santa Barbara, Ventura, Los Angeles, Orange, and San Diego Counties, California. Overall, the critical habitat for this species has remained stable but is still threatened by coastal development. The Elements specific to the goby include:

Element 1: Persistent, shallow (in the range of approximately 0.3 to 6.6 feet), still-to-slow-moving water in lagoons, estuaries, and coastal streams with salinity up to 12 ppt, which provides adequate space for normal behavior and individual and population growth that contain one or more of the following:

Element 1a: Substrates (e.g., sand, silt, mud) suitable for the construction of burrows for reproduction;

Element 1b: Submerged and emergent aquatic vegetation, such as *Potamogeton pectinatus*, *Ruppia maritima*, *Typha latifolia*, and *Scirpus* spp., that provides protection from predators and high flow events; or

Element 1c: Presence of a sandbar(s) across the mouth of a lagoon or estuary during the late spring, summer, and fall that closes or partially closes the lagoon or estuary, thereby providing relatively stable water levels and salinity.

Crustaceans

Vernal Pool Fairy Shrimp Critical Habitat

The Service designated approximately 858,846 acres (347,563 hectares) of critical habitat for four vernal pool crustaceans and 11 vernal pool plants in 34 counties in California and one county in southern Oregon in a final rule of August 11, 2005 (70 FR 46924). Pursuant to that rule, on February 10, 2006, the Service published species-specific unit descriptions and maps for the 15 species. This rule specifically identifies the critical habitat for each individual species identified in the August 11, 2005, final rule. Thirty-five units are designated as critical habitat for the fairy shrimp totaling 597,821 acres. The Elements of critical habitat for the fairy shrimp are the habitat components that provide:

Element 1: Topographic features characterized by mounds and swales and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting the pools described below in paragraph (ii), providing for dispersal and promoting hydroperiods of adequate length in the pools;

Element 2: Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 18 days, in all but the driest years; thereby providing adequate water for incubation, maturation, and reproduction. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands;

Element 3: Sources of food, expected to be detritus occurring in the pools, contributed by overland flow from the pools' watershed, or the results of biological processes within the pools themselves, such as single-celled bacteria, algae, and dead organic matter, to provide for feeding; and

Element 4: Structure within the pools described above in paragraph (ii), consisting of organic and inorganic materials, such as living and dead plants from plant species adapted to seasonally inundated environments, rocks, and other inorganic debris that may be washed, blown, or otherwise transported into the pools, that provide shelter.

Vernal Pool Tadpole Shrimp Critical Habitat

The Service originally designated critical habitat for this species on August 6, 2003. On August 11, 2005, the Service re-evaluated the economic exclusions made to the previous final rule (68 FR 46684; August 6, 2003), which designated critical habitat for four vernal pool crustaceans and 11 vernal pool plants. A total of approximately 858,846 acres (347,563 hectares) of land are now designated critical habitat. The same Elements are designated for the tadpole shrimp as fairy shrimp, listed above in Vernal Pool Fairy Shrimp Critical Habitat.

Plants

Slender Orcutt Grass Critical Habitat

Critical habitat was designated for the slender Orcutt grass on February 10, 2006 (71 FR 7118). The Elements of critical habitat for the grass are the habitat components that provide:

Element 1: Topographic features characterized by isolated mound and intermound complex within a matrix of surrounding uplands that result in continuously, or intermittently, flowing surface water in the depressional features including swales connecting the pools described in paragraph (ii) of this section, providing for dispersal and promoting hydroperiods of adequate length in the pools; and

Element 2: Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a period long enough to promote germination, flowering, and seed production of predominantly annual native wetland species and typically exclude both native and nonnative upland plant species in all but the driest years. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands.

Environmental Baseline

The implementing regulations for section 7(a)(2) (50 CFR 402.02) define the environmental baseline as “the condition of the listed species or its designated critical habitat in the Action

Area, without the consequences to the listed species or designated critical habitat caused by the Proposed Action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the Action Area, the anticipated impacts of all proposed Federal projects in the Action Area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The impacts to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.”

Mammals

Pacific Marten, Coastal DPS

A small population of marten exists in the planning area in Northern California, but the distribution does not currently include Bureau-administered parcels in the planning area. Marten is not currently known from the Action Area. Marten occur in forested habitats with a shrubby understory, including serpentine forests. Suitable habitats include coastal forests, Douglas fir and tanoak dominated forest, late-successional forest, mixed conifer, and potentially other habitats infrequently. The Action Area has some areas of suitable habitat and could be occupied by marten in the future if the population in the planning area increases and its range expands.

There are several federal projects within the planning area that may affect marten. Six Rivers National Forest have several consultations covering fuels management projects, aquatic restoration activities, and road maintenance. Six Rivers National Forest also implements some monitoring efforts within the planning area. Tribes and private entities have forestry activities that may impact marten within the planning area, as well as extensive research and monitoring efforts by the Tribes, State Parks and private entities.

Birds

Marbled Murrelet and its Critical Habitat

The recovery plan established six murrelet conservation zones (Service 1997). The Action Area includes conservation zones 4 through 6 in Northern California. From 2000 through 2017, surveys have shown a 3.7 percent increase in the annual rate of change in zone 4 (far Northern California); farther down the coast, zone 5 showed a 7.2 percent increase. In conservation zone 6 (southernmost range), the murrelet population in the portions of the zone that were surveyed appeared to have undergone a significant and rapid population decline sometime after 2003 continuing through 2008 and then rebounded back to similar population estimates by 2016 (Service 2019e). This is likely due to surveys not being able to cover all suitable habitat rather than true indications of population fluctuations.

The murrelet is known to seasonally occupy the Headwaters Forest Reserve in the planning area, but Headwaters Forest Reserve is not in the Action Area. Murrelet are suspected to occupy the Lacks Creek Area of Critical Environmental Concern (ACEC) in the Action Area within the Bureau's Arcata Field Office administrative boundary. Due to its cryptic nature, murrelet could nest in small patches of suitable habitat elsewhere in the Action Area as habitat continues to develop the habitat elements murrelet require. Murrelet may be found in coastal forest, Douglas fir and tanoak dominated forest, late-successional forest, mixed conifer forest, and other suitable forested habitat. The murrelet can also be found year-round on nearshore ocean waters of the California Coastal National Monument, which is also in the planning area but not the Action

Area. Its nesting population in the planning area is stable but fluctuating. As discussed above, there are approximately 45,800 acres of critical habitat for the murrelet in the Arcata Field Office portion of the Action Area. It is unknown to what extent the physical and biological features of the critical habitat are present in the Action Area.

Large federal consultations in the planning area for murrelet include the Six Rivers National Forest and the Bureau's fuels management projects, and habitat restoration at Redwood National Park. A private timber company is developing a Habitat Conservation Plan for murrelet within the planning area as well. There are many smaller, private timber harvest projects implemented throughout the planning area that may affect murrelet. Murrelet is a covered species under a multi-agency statewide restoration programmatic biological opinion lead by the Service that covers a wide range of restoration activities in the planning area.

California Spotted Owl, Sierra Nevada DPS

The current condition of CSO analysis units throughout the Sierra Nevada population varies, with three analysis units currently considered stable, five declining, and three strongly declining (Service 2022a). Habitat for the Sierra Nevada population contains higher canopy cover and larger tree sizes than in coastal Southern California. A lower abundance of large trees may signify lower habitat suitability for CSO.

CSO range has small amount of overlap with planning area. The portions of the planning area where CSO are likely to occur or have been documented to occur contain discontinuous and scattered Bureau-administered lands. Two CSO Protected Activity Centers are in the Action Area; both are in Redding Field Office's administrative boundaries (Bureau 2024a). The likelihood of occurrence of additional activity centers or nests on Bureau-administered land is low, particularly because recent fire history has resulted in reduction in nesting habitat in the portions of Butte and Tehama Counties where suitable habitat previously existed. It is likely that many of these scattered parcels that are located at suitable elevations contain foraging habitat for CSOs. CSO may be found in Foothill Pine and Oak Woodland, Knobcone, Late-Successional Forest, Mixed Conifer Forest, and other forested habitats in the Action Area.

The Forest Service has a draft programmatic conference opinion covering activities in the Plumas and Lassen National Forests that may affect CSO. There is a Habitat Conservation Plan with Sierra Pacific Industries that covers effects of the company's timber harvest activities to CSO within the planning area. Additionally, the CSO is a covered species under consultation with the Federal Highway Administration for a broad-band installation project.

Northern Spotted Owl and its Critical Habitat

The NSO occupies habitat within the Action Area in Mendocino, Humboldt, Siskiyou, Trinity, Shasta, and Tehama Counties. There are 70,368 acres of final critical habitat and 88 mapped NSO activity centers in the Action Area, with 33 on Bureau split-estate and 55 on Bureau surface lands (Bureau 2024a). It is unknown to what extent the physical and biological features of critical habitat may be present within the Action Area. The Action Area is within the California Coast, California Klamath, and California Cascade Recovery Units (see Figure A-1 in Service 2011a), generally coinciding with the Redwood Coast zone, Klamath and Northern California Interior Coast Ranges zone, and East Cascade zone, described in the critical habitat discussion above. One of the biggest threats to the NSO habitat in the latter (drier interior) regions is ongoing habitat loss as a result of wildfires and the effects of fire exclusion on vegetation change (Service 2011a).

Populations in the Action Area are likely stable to declining, due primarily to range expansion of nonnative barred owls and resulting competition for resources with this species, and habitat loss or modification. Decreases in suitable nesting, roosting, and foraging habitat resulting from wildfire, urbanization and other land use practices are likely to continue within the planning area and will likely contribute to population decline and range reduction. NSO may be found in Coastal Forests, Douglas Fir and Tanoak Dominated Forest, Foothill Pine and Oak Woodland, Knobcone, Late-Successional Forest, Mixed Conifer Forest, and other forested habitats in the Action Area.

The Forest Service and the Bureau both have fuel management programs that cover NSO within the planning area. There are several large-scale Habitat Conservation Plans with private timber companies in the planning area and many smaller timber harvest plans that may affect NSO. Timber harvest and fires have been the leading causes of habitat loss and continue to act on the species at a range-wide level. Federal, state, tribal, and private entities are currently working on experimental removal of barred owl, another major threat to the species. Additionally, NSO is a covered species the statewide restoration programmatic biological opinion.

Western Snowy Plover, Pacific Coast Population DPS and its Critical Habitat

The plover remains threatened, with the population at 2,217 breeding adults counted during breeding window surveys in 2019 (Service 2019b). In the Northern California recovery unit (Recovery Unit 2, which encompasses the Action Area), there was a range of 38 to 56 breeding adults from 2015 to 2019; the target for this unit is 150 breeding adults (Service 2019b). The species faces ongoing threats to its habitat and population, including habitat loss and degradation caused by human activities, predation, and environmental stochasticity. Recovery efforts include habitat restoration, predator management, public education and outreach, and monitoring of population trends and threats (Service 2007a, Service 2019b).

The plover occupies suitable habitat within the Action Area in coastal Humboldt County year-round. Suitable habitat includes Dunes and beach habitats. Plovers are known to nest at the Mike Thompson Wildlife Area at the South Spit of Humboldt Bay, and at the Samoa Dunes RMA on the North Spit of Humboldt Bay, from March 1 to September 15 each season. The population is likely to be stable or declining owing to a loss of breeding habitat, direct human-caused mortality, and increased predator populations.

As mentioned above, about 640 ac of critical habitat are in the Arcata Field Office's administrative boundaries. In the Action Area, critical habitat on Bureau-administered surface lands is at the Mike Thompson Wildlife Area at the South Spit of Humboldt Bay. Critical habitat on Bureau-administered subsurface mineral estate is at two locations managed by California State Parks: Little River State Beach in Humboldt County and the Ten Mile Dunes area at MacKerricher State Park in Mendocino County. It is unknown to what extent the physical and biological features of critical habitat may be present within the Action Area.

The Bureau currently manages a plover protection area at the Mike Thompson Wildlife Area by removing European beachgrass with heavy equipment and adding oyster shells to help plovers make their nests cryptic. Outside of the plover protection area there is an ongoing effort by the Bureau to remove invasive species and restore the area to native vegetation. Similar efforts to restore dunes are occurring along the coast within the planning area by other federal, state, and non-profit groups. Plover is a covered species under the statewide restoration programmatic biological opinion lead by the Service and the Bureau's wildland-urban interface fuels treatment

programmatic letter of concurrence. In general, these projects are designed and managed to avoid impacts to plovers and improve habitat for plovers.

Yellow-billed Cuckoo, Western DPS

The only sighting of a cuckoo in the Action Area was a single migrant individual on Clear Creek, a tributary of the Sacramento River, in the Redding Field Office administrative boundary. There is an additional detection from the Arcata Field Office's administrative boundary in 2023 (Service 2023, unpublished data). Currently there is no habitat capable of supporting a breeding population of cuckoos on the Action Area. Despite the lack of records and lack of habitat for the species, the Bureau surveys riparian habitat prior to project activities that could affect cuckoos but, to date, these surveys have not detected cuckoos. Suitable habitat for the cuckoo is Valley-Foothill Riparian. The Bureau is embarking on a major riparian habitat restoration program at Rancho Briesgau along Battle Creek and the Sacramento River (River Partners 2024). A goal of this restoration is to create a block of habitat of sufficient size and composition to support breeding cuckoos on the Sacramento River in the Action Area. The cuckoo is a covered species under the Bureau's wildland-urban interface fuels treatment programmatic letter of concurrence.

Reptiles

Northwestern Pond Turtle

In the proposed rule to list the northwestern pond turtle (88 FR 68370), the Service concluded that the northwestern pond turtle is likely to become in danger of extinction within the foreseeable future throughout its range. The species is in decline due to habitat degradation, disease, and the introduction of predators like bass and bullfrogs.

The species range occurs throughout much of the planning area and Action Area. The species is known to occupy multiple watersheds within the Action Area. However, precise abundance and occupancy are unknown. Approximately 274,800 acres of the species range, as mapped by the Service, exists on Bureau-administered surface in the Action Area (Bureau 2024a).

The Service is currently conferencing with federal agencies, Tribes, and California Department of Transportation that are proposing projects that may affect the turtle within the planning area which include road and bridge repair, development and restoration projects.

Amphibians

Foothill Yellow-legged Frog, North Feather River DPS

The frog is expected to decline across the range over the next 40 years with possible extirpation of entire genetic clades. The species has lost diversity due to large extirpations, and it exhibits an overall trend of decreasing genetic diversity (88 FR 59698).

The frog occupies habitat within the Action Area. Within the range of the frog, the Bureau manages scattered and largely discontinuous parcels of land containing suitable habitat. Numerous occurrences of the species have been documented in Butte County, particularly in the area surrounding Lake Oroville and the West Branch of the Feather River, some of which are in the Action Area. Threats to the species in the planning area include habitat loss and alteration due to climate change and resulting changes to hydrologic regimes, urbanization and expansion, illegal water diversion, and high-severity wildfire. Habitat on Bureau-administered land is likely stable to slightly declining due to the aforementioned factors.

Foothill yellow-legged frog is a covered species in the Bureau's wildland-urban interface fuels reduction program, Forest Service's amphibian programmatic biological opinion for the Plumas National Forest area, and statewide multi-agency restoration programmatic biological opinion.

Western Spadefoot, Northern DPS

The Service assessed the condition of 20 regions within the range of the species (Service 2023c). Two regions occur in the planning area: the northwestern and northeastern Sacramento Valley regions (see Figure 8 in Service 2023c). The overall assessed condition of both regions is low. The threats that are likely impacting the regions are a combination of development on unprotected areas, overabundant vegetation (invasive annual grasses), nonnative predators, drought, noise disturbance, wildfire, and the effects of climate change (Service 2023c).

The spadefoot range is distributed in the planning area and Action Area. Bureau-administered surface lands and subsurface mineral estates distributed in the Central Valley and adjacent foothills of the Sierra Nevada and Coast Range that contain riparian and wetland areas, and especially vernal pool landscapes, likely support suitable habitat for the species. Surveys carried out by the Bureau to date in vernal pool habitats on Bureau-administered surface lands have not documented the species. The threats to the species habitat in the Action Area are represented by those described in the Status of the Species above.

Fish

Tidewater Goby and its Critical Habitat

According to the California Natural Diversity Database (Diversity Database), there are about 3,000 acres where goby reside in the planning area, but there is no overlap between the Action Area and occupied goby habitat (Bureau 2024a).

Tidewater goby distribution in the Action Area is likely at portions of the Action Area that are directly adjacent to waterbodies where tidewater goby is known to be present. This is likely the case at portions of the Action Area at the Mad River Slough in Arcata Bay, which abuts the Male'l Dunes area. In this location, Action Area parcels are close to, or are directly adjacent to, the waterbodies that are likely occupied by tidewater goby. Similarly, there is designated critical habitat adjacent to the Action Area. It is unknown to what extent the physical and biological features of critical habitat may be present within the Action Area.

The California Department of Fish and Wildlife has an active restoration project within the planning area at the Eel River Wildlife Area just south of the Mike Thompson Wildlife area that includes restoring tidal connectivity to areas previously behind dikes and tide gates where gobies are known to occur. Preliminary monitoring has indicated gobies are abundant in this area and the project was designed to provide suitable habitat. Tidewater goby is also a covered species under the statewide restoration programmatic biological opinion and the Bureau's wildland-urban interface fuels treatment programmatic letter of concurrence.

Insects

Franklin's Bumble Bee

Franklin's bumble bee has been rare on the landscape within its historical range since 1923, when occurrences were first documented. The species experienced widespread declines in the mid to late 1990s, with just a few observations since 2000 and the last observation on Mt.

Ashland in 2006. Annual multiagency survey efforts have expanded each year since 2006 near historic detection locations with no confirmed observations. However, vast areas of relatively plentiful and widely distributed substantial floral resources have not been surveyed (Service 2021c).

There are 16 historic observations of Franklin's bumble bee in the Action Area with seven High Priority Zones (HPZs). The HPZs encompass 215,436 total acres and include approximately 15 separate Bureau land parcels from the Yreka-Montague area north to the California-Oregon border. The HPZ areas account for the six-mile foraging and dispersal distance for Franklin's bumble bee (Thorp pers. comm. 2017).

As described in the Status of the Species section, Franklin's bumble bee has been found at a broad elevational range in a wide variety of habitats. The substantial floral resources are required, defined as a diverse and constant supply of insecticide-free native flowering plants that provide both pollen and nectar throughout the colony's active flight period (May 15 through September 30; Xerces Society and Thorp 2010). Since substantial floral resources must be available throughout this period, a varied assortment of plant species with staggered floral senescence must be abundant (i.e., no monocultures). This is typically exemplified by existing meadow systems (i.e., larger open meadows in proximity to seeps and other wet meadow environments). Meadow complexes with substantial floral resources may contain nesting and overwintering habitat consisting of abandoned rodent burrows, bunch grasses, rock piles, and large downed wood within 100 meters of the substantial floral resources. Overwintering habitat consisting of loose, well-drained soil and other materials in shaded areas under trees may also be present in the Action Area.

No surveys have been conducted on Bureau lands in the seven HPZs and prior surveys for pollinators and floral resources on Bureau lands have been sporadic and project related. Species-specific and substantial floral resources habitat survey efforts have not been conducted on Bureau lands addressed in the Revised Management Plan to date. The Biological Assessment describes approximately 37,400 acres of potential habitat in the Action Area.

Previous and current federal activities in the Action Area in and outside of HPZs include vegetation management and fuels reduction on Forest Service lands, including recreation management, wildfire suppression activities typically addressed by emergency consultation under the Act, hazard tree abatement, and permitted grazing activities on allotments. Meadow restoration treatments are not a focus in the HPZs, but may be incidental to larger vegetation management projects. These ongoing activities are typically highly dispersed (e.g., recreation management, hazard tree abatement) or are concentrated in specific project areas. While they can result in modification, reduction or a seasonal loss of substantial floral resources, or a reduction or loss of nesting or overwintering habitats (e.g., broadcast burning, dead and down logs, trees or snags with structure, small trees and brush) they are not expected to have significantly affected, or significantly affect important habitat needs for Franklin's bumble bee.

Monarch Butterfly

The monarch is currently a federal candidate for listing under the Act. The North American migratory populations are the largest relative to the other rangewide populations, accounting for more than 90 percent of the worldwide number of monarchs. Based on the past annual censuses, the eastern and western North American migratory populations have been generally declining over the last 20 years. The western North American population has a much higher risk of

extinction due to current threats than the eastern North American population. At the current and projected population numbers, both the eastern and western populations have become more vulnerable to catastrophic events (for example, extreme storms at the overwintering habitat). Also, under different climate change scenarios, the number of days and the area in which monarch butterflies will be exposed to unsuitably high temperatures within their migration and breeding habitats will increase markedly (Service 2020d). The species status assessment for the monarch indicates the western population has declined by over 99 percent since the 1980s (Service 2020d).

The species has been documented throughout the planning area, and breeding is known to occur from approximately June through October. Suitable habitat for monarchs in the Action Area is likely to include open habitats with sufficient nectar resources. This may include most of the vegetation cover types described in the Action Area such as Grasslands, Vernal Pools, and Oak Savannas and Open Woodlands. On Bureau-administered lands within the planning area, it is likely that this habitat is stable to improving in abundance and quality. Restoration activities at Rancho Briesgau along Battle Creek and the Sacramento River (River Partners 2024) will include planting both milkweed as a larval plant and other plants as nectar sources.

The monarch is a covered species under consultation with the Federal Highway Administration for broad-band installation project and measures to protect pollinators including monarch are included in the statewide restoration program. Monarch is also subject to two conservation benefit agreements with utility infrastructure and agriculture.

Valley Elderberry Longhorn Beetle

According to the 2019 revised recovery plan for the beetle, the species' population has experienced declines due to habitat loss and degradation, particularly in the Sacramento and San Joaquin populations. The current total population size is unknown, but the species is considered to be at moderate to high risk of extinction (Service 2019c).

The species is known to be present on Bureau-administered lands along the Sacramento River and tributaries within the Action Area, though population distribution and trends are unknown. The species' habitat, and in particular the abundance of its host elderberry plant, is likely declining throughout the planning area. However, habitat quality and quantity are increasing on Bureau-administered lands due to the implementation of conservation measures and an emphasis on protecting, restoring, and enhancing riparian habitats – specifically the abundance and health of elderberry plants within those habitats. The beetle is most often found in Valley-Foothill Riparian, but may also be found in Grasslands or Oak Savannas and Open Woodlands. The Rancho Briesgau restoration project along Battle Creek and the Sacramento River (River Partners 2024) will include elderberry shrub plantings and is anticipated to create additional beetle habitat on the Action Area. The statewide restoration programmatic biological opinion includes measures to protect elderberry shrubs when projects occur within the range of the species, as does the broad-band installation project mentioned above.

Crustaceans

Vernal Pool Fairy Shrimp and its Critical Habitat

Intensive surveys for fairy shrimp have been conducted on Bureau-administered lands in the planning area. A number of vernal pools have been found in the Action Area within existing Areas of Critical Environmental Concern with populations of this species. The species status in

the Action Area appears to be stable, and no populations have been extirpated. Surveys have not been done in vernal pool habitat within designated critical habitat for this species on Bureau-administered subsurface mineral estate (i.e., private surface lands). It is unknown to what extent the physical and biological features of critical habitat may be present within the Action Area. The statewide restoration programmatic biological opinion and broad-band installation project include measures to protect vernal pool fairy shrimp when projects occur within the range of the species.

Vernal Pool Tadpole Shrimp and its Critical Habitat

Intensive surveys for tadpole shrimp have been conducted on Bureau-administered lands in the planning area. A number of vernal pools have been found in the Action Area within existing Areas of Critical Environmental Concern with populations of this species. The species status in the Action Area appears to be stable, and no populations have been extirpated. Surveys have not been done in vernal pool habitat within designated critical habitat for this species on Bureau-administered subsurface mineral estate (i.e., private surface lands). It is unknown to what extent the physical and biological features of critical habitat may be present within the Action Area. The statewide restoration programmatic biological opinion and broad-band installation project include measures to protect vernal pool tadpole shrimp when projects occur within the range of the species.

Plants

Beach Layia

Layia was listed due to habitat loss from invasion of nonnative species such as European beachgrass (*Ammophila arenaria*) and from coastal development. Invasive species occur at nearly all sites with known layia populations; however, intensive treatments have mostly eradicated the nonnative species, restoring habitat at Lanphere Dunes, Ma-le'l North, and a significant portion of the Mike Thompson Wildlife Area within the North Spit of the Humboldt Bay (Service 2018b). Removing the invasive species is helping to reduce negative influences; this will improve the species' resilience at most populations.

The largest populations of beach layia occur on the Ma-le'l South and Samoa Dunes parcels on the North Spit of Humboldt Bay and the Mike Thompson Wildlife Area on the South Spit of the Humboldt Bay, within the restored area. Populations within the Arcata Field Office's administrative boundaries are increasing, which is attributed to extensive restoration efforts and protection from off road as well as annual restoration on South Spit. Currently, nonnative, invasive species such as European beachgrass and ice plant (*Carpobrotus edulis*) are the primary cause of habitat loss within the coastal dunes.

Dune restoration projects are occurring along the coast within the planning area lead by the Bureau and other federal, state, and non-profit groups. These projects are designed and managed to improve habitat for beach layia and monitoring data show occupied area and density have increased as a result (Service 2018b). Additionally, beach layia is a covered species under consultation for the broad-band installation project.

Gentner's Fritillary

A small portion of the Gentner's fritillary range occurs within the planning area, within the Redding Field Office. Out of 274 known occupied Gentner's fritillary sites, only three sites are in northeastern California. These California sites are located on joint State and Bureau lands and

private lands in Siskiyou County, California. Systematic surveys to determine the complete distribution of the species on lands managed by the Bureau Redding Field Office administrative boundary have not been completed, so it is possible that the species may occur on Bureau-administered surface lands within suitable habitat. Suitable habitat for Gentner's fritillary may include open areas (e.g., grasslands and meadows) within Chaparral Shrubland, Foothill Pine and Oak Woodland, and Mixed Conifer forest. The Gentner's fritillary is a covered species under the Bureau's wildland-urban interface fuels treatment programmatic letter of concurrence and the broad-band installation project.

McDonald's Rock-cress

Approximately 85 percent of this species' range occurs within the Bureau Red Mountain ACEC and wilderness area within the Red Mountain Management Area. Recent monitoring data compared with baseline data show the population beginning to decline, although the decline has not been attributed to a single cause.

The McDonald's rock-cress is only found on Red Mountain in the Red Mountain Management Area administered by the Arcata Field Office within the Action Area. This area was designated as South Fork Eel River Wilderness in 2006. The Bureau Arcata Field Office monitors this population annually. The most recent survey in 2022 confirmed the population is extant. Approximately 468 acres of occupied habitat occur on Bureau-administered surface, and 8 acres occur on Bureau-administered subsurface mineral estate in the Action Area (Bureau 2024a). The population remains stable but may be declining. Federal consultations in the planning area for McDonald's rock-cress include the Six Rivers National Forest and the Bureau's fuels management projects.

Menzies' Wallflower

According to the most recent 5-Year Review (Service 2020e), the North Spit Humboldt Bay population is large and healthy. The population is stable and is exhibiting signs of increasing in particular areas. Invasive species, disease, and, to a minor degree, off-road vehicle use are still threats. The South Spit Humboldt Bay population is historically small and remains so. It remains threatened by lack of habitat, competition with native and invasive vegetation, and herbivory. The Elk River Spit population is on land managed by the City of Eureka. This population is declining due to competition with invasive species, mainly European beachgrass. Recreation is also a threat. No active management at this population has occurred to date.

The Mendocino County population largely occurs on lands owned and managed by the California Department of Parks and Recreation (MacKerricher State Park). At this population, dune rehabilitation projects, habitat enhancement plots, and invasive species removal have resulted in expansion of the population, though competition from invasive species and recreation impacts remain threats.

The Menzies' wallflower occurs in the Action Area in two locations: at the North and South Spits of Humboldt Bay in Humboldt County, and at Ten Mile Beach in Mendocino County. In Humboldt County, the species grows on Ma-le'l Dunes Cooperative Management Area and Samoa Dunes within the 40-acre endangered plant protection area, which is closed to public use. It also occurs within the Samoa Dunes Recreation Area, including in a 40-acre area that is closed to motorized use for plant protection. This is part of the Humboldt Bay North Spit population described above. The population is increasing, and this increase is attributed to annual invasive

species removal within both areas on Bureau-administered lands. Currently, habitat loss is caused by invasion of nonnative plant species and off-road vehicle use.

Dune restoration projects are occurring along the coast within the planning area lead by the Bureau and other federal, state, and non-profit groups. These projects are designed and managed to avoid impacts to and improve habitat for Menzies' wallflower. Additionally, Menzies' wallflower is a covered species under consultation for the broad-band installation project.

Slender Orcutt Grass and its Critical Habitat

The status of slender Orcutt grass has remained the same since the time of its listing in 1997. Drought has been known to cause 100 percent mortality of local populations (Service 2005b). Urbanization continues to threaten the slender Orcutt grass populations near Redding and Sacramento.

According to the Diversity Database, there are 49 occurrences and 3,790 acres of occupied habitat in the planning area. In the Action Area, there are 10 occurrences and about 100 acres of occupied habitat (Bureau 2024a). Of these 10 occurrences, two occurrences are considered to be possibly extirpated and eight are presumed to be extant. The grass is found in vernal pool habitat in the Hawes Corner RNA/ACEC and in the Sacramento River Bend ONA/ACEC within the Redding Field Office's administrative boundaries.

Of the approximately 94,200 acres of critical habitat across the range of the species, approximately 15,800 acres of final critical habitat are in the Action Area. It is unknown to what extent the physical and biological features of critical habitat may be present within the Action Area.

Slender Orcutt grass is a covered species under the statewide restoration programmatic biological opinion, broad-band installation project, and a consultation with the Modoc National Forest for grazing. Additionally, some populations of slender Orcutt grass were impacted in 2021 by the Dixie Fire and associated emergency response effort.

Stebbins' Morning Glory

There are no Stebbins' morning-glory occurrences known from Bureau lands in the Action Area. However, as described in the Status of the Species section, the new population discovered in 2022 in the Whiskeytown National Recreation Area (NRA) is in the Action Area near Bureau lands. Additional survey efforts are needed to better delineate the extent and abundance of the newly discovered population in the Whiskeytown NRA, and surveys are also needed in potentially suitable habitat on Bureau-administered lands in the vicinity of this new population.

It is reasonable to expect that new populations may be discovered on Bureau-administered lands during surveys in coming years. Populations in the Pine Hill formation grow on gabbroic soils, while populations near Grass Valley grow on serpentine soils. Habitat with similar soil types as known occurrences are extensive in the portions of the Action Area, including the Chappie Shasta Off Highway Vehicle Area, and Bureau parcels in the West Redding area and French Gulch area, all within the administrative boundaries of the Redding Field Office. Stebbins' morning-glory is a covered species under consultation for the broad-band project led by the Federal Highway Administration.

Yreka Phlox

The entirety of the Yreka phlox range is in the planning area. The range is located in an area with scattered parcels of Bureau-administered surface lands; however, the species is not known to occur on these lands. Phlox is primarily known from open habitats on serpentine soils and could be found in any vegetation type within the Action Area where soils are suitable. Systematic surveys to determine the complete distribution of the species have not been completed, so it is possible that the species may occur on Bureau-administered surface lands in the vicinity of known occurrences.

The Bureau has conducted some surveys to locate Yreka phlox and the Service participating in Recovery Land Acquisition Section 6 proposals with the California Department of Fish and Wildlife in an effort to acquire areas of occupied habitat. Private landowners have allowed federal and local agencies access to occupied areas to remove competitive non-invasive species.

Effects of the Action

The implementing regulations for section 7(a)(2) define effects of the action as “all consequences to listed species or critical habitat that are caused by the Proposed Action, including the consequences of other activities that are caused by the Proposed Action but that are not part of the action. A consequence is caused by the Proposed Action if it would not occur but for the Proposed Action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action.” (50 CFR 402.02).

In conducting this analysis, we have considered factors such as previous consultations, Federal Register rules, 5-year reviews, conservation agreements, published scientific studies and literature, professional expertise of Service personnel, information obtained from other academic researchers or experts particularly dealing with aspects directly related to the sensitive species involved, species threats assessments, or other related documents in determining whether effects are reasonably certain to occur. We have also determined that certain consequences are not caused by the Proposed Action, such as the increase or spread of disease, poaching, or collecting, because they are so remote in time, or geographically remote, or separated by a lengthy causal chain, so as to make those consequences not reasonably certain to occur.

Mammals

Pacific Marten, Coastal DPS

Effects

Plan management categories that may affect coastal marten include Vegetation and Forestry, Wildlife, Wildland Fire Management, Renewable Energy, Minerals, and Travel and Transportation Management. Activities under these categories include Invasive Plant Removal, Fuels Management, Prescribed Burns, Terrestrial Habitat Restoration, Timber Harvest, Recreation and Roads. Many of the specific activities and subactivities for these management categories overlap. Best Management Practices including Wild 1-8, WF 1-3, MC 1-4, and LSF 1-5, as described in the Conservation Measures section of the Proposed Action will be applied to appropriate activities to minimize or avoid impacts to marten.

Specific activities implemented to achieve management goals under the Vegetation and Forestry, and Wildland Fire Management categories that may affect coastal marten include removal of

brush, small diameter trees, and ladder fuels; felling snags, construction of fuel breaks and fire control lines; pile and broadcast burning; tree thinning; helicopter use, felling, skidding and decking logs; mastication, and the construction of temporary landings and roads. Categories of treatments under Vegetation and Forestry also broadly include forest thinning to promote late-seral conditions and riparian health and removing encroaching conifers from oak woodlands and prairies. These treatments would occur using a mix of prescribed fire and manual, biological, chemical, and mechanical treatments. Hazard tree removal may increase habitat fragmentation as wide areas of trees are removed on both sides of roadways. This fragmentation can create a barrier to movement if marten do not cross and could increase predation or vehicle strikes for marten that do attempt to cross the roadways.

These activities can remove, downgrade, or maintain but degrade denning, resting, and foraging habitat and movement habitat. Treatments can simplify habitat structure, remove potential den sites such as snags, slash accumulations, or down logs, and remove the mesic (i.e., ericaceous) brush layer important for marten cover and prey habitat. Depending on the site, effects due to the removal of the mesic brush layer are not long-lasting because the brush layer typically grows back. Amounts of movement habitat in landscapes is widespread and not considered a limiting factor for marten, and most treatments impacts are temporary.

Depending on project specifications, fuels treatments and restoration activities also have the potential to benefit marten by reducing future habitat losses due to catastrophic wildfires. Activities that maintain late successional characteristic also help maintain post-treatment suitability of denning, resting, and foraging habitat and help ameliorate habitat losses from catastrophic wildfire.

Commercial timber harvest includes the subactivities of felling large trees and skidding and decking them using heavy equipment or helicopters, construction of temporary roads and log landings, and subsequent site preparation for replanting. Commercial timber harvest can remove, downgrade, or maintain but degrade denning, resting, and foraging habitat, which can reduce availability of cover from predators and adverse weather such as summer heat or winter storms, and reduce the availability of suitable den sites. This is especially true within the hotter, inland Douglas-fir dominated portions of the marten's range in the Action Area, where marten occurrence is associated with late successional forest that provides for thermoregulation during the summer. No even-aged management is proposed under the Plan. In Late Successional Reserves, commercial timber harvest will not be the primary purpose of tree felling; timber and other forest products would only be removed from Late Successional Reserves as a byproduct of restoration. Depending on where they are located, construction of temporary roads and landings can remove suitable marten habitat, but typically in small amounts. In addition, timber harvest in occupied or unsurveyed denning, resting, and foraging habitat during the breeding season can result in direct injury or mortality to adults or young marten during tree felling and equipment operations.

Depending on project specifications, all the management categories have activities and subactivities that may cause breeding season disturbance to marten due to proximity to suitable habitat, presence of active den sites, and the noise or smoke levels produced. Smoke and noise disturbance can cause abandonment of den sites, lowered reproductive output, and increased predation. Travel and Transportation includes road and trail construction, maintenance, and decommissioning; bridge or culvert installation; hazard tree removal; and vegetation removal.

Heavy equipment use, helicopter use, mastication, maintenance and construction activities, drone use, mineral extraction, target shooting, off road vehicle use and other activities have the potential to produce loud noise disturbance during the breeding season (March 1 to July 31) when it is within 0.25 miles of active dens or unsurveyed denning, resting, and foraging habitat. Specifically, take could occur if either project-generated sound exceeds ambient nesting conditions by 20-25 decibels or when project-generated sound, when added to existing ambient conditions, exceeds 90 decibels. Pile and broadcast burning also has the potential to produce smoke disturbance to denning martens during the same time period. In addition, recreation and drone or kite use may cause visual disturbance when near denning marten.

All activities that may affect marten will be evaluated in a separate project-level consultation with the Service as directed by the law and Bureau policy. During project-level consultation, conservation measures including the Best Management Practices (Appendix B) will be developed for marten that will minimize the potential for adverse effects during such projects. Best Management Practices for Late Successional Forest (LSF 1-LSF 5) will benefit marten by maintaining essential habitat features. Specifically, implementation of LSF 3 will maintain trees with features to support marten resting and denning, and LSF 5 is designed to maintain connectivity for marten by maintaining ericaceous shrubs and habitat complexity to support prey and provide cover from predators. Marten distribution is uncertain, and they may occur on Bureau lands in the Plan area. Impacts to marten from the above activities are generally dispersed throughout the Action Area and over time, limiting adverse effects.

Impact on Recovery

The objectives of the 2020 coastal marten recovery outline are (1) to continue to fill knowledge gaps on species and population needs, habitat use, and threats, (2) protect existing population areas and currently suitable habitat by establishing management commitments in Environmental Protection Areas, (3) explore feasibility and need to reestablish populations, (4) restore suitable habitat conditions in specific areas to increase population size and distribution, and (5) ameliorate primary threats so that coastal marten populations will persist for the foreseeable future (Service 2023a).

The most important management activities in the Plan relative to marten recovery goals are the proposed habitat conservation and active forest restoration, which have the potential to restore suitable marten habitat conditions in specific areas to increase population size and distribution. The Plan also proposes active forest restoration, including fuels treatments that will improve forest resiliency to fire and restore or enhance late successional forest.

The Plan indicates that Bureau will conduct recovery actions for listed species. When Plan components are implemented with marten protection and recovery in mind, the Plan will not conflict with marten recovery objectives. The Bureau proposed measures that would minimize adverse effects to marten. LSF 5 states that the Bureau will maintain and enhance connectivity of continuous blocks of habitat for martens including retaining increased stand complexity, understory shrubs and trees, snags, and downed woody debris. The Plan also proposes to inventory and monitor special status species and their habitats to better understand their abundance and distribution and to facilitate implementation of conservation and recovery actions within the planning area. Under the Plan, wildlife and habitat would be monitored to determine population and habitat trends. Marten recovery will benefit from the fuels and forest restoration

activities if those activities are implemented in ways to protect older stands of denning, resting and foraging habitat.

Pacific Marten, Coastal DPS Critical Habitat

The effects to designated final critical habitat for coastal marten are identical to those described for coastal marten habitat above, except for noise and smoke disturbance which are not considered to effect coastal marten critical habitat Feature 1 (denning, resting, and foraging habitat) or Feature 2 (movement habitat).

Implementation-level Vegetation and Forestry treatments will be evaluated in a separate project-level consultation with the Service as directed by law and Bureau policy. During project-level consultation, conservation measures would be developed for marten critical habitat that would minimize the potential for adverse modification during such projects.

Birds

Marbled Murrelet

Effects

The primary management categories that may affect murrelet include Riparian Management Areas, Vegetation and Forestry, Wildlife, Wildland Fire Management, Renewable Energy, minerals development, travel and transportation management, and recreation. Many of the specific activities and subactivities for these management categories overlap. Depending on project specifications, all the management categories have activities and subactivities that may cause breeding season disturbance to murrelets depending on their location, presence of breeding birds, and the noise or smoke levels produced. Smoke and noise disturbance can cause nest abandonment, lowered reproductive output, and increased predation. Best Management Practices including Wild 1-8, WF 1-3, MC 1-4, and LSF 1-5, as described in the Conservation Measures section of the Proposed Action will be applied to appropriate activities to minimize or avoid impacts to murrelets.

Activities under the above-mentioned management categories that could adversely affect marbled murrelet include removal of brush, small diameter trees, and ladder fuels, felling small snags, construction of shaded fuel breaks and fire control lines, and tree thinning. Forest thinning to promote late-seral conditions and riparian health as well as removing encroaching conifers from oak woodlands and prairies are important components of the Plan. These treatments would occur using a mix of prescribed fire and manual, biological, chemical, and mechanical treatments. If these actions avoid any changes to the canopy cover, adverse effects to the marbled murrelet are likely restricted to changes in microclimate or increases of nest predators. Although these effects from management are not well understood, they likely result in degradation of nesting habitat.

Commercial timber harvest has the highest probability of adversely affecting (i.e., to permanently remove or degrade) murrelet nesting habitat because the large, old trees valued as commercial products are the primary components of nesting habitat. Commercial timber harvest typically includes the subactivities of felling large overstory trees and skidding and decking them using heavy equipment or helicopters, construction of temporary roads and log landings, and subsequent site preparation for replanting. Construction of temporary roads and landings can remove suitable nesting habitat and increase fragmentation. In the case of Late Successional Reserves commercial timber harvest will not be the primary purpose of tree felling; the Plan

indicates that timber and other forest products would only be removed from Late Seral Reserves only as a byproduct of restoration. Site preparation and replanting would have minimal, if any, effect on marbled murrelet. In addition, timber harvest in occupied or unsurveyed nesting habitat during the breeding season (March 24 to September 15) can result in direct injury or mortality to adults or young marbled murrelets during tree felling.

Additional loss of suitable nesting habitat from these and other activities, in conjunction with past and future losses from logging are a primary threat to murrelet persistence. Removal of nesting habitat is permanent, and there is no evidence that the murrelet has ever recolonized an area where nesting habitat was removed and subsequently grew back into suitable habitat. This is likely due to the very long timespans (e.g., at least 100 years) necessary to grow suitable nesting habitat.

Depending on project specifications, fuels treatments and restoration activities also have the potential to benefit murrelet by reducing future habitat losses due to wildfires. Activities that maintain the late mature and old-growth habitats used by murrelet for nesting help ameliorate habitat losses from wildfire. Commercial harvest has the potential for removal and degradation of habitat and can increase fire risk to murrelet habitat.

Hazard tree removal also has the potential to remove or degrade nesting habitat. When a low number of dead trees are selected and removed hazard tree removal is not highly impactful but impacts to nesting habitat may occur when all standing (including large green trees) are removed in wide roadside swaths. In this case, nesting habitat may be removed and adjoining suitable habitat is affected by microclimate changes and increases in nest predators.

When designing projects Bureau would consider the need for restrictions for subactivities that could adversely affect nesting habitat. Best Management Practices LSF-1, LSF-2, LSF-3, LSF-4, and LSF-5 (Appendix B) provide guidance such that late successional habitat such as nesting habitat will likely be maintained as functionally suitable post-management. LSF-1 intends to manage for late successional characteristics such as uneven-age stands and a multilayered canopy. LSF-2 intends for snags greater than 12 inches diameter at breast height to be retained whenever possible. LSF-3 intends that large trees with cavities, deformity, mistletoe presence, and other late successional characteristics will be maintained in murrelet nesting habitat. LSF-4 intends that a minimum 60 percent canopy closure will be maintained, although overstory conifer canopy removal to this level likely renders the stand unsuitable for nesting murrelets. LSF-5 intends to provide for forest carnivore habitat, which may benefit murrelets. No even-aged management is proposed under the Plan.

Heavy equipment use, helicopter use, mastication, maintenance and construction activities, drone use, mineral extraction, target shooting, off road vehicle use and other activities have the potential to produce loud noise disturbance during the critical portion of the breeding season (March 24 to August 5) when it is within 0.25 miles of breeding murrelets or unsurveyed nesting habitat. Specifically, take could occur if either project-generated sound exceeds ambient nesting conditions by 20-25 decibels (dB) or when project-generated sound, when added to existing ambient conditions, exceeds 90 dB. Pile and broadcast burning also has the potential to produce smoke disturbance to nesting murrelets during the breeding season. In addition, recreation and drone or kite use may cause visual disturbance when conducted near nesting murrelets.

Implementation-level subactivities and activities will be evaluated in a separate project-level consultation with the Service as directed by the law and Bureau policy. During project-level consultation, conservation measures would be developed for murrelets that would minimize the potential for adverse effects during such projects. Known occupied sites (such as Lacks Creek) or potential murrelet nesting habitat are not widespread on Bureau lands, so areas where noise and smoke disturbance need to be managed for the species are limited. Adverse effects discussed above are likely to occur, therefore, the proposed action is likely to adversely affect murrelets in the Action Area.

Impact on Recovery

The 1997 Marbled Murrelet Recovery Plan (Service 1997) objectives were to stabilize population size at or near current levels by (1) maintaining and/or increasing productivity of the population as reflected by changes in total population size, the adult to juvenile ratio, and nesting success by maintaining and/or increasing marine and terrestrial habitat and by (2) removing and/or minimizing threats to survivorship, including mortality from gill-net fisheries and oil spills.

Management conducted under the Plan has the potential to maintain terrestrial nesting habitat. Project-level surveys will occur prior to management activities that may affect habitat. Thus, there is a high likelihood that suitable nesting habitat will be avoided and maintained under the Plan.

Management conducted under the Plan has the potential to remove or minimize threats to survivorship. The Plan contains management direction to consider allowing predator control to protect listed species; when predator management is proposed, the Bureau would consult with the Service and Tribes on management actions. Management of corvids can include habitat treatment, management of trash and recreational use, and lethal removal. Bureau may undertake such predator management within the Action Area. The Service expects there to be significant benefits to murrelets from management of nest predators such as corvids. Habitat buffers around occupied or unsurveyed suitable habitat help maintain microclimate and potentially survivorship.

The Bureau may conduct recovery actions under the Plan for listed species with Service recovery plans such that the measurable results of these actions contribute to meeting delisting criteria for a given species and that they will enable forests to contribute to the recovery of the marbled murrelet. When Plan components are implemented with murrelet protection and recovery in mind, the Plan will not conflict with recovery objectives. The Bureau proposed measures that would minimize adverse effects to the murrelet. Specifically, LSF 3 will maintain large trees that have characteristics (i.e., broken tops and mistletoe clumps) suitable for murrelet nesting. Wild 10, food and waste management, will minimize predation risk to nesting murrelets by dissuading corvids from investigating recreation areas. Thinning and fuels work may benefit the species by reducing the risk of stand-replacing fires in late-successional habitats.

Marbled Murrelet Critical Habitat

The effects to critical habitat for the marbled murrelet are identical to those described for murrelet nesting habitat above, except for noise and smoke disturbance which are not considered to effect critical habitat Elements.

Implementation-level vegetation and forestry treatments will be evaluated in a separate project-level consultation with the Service as directed by the Act and Bureau policy. During project-

level consultation, conservation measures would be developed for murrelet critical habitat that would minimize the potential for adverse effects during such projects. Adverse effects discussed above are likely to occur. Accordingly, the Proposed Action is likely to adversely affect marbled murrelet critical habitat in the Action Area.

California Spotted Owl, Sierra Nevada DPS

Effects

The primary program areas that may affect CSO include Riparian Management Areas, Vegetation and Forestry, Wildlife, Wildland Fire Management, Renewable Energy, Minerals, Travel and Transportation Management and Recreation. Many of the specific activities and subactivities for these management categories overlap. Best Management Practices including Wild 1-8, WF 1-3, MC 1-4, and LSF 1-5, as described in the Conservation Measures section of the Proposed Action will be applied to appropriate activities to minimize or avoid impacts to CSO.

Subactivities under Riparian Management Areas, Vegetation and Forestry, Wildlife, and Wildland Fire Management that may affect CSO include removal of brush, small diameter trees, and ladder fuels; felling snags; construction of fuel breaks and fire control lines; pile and broadcast burning; tree thinning; helicopter use; felling, skidding and decking logs; mastication; and the construction of temporary roads and landings. Categories of treatments under Vegetation and Forestry also broadly include forest thinning to promote late-seral conditions and riparian health and removing encroaching conifers from oak woodlands and prairies. These treatments would occur using a mix of prescribed fire and manual, biological, chemical, and mechanical treatments.

These activities can remove, downgrade, maintain but degrade, improve, or have no effect on suitable CSO nesting and roosting and foraging habitat. Treatments can simplify habitat structure, remove potential nest sites such as snags and other trees, and temporarily degrade prey habitat by removing cover and down woody material. Additional loss of suitable habitat from these and other activities, in conjunction with past and future losses from logging and wildfire, are a primary threat to CSO persistence.

Depending on project specifications, fuels treatments and restoration activities also have the potential to benefit CSO by reducing future habitat losses due to wildfires. Activities that maintain high overstory canopy, maintain or increase stand diameter at breast height (i.e., tree size) and basal area generally maintain post-treatment CSO habitat suitability and help ameliorate habitat losses from wildfire. Dense stands of smaller diameter trees may also be enhanced for CSO foraging by facilitating owl movement in post-thinned stands. Thinning can also release conifers so that the quality and amount suitable nesting and roosting habitat is increased.

Commercial timber harvest includes the subactivities of felling large trees and skidding and decking them using heavy equipment or helicopters, construction of temporary roads and log landings, and subsequent site preparation for replanting. Commercial timber harvest has the highest probability of adversely affecting (i.e., to remove, downgrade, or degrade) CSO nesting and roosting and foraging habitat because the large trees valued as commercial products are the primary components of those CSO habitats. Depending on where they are located, construction of temporary roads and landings can remove suitable CSO habitat, but typically in small

amounts. In the case of Late Successional Reserves (Reserves), commercial timber harvest will not be the primary purpose of tree felling; the Plan indicates that timber and other forest products would only be removed from Reserves as a byproduct of restoration.

Commercial timber harvest can remove, downgrade, or maintain but degrade nesting and roosting or foraging habitat which can reduce availability of CSO cover from predators and adverse weather such as summer heat or winter storms, cause CSO to travel further to find suitable nesting and roosting or foraging habitat, remove potential nest structures, exacerbate barred owl conflicts, and have other adverse effects. In addition, timber harvest in occupied or unsurveyed CSO nesting and roosting during the breeding season can result in direct injury or mortality to adults or young CSO during tree felling.

Travel and Transportation includes road and trail construction, maintenance, and decommissioning; bridge or culvert installation; hazard tree removal; vegetation removal; and recreation. Hazard tree removal also has the potential to remove CSO post-fire foraging habitat, or remove, downgrade, or degrade nesting and roosting or foraging habitat, and is especially impactful if conducted after large fires where CSO have experienced widespread loss of nesting and roosting and foraging habitat. In post-burn situations, the removal of burned trees that would have survived, as well as those not within striking distance of roads or other improvements, exacerbates this forest fragmentation and unnecessarily precludes or delays nascent CSO habitat from developing into suitable CSO habitat in the future. Removal of post-fire foraging can further reduce foraging opportunities in burned landscapes, and hamper dispersal and other CSO movements.

When designing projects Bureau would consider the need for additional conservation measures for subactivities that could adversely affect CSO habitat. Best Management Practices (Appendix B) LSF-1, LSF-2, LSF-3, LSF-4, and LSF-5 provide guidance such that late successional habitat such as nesting and roosting will likely be maintained as functionally suitable post-management. LSF-1 intends to manage for late successional characteristics such as uneven-age stands and a multilayered canopy. LSF-2 intends for snags greater than 12 inches diameter at breast height to be retained whenever possible. LSF-3 intends that large trees with cavities, deformity, mistletoe presence, and other late successional characteristics will be maintained in CSO nesting and roosting habitat. LSF-4 intends that a minimum 60 percent canopy closure will be maintained. LSF-5 intends to provide for forest carnivore habitat, which would likely also benefit CSO. No even-aged management is proposed under the Plan.

Depending on the specifics, all the Management Categories have activities and subactivities that may cause breeding season disturbance to CSO depending on their location, presence of breeding CSO, and the noise or smoke levels produced. Smoke and noise disturbance can cause nest abandonment, lowered reproductive output, and increased predation.

Heavy equipment use, helicopter use, mastication, maintenance and construction activities, drone use, mineral extraction, target shooting, off highway vehicle use and other activities have the potential to produce loud noise disturbance during the critical breeding season (February 1 to July 9) when it is within 0.25 miles of breeding CSO or unsurveyed nesting and roosting. Specifically, take could occur if either project-generated sound exceeds ambient nesting conditions by 20-25 decibels or when project-generated sound, when added to existing ambient conditions, exceeds 90 decibels. Pile and broadcast burning also has the potential to produce

smoke disturbance to nesting CSO during the same time period. In addition, recreation and drone or kite use may cause visual disturbance when near nesting CSO.

Although the Plan contains no specific provisions to limit noise or smoke disturbance to nesting CSO, the Plan states that activities near active nests of migratory birds would be prohibited during active nesting periods. Activities would be allowed during nesting periods if current migratory bird nesting surveys indicate no active nests. Nesting season dates and appropriate disturbance-free buffers around nests would be identified on a case-by-case basis (Bureau 2024a) and that limited operating periods would be applied to mitigate disturbance, including noise and smoke, to nesting species.

Implementation-level subactivities and activities will be evaluated in a separate project-level consultation with the Service as directed by the law and Bureau policy. During project-level consultation, conservation measures would be developed for CSO that would minimize the potential for adverse effects during such projects. Impacts to CSO from the above activities are generally dispersed throughout the Action Area and over time, thereby further limiting adverse effects. However, adverse effects discussed above are likely to occur. Accordingly, the Proposed Action is likely to adversely affect CSO in the Action Area.

Impacts on Recovery

The Service has not published a recovery plan for CSO; however, activities implemented to achieve the management goals of the Plan may provide for long-term conservation of the CSO despite short-term or temporary adverse effects. The Plan contains management direction to consider allowing predator control to protect listed species; when predator management is proposed, the Bureau would consult with the Service and Tribes on management actions. If barred owl removal efforts are considered successful, Bureau may undertake such predator control within the Action Area. While barred owl management has primarily been used as a tool to conserve NSO, barred owl removal may be a valuable tool to protect CSO populations from invasion and further decline.

The Plan also proposes active forest restoration, including fire management actions that will improve forest resiliency to fire. Depending on the details of treatments, removing trees, vegetation, and fuels in Late-Successional Forest and elsewhere could affect CSO through the loss and degradation of habitat, breeding season disturbance, and potential direct injury or mortality as described above. The Plan considers that treatments carried out in the interior of nesting forest patches may contribute to CSO recovery the most. However, the impacts of treatments on CSO are probably greater when they are inside of late-successional forest, rather than treatments in areas where late successional has already been removed and replaced with highly flammable early successional vegetation. During the consultation process some, but not all, of the impacts discussed above would be minimized consistent with past consultations with Bureau.

Northern Spotted Owl

Effects

The management categories that may affect NSO include Riparian Management Areas, Vegetation and Forestry, Wildlife, Wildland Fire Management, Renewable Energy, Minerals, Travel and Transportation Management and Recreation. Many of the specific activities and subactivities for these management categories overlap. Best Management Practices including

Wild 1-8, WF 1-3, MC 1-4, and LSF 1-5, as described in the Conservation Measures section of the Proposed Action will be applied to appropriate activities to minimize or avoid impacts to NSO.

Activities under vegetation management, wildlife management, and wildland fire management that may affect NSO include removal of brush, small diameter trees, and ladder fuels, felling snags, construction of fuel breaks and fire control lines, pile and broadcast burning, temporary road construction, tree thinning, helicopter use, felling, skidding and decking logs, mastication, and the construction of temporary landings. Categories of treatments under vegetation management also broadly include forest thinning to promote late-seral conditions and riparian health and removing encroaching conifers from oak woodlands and prairies. These treatments would occur using a mix of prescribed fire and manual, biological, chemical, and mechanical treatments.

These activities can remove, downgrade, maintain but degrade, improve, or have no effect on suitable NSO nesting and roosting and foraging habitat. Treatments can simplify habitat structure, remove potential nest sites such as snags and other trees, and temporarily degrade prey habitat by removing cover and down woody material. Additional loss of suitable NSO habitat from these and other activities, in conjunction with past and future losses from logging and wildfire, are a primary threat to NSO persistence.

Depending on the specifics, fuels treatments and restoration activities also have the potential to benefit NSO by reducing future habitat losses due to wildfires. Activities that maintain high overstory canopy, maintain or increase stand dbh and basal area generally maintain post-treatment NSO habitat suitability and help ameliorate habitat losses from wildfire. Dense stands of smaller diameter trees may also be enhanced for NSO foraging by facilitating owl movement in post-thinned stands. Thinning can also release conifers so that the quality and amount of suitable nesting and roosting habitat is increased.

Commercial timber harvest includes the subactivities of felling large trees and skidding and decking them using heavy equipment or helicopters, construction of temporary roads and log landings, and subsequent site preparation for replanting.

Commercial timber harvest has the highest probability of adversely affecting (i.e., to remove, downgrade, or degrade) NSO nesting and roosting and foraging habitat because the large trees valued as commercial products are the primary components of those NSO habitats. Depending on where they are located, construction of temporary roads and landings can remove suitable NSO habitat, but typically in small amounts. In the case of Late Successional Reserves (LSRs) commercial timber harvest will not be the primary purpose of tree felling; the Plan indicates that timber and other forest products would only be removed from LSRs as a byproduct of restoration.

Commercial timber harvest can remove, downgrade, or maintain but degrade nesting and roosting or foraging habitat which can reduce availability of NSO cover from predators and adverse weather such as summer heat or winter storms, cause NSO to travel further to find suitable nesting and roosting or foraging habitat, remove potential nest structures, exacerbate barred owl conflicts, and have other adverse effects. In addition, timber harvest in occupied or unsurveyed NSO nesting and roosting during the breeding season can result in direct injury or mortality to adults or young NSO during tree felling.

Travel and Transportation includes road and trail construction, maintenance, and decommissioning; bridge or culvert installation; hazard tree removal; vegetation removal; and recreation. Hazard tree removal also has the potential to remove NSO post-fire foraging habitat, or remove, downgrade, or degrade nesting and roosting or foraging habitat, and is especially impactful if conducted after large fires where NSO have experienced widespread loss of nesting and roosting and foraging habitat. In post-burn situations, the removal of burned trees that would have survived, as well as those not within striking distance of roads or other improvements exasperates this forest fragmentation unnecessarily precludes or delays nascent NSO habitat from developing into suitable NSO habitat in the future. Removal of post-fire foraging can further reduce foraging opportunities in burned landscapes, and hamper dispersal and other NSO movements. It is unclear how post-fire foraging habitat would be managed during hazard tree removal and adverse effects to NSO may occur.

Depending on project specifications, all the Management Categories have activities and subactivities that may cause breeding season disturbance to NSO depending on their location, presence of breeding NSO, and the noise or smoke levels produced. Smoke and noise disturbance can cause nest abandonment, lowered reproductive output, and increased predation. Heavy equipment use, helicopter use, mastication, maintenance and construction activities, drone use, mineral extraction, target shooting, off road vehicle use and other activities have the potential to produce loud noise disturbance during the critical breeding season (February 1 to July 9) when it is within 0.25 miles of breeding NSO or unsurveyed nesting and roosting. Specifically, take could occur if either Project-generated sound exceeds ambient nesting conditions by 20-25 decibels or when Project-generated sound, when added to existing ambient conditions, exceeds 90 decibels. Pile and broadcast burning also has the potential to produce smoke disturbance to nesting NSO during the same time period. In addition, recreation and drone or kite use may cause visual disturbance when near nesting NSO.

Implementation-level subactivities and activities will be evaluated in a separate project-level consultation with the Service as directed by the Act and Bureau policy. During project-level consultation, conservation measures would be developed for NSO that would minimize the potential for adverse effects during such projects. Impacts to NSO from the above activities are generally dispersed throughout the Action Area and over time, thereby further limiting adverse effects. However, all the adverse effects discussed above may not be fully mitigated. Accordingly, the Proposed Action is likely to adversely affect NSO in the Action Area.

Impact on Recovery

The 2011 NSO Recovery Plan strategy focused on (1) development of a rangewide habitat modeling framework, (2) barred owl management, (3) monitoring and research, (4) adaptive management, and (5) habitat conservation and active forest restoration (Service 2011a).

No rangewide habitat modeling will be conducted under the proposed Plan. However, the Plan states that a habitat-based metric would be used to track changes in NSO suitable habitat. Available suitable habitat would be increased through forest health vegetation management in Reserves and late-successional forest that are available for management (non-wilderness) (Bureau 2024b). The Plan also proposes to inventory and monitor special status species and their habitats to better understand their abundance and distribution and to facilitate implementation of conservation and recovery actions within the planning area. Under the Plan, wildlife and habitat would be monitored to determine population and habitat trends. The Plan also indicates that

Bureau may implement initiatives that including the capture, handling, and marking of endangered species for scientific study and management, which presumedly includes NSO. Based on past consultations with Bureau we presume project-level NSO surveys will occur prior to management activities that may affect NSO. The monitoring of NSO and habitat is consistent with the Recovery Plan emphasis on monitoring and research.

The Plan contains management direction allowing predator control to protect listed species; when predator management is proposed, the Bureau would consult with the Service and Tribes on management actions. If ongoing barred owl removal efforts are considered successful, Bureau may undertake such predator control within the Action Area. Any disturbance to NSOs that may occur during barred owl removal efforts is likely to be discountable.

The most important of these Management Activities relative to recovery goals is the proposed habitat conservation and active forest restoration. Reserves have provided important conservation benefits to NSO and other species since their inception by protecting some of the last remaining large stands of late-successional habitat. In addition, given that older forests are more resilient to fire than younger forests, Reserves provide a habitat refugia from wildfire. The Plan proposed that timber management in both matrix and Reserves lands would be implemented with the primary objective of accelerating the development of late-seral stage forest characteristics. However, the Plan does allow commercial timber harvest in Reserves. Late-seral stands that are not designated as Reserves, such as those in the matrix, would only be thinned to increase their resilience to fire and protect late-seral stand characteristics. Reserve boundaries will be unchanged. However, the unmapped Reserves from the Northwest Forest Plan (Forest Service 1994) will not be carried forward. No even-aged management is proposed.

When designing projects Bureau would consider the need for restrictions for subactivities that could adversely affect NSO habitat. Best Management Practices (Appendix B) LSF-1, LSF-2, LSF-3, LSF-4, and LSF-5 provide guidance such that late successional habitat such as nesting and roosting will likely be maintained as functionally suitable post-management. LSF-1 intends to manage for late successional characteristics such as uneven-age stands and a multilayered canopy. LSF-2 intends for snags greater than 12 inches diameter at breast height to be retained whenever possible. LSF-3 intends that large trees with cavities, deformity, mistletoe presence, and other late successional characterizes will be maintained in NSO nesting and roosting habitat. LSF-4 intends that a minimum 60 percent canopy closure will be maintained. LSF-5 intends to provide for forest carnivore habitat, which would likely also benefit NSO. No even-aged management is proposed under the Plan.

The Plan also proposes active forest restoration, including fire management actions that will improve forest resiliency to fire. Depending on the details of treatments, removing trees, vegetation, and fuels in Reserves and elsewhere could affect NSO through the loss and degradation of habitat, breeding season disturbance, and potential direct injury or mortality as described above. The Plan considers that treatments carried out in the interior of nesting forest patches may contribute to NSO recovery the most. However, the impacts of treatments on NSO are probably greater when they are inside of late-successional forest, rather than treatments in areas where late successional has already been removed and replaced with highly flammable early successional vegetation. During the consultation process some, but not all, of the impacts discussed above would be minimized consistent with past consultations with Bureau.

The Plan indicates that Bureau will conduct recovery actions for listed species with Service recovery plans such that the measurable results of these actions contribute to meeting delisting criteria for a given species and that they will enable forests to contribute to the recovery of NSO. When Plan components are implemented with NSO protection and recovery in mind, the Plan will not conflict with NSO recovery actions or goals. The Bureau proposed measures that would minimize adverse effects to NSO. To the extent that fire risk to suitable NSO habitat is reduced, and that thinning dense, previously harvested stands results in enhancement of foraging habitat or speeding its trajectory towards nesting and roosting, NSO recovery will benefit from the fuels and forest restoration activities.

Northern Spotted Owl Critical Habitat

The effects to critical habitat for NSO are identical to those described for NSO habitat above, except for noise and smoke disturbance which are not considered to effect NSO critical habitat Features. Management of Feature 3 (dispersal habitat) is not specifically discussed but habitat conservation and active forest restoration activities would be expected to maintain, or improve, NSO dispersal habitat.

Implementation-level vegetation and forestry treatments will be evaluated in a separate project-level consultation with the Service as directed by law and Bureau policy. During project-level consultation, conservation measures would be developed for NSO critical habitat that would minimize the potential for adverse effects during such projects. Impacts to NSO critical habitat from the above activities are generally dispersed throughout the Action Area and over time, thereby further limiting adverse effects. Adverse effects discussed above are likely to occur. Accordingly, the Proposed Action is likely to adversely affect NSO critical habitat in the Action Area.

Western Snowy Plover, Pacific Coast Population DPS

Effect

The program areas that may affect plover include Vegetation and Forestry, Wildlife, and Travel and Transportation Management and Recreation. There is some overlap in the activities that could be implemented to achieve the management goals of these program categories.

Removal of invasive non-native species is a goal of the Plan using methods including mechanical and manual removal, as well as herbicide and fire treatments. Through implementing this goal, equipment or humans could trample or bury nests, young, or eggs of plover, and disturbance could result in nest abandonment or nest failure. Equipment use and human presence could cause noise that might disrupt breeding, feeding and sheltering behaviors. The Bureau would conduct restoration projects outside of the plover breeding season (March 1 through September 15) to ensure that nests, eggs, or young are not unintentionally disturbed, injured, or killed by project equipment or personnel. Outside of the breeding season, projects could cause noise that would disrupt individuals or their foraging behavior, leading to stress, reduced fitness, or habitat avoidance. Best Management Practice Wild 2 would help minimize impacts by completing project activities in a timely manner to reduce disturbance and displacement of plovers in project areas.

The Mike Thompson Wildlife Area would be managed as off-road vehicle limited under the Plan, meaning that motorized use would be limited to existing designated routes. Allowing off road vehicles to operate in areas where plovers are known to breed, feed and shelter can have

adverse impacts. Plovers can be disturbed from feeding which can reduce fitness and ability to care for their young. They can be flushed from sheltering exposing them to adverse weather or predators, leading to reduced fitness or possibly death. Additionally, adults, juveniles, and nests with eggs or young could be struck by vehicles causing mortality. Limiting off-road vehicle use in plover habitat, including critical habitat, would ensure that noise and human presence are limited to existing routes, maintaining undisturbed habitat areas away from routes. Speed limits of 15 miles per hour would apply year-round and dog leash requirements, and breeding area closures would occur during the breeding season. Other measures to protect plovers include prohibiting drone flights year-round without a permit, restricting vehicle use to the wave slope in habitat areas during the breeding season, prohibiting all public use in the plover restoration area during the breeding season, and prohibiting kites and campfires near plover protection areas during the breeding season. These restrictions would generally reduce the potential for disturbance, injury, and mortality from recreational use during the plover breeding season.

Impacts on Recovery

Activities implemented to achieve the management goals of the Plan may provide for long-term conservation of the plover despite short-term or temporary adverse effects. While recreation could increase human presence on beaches where plovers occur, the Bureau has included best management practices and limitations that would minimize impacts to plovers. The Plan contains management direction to allow predator control to protect listed species; when predator management is proposed, the Bureau would consult with the Service and Tribes on management actions. Predator management would help minimize nest failure rates for plovers, as predation is a primary cause of failure (Service 2019b). Dune restoration and the use of oyster shells on the beaches would also result in improved habitat conditions for the plover and would likely increase the amount of available habitat by removing dense vegetation and increasing substrate heterogeneity that can aid egg crypsis. Despite the short-term and long-term adverse effects, the Proposed Action is expected to provide for the long-term conservation of the plover.

Western Snowy Plover Pacific Coast Population DPS Critical Habitat

Effects to plover critical habitat are largely similar to the effects to plover habitat described above. Approximately 400 acres of designated critical habitat occurs on the Mike Thompson Wildlife Area South Spit Humboldt Bay, and most of this designated critical habitat has the primary constituent elements (i.e., physical and biological features). The Plan includes management goals to restore habitat and at-risk species, include plover. Removal of European beach grass and other invasive plants and placement of oyster shells within critical habitat designations will restore Element 1 (open habitats above daily high tide). Restoration work may affect Element 4 (minimal disturbance), but best management practices and conservation measures would be applied to the projects to reduce the effects to Element 4 and plovers more generally. Recreation, particularly off-highway vehicle use in waveslopes, may affect Element 2 (shoreline habitat with food resources) by compacting the sand and damaging food resources or disrupting plover feeding behavior and Element 4 due to human and pet presence. These effects may be ameliorated due to infrequent use by off-highway vehicles and the requirement that pets be leashed during the plover breeding season.

Yellow-billed Cuckoo, Western DPS

Effects

The primary program areas that may affect cuckoo include Riparian Management Areas, Vegetation and Forestry, Wildlife, and Travel and Transportation Management and Recreation.

Additional programs that may affect cuckoo are Water Resources, Wildland Fire Management, and Livestock and Grazing. Best Management Practices including Wild 1-8 as described in the Conservation Measures section of the Proposed Action will be applied to appropriate activities to minimize or avoid impacts to cuckoos.

Cuckoos are distributed in the planning area, but the only observation from the Action Area has been a single migrant on Clear Creek, a tributary of the Sacramento River. It would be unlikely, but not impossible, that the Proposed Action will directly affect the species given its distribution on the Action Area. However, ongoing and future habitat restoration is anticipated to improve the extent and quality of suitable habitat in the Action Area, which may lead to future species establishment and increased potential for effects on the species. Many of the specific activities and subactivities for these management categories overlap. Best Management Practices including Wild 1-5, as described in the Conservation Measures section of the Proposed Action will be applied to appropriate activities to minimize or avoid impacts to cuckoo.

Primary effects from riparian management will be disturbance to the cuckoo from human presence, equipment, and noise during project implementation. This could disturb individuals and foraging behavior. Best Management Practice Wild 2 would help minimize impacts by completing project activities in a timely manner to reduce disturbance and displacement of cuckoos in project areas. Effects on breeding behavior are not anticipated because the Bureau will continue to conduct cuckoo surveys prior to project implementation, when implementing projects during the breeding season, or projects will be completed outside of the breeding season, when cuckoos are not present in the planning area. Depending on cuckoo survey results, additional mitigation measures would be developed as needed; these may include spatial or temporal habitat avoidance or other measures developed in consultation with the Service during project-level section 7 consultation.

In addition, Bureau riparian management activities like maintaining, restoring, and creating riparian forests with a variety of size and age classes, spatial heterogeneity, and species diversity in the overstory and understory, will result in riparian forests that are more resilient to future disturbances. This will likely maintain or increase riparian habitat suitability for the cuckoo in the Action Area in the long term and increase the potential for the species' establishment there in the future.

Noise from equipment due to Vegetation and Forestry activities could disturb the cuckoo, causing habitat avoidance, and interfere with nesting and foraging. Hazard tree removal and forest thinning may result in loss or disturbance of potential nesting trees. This could cause reduced reproduction success or direct mortality of the cuckoo if timber harvest occurs during breeding seasons. However, as previously mentioned, limited operating periods will be applied to mitigate disturbance to the cuckoo. Specifically, activities would be prohibited during active nesting periods, and buffers and nesting seasons will be applied on a case-by-case basis. Hazard tree removal will require a site-specific analysis on a case-by-case basis. Large areas of vegetation removal, such as for establishing fuel breaks, could result in habitat loss and fragmentation to surrounding cuckoo habitat. Habitat fragmentation could interfere with the cuckoo's movement and migration abilities and could limit gene flow. However, under the Plan, it is assumed the acres of vegetation treated will be spread out across the Action Area and over the life of the Resource Management Plan. Therefore, effects to the cuckoo will be dispersed through time and space, which will limit their intensity. Removal of trees in riparian areas could

also reduce habitat cover and nesting sites for the cuckoo. However, riparian restoration projects will ultimately benefit riparian-dependent wildlife species, such as the cuckoo, by improving the hydrologic function, water quality, and riparian vegetation. As a result, riparian areas will be better able to provide habitat characteristics for the cuckoo. These include clean water sources and riparian vegetation characteristics that support nesting habitat for the cuckoo.

Effects to the cuckoo from Wildlife activities will result from habitat alterations, noise, human presence, and use of equipment to carry out the projects. Noise, human presence, and equipment use during habitat treatments to enhance, maintain, and restore corridors could result in the cuckoo avoiding these areas during treatments. To minimize the potential for this effect, treatments will be timed to avoid the cuckoo's nesting period as previously stated. For example, cuckoo nesting surveys will be conducted prior to allowing activities, and activities will only proceed if surveys indicated no active cuckoo nests in the area.

Due to lands and realty activities, specifically where road and rights-of-way construction occurs, potential foraging habitat and nesting trees could be removed, reducing habitat quality for the cuckoo. Rights-of-way are often linear and extend for miles. Effects could also include an increased likelihood for injury or mortality to the cuckoo, including interference with acoustic signals, which could reduce the ability to hear and avoid predators, potentially leading to injury or mortality; and noise or visual disturbance that could lead to habitat avoidance. Other effects could include habitat fragmentation or degradation, which could cause changes in movement patterns and prevent cuckoos from successfully foraging, finding cover from predators, or reproducing.

Effects to the cuckoo resulting from Travel and Transportation Management and Recreation activities could occur from vehicle use (for example, off-highway vehicles), human presence, and surface disturbance, which can cause behavioral disturbance of cuckoos as well as habitat loss, degradation, and fragmentation. Noise associated with off-highway vehicle use and human presence may influence cuckoo behavior patterns, such as by causing habitat avoidance; such factors as distance to noise, frequency, and habitat type will influence this effect. However, designating certain areas as off-highway vehicle avoidance or off-highway vehicle limited will limit the potential for effects to the cuckoo and potential habitat by closing or limiting off-highway vehicle use in certain areas, thereby reducing the potential for human presence and noise.

Impacts on Recovery

There is only one recent detection of cuckoo within the Action Area on Clear Creek despite survey efforts for the species. Activities implemented to achieve the management goals of the Plan may result in disturbance and limited habitat modifications for the cuckoo. However, riparian habitat restoration will increase the available habitat for the species over time. As riparian restoration develops, larger and more connected patches of suitable habitat will develop and become available for the cuckoo. In addition, the Bureau's commitment to continue to monitor the species will inform the Bureau and Service of the status and distribution of the cuckoo throughout Bureau-administered lands.

Reptiles

Northwestern Pond Turtle

Effects

The primary program areas that may affect the turtle species include Soils, Water Resources, Riparian Management Areas, Vegetation and Forestry, Wildland Fire Management, Wildlife Management, and Travel and Transportation Management and Recreation. Many of the specific activities and sub-activities for these Management Categories overlap. Best Management Practices including Wild 2, WRH 3, R 1-16, RST 5-10, and AQ 1-10 as described in the Conservation Measures section of the Proposed Action will be applied to appropriate activities to minimize or avoid impacts to turtles.

Sub-activities under Soils, Water Resources, Riparian Management Areas, and Travel and Transportation Management and Recreation that may affect the turtle include resurfacing soils, promoting drainage, replacing culverts, standard road maintenance, conducting off-channel and side channel restoration through excavation, in-stream restoration projects, prescribed burning, and the construction of new facilities such as roads, parking lots, trails, bridges, and campgrounds.

Sub-activities under Vegetation and Forestry, and Wildland Fire Management that may affect the turtle include timber harvesting activities, such as the installation of temporary roads and landings, and cutting and falling of trees using heavy equipment. Prescribed fire, fuels treatments to reduce fire hazards, and using heavy equipment to prepare sites for burning may also affect the turtle. Best Management Practice Wild 2 would help minimize impacts by completing project activities in a timely manner to reduce disturbance and displacement of turtles in project areas.

These activities can remove, downgrade, or temporarily disturb nesting or overwintering habitats in upland environments. Ground disturbing activities near (i.e., within 500 meters of) aquatic habitats suitable for turtle nesting or overwintering could result in destruction of active turtle nests, or mortality or injury of overwintering adult turtles. Turtles that are within the project area have the potential to be crushed or injured by heavy equipment used during these activities, such as during timber harvesting or fuels treatment activities. Turtles that are within a burn footprint of a prescribed fire would not be able to escape the burn area, likely resulting in the injury or mortality of all adult turtles within that area, depending on the season when the burn is conducted and the available overwintering and nesting habitat within the burn area. Temporary roads and landings could remove, downgrade, or temporarily destroy suitable nesting or overwintering habitat, depending on where they are located. Additionally, roads pose a hazard for turtles as they travel between aquatic habitats and overwintering or nesting areas, as they could be hit by vehicles, which could result in direct injury or mortality to adults or hatchlings.

Depending on project specifications, off-channel and side-channel restoration, adding in-stream logs and beaver dam analogs, conducting invasive plant removal, levee and culvert replacements also have the potential to benefit turtle by increasing available basking structures, increasing habitat connectivity, and creating additional suitable aquatic habitat for foraging and additional upland habitat for nesting and overwintering. Turtles will use large woody debris in aquatic habitats for basking, and complex woody structures can provide refugia habitat for hatchlings seeking to avoid predators. Removing canopy cover or other thick vegetation in suitable nesting areas can increase availability of nesting habitat for turtles. Additionally, fuels treatments to

reduce fire risk can benefit the turtles by reducing future habitat loss and direct mortality by wildfires.

Heavy equipment use, helicopter use, mastication, maintenance and construction activities, drone use, mineral extraction, target shooting, off-highway vehicle use, and other activities have the potential to produce loud noise disturbance to nesting females during the nesting season (May 1 to July 31) when it is within 0.25 miles of suitable nesting. Specifically, take could occur if either Project-generated sound exceeds ambient nesting conditions by 20-25 dB or when Project-generated sound, when added to existing ambient conditions, exceeds 90 dB. These sound-levels could disturb nesting females and cause them to abandon nesting efforts in that area.

When designing projects, the Bureau would consider the need for restrictions for sub-activities that could adversely affect turtle. Best management practices for Operations in or near Aquatic Ecosystems (AQ 01-27) and Spill Prevention and Abatement (SP 01-08) are designed to prevent adverse effects to aquatic ecosystems caused by spills or sedimentation. These best management practices minimize the chances of a hazardous spill in suitable aquatic habitat for turtle and minimize the potential for direct effects to turtles through impingement, by following pumping guidance to protect salmonids (AQ 16). Best management practices RST 01 – 06 are designed to minimize ground disturbance and soil compaction by heavy equipment in aquatic areas and during riparian restoration activities. This will minimize the potential for adverse effects to turtle nesting areas and will likely allow most nesting areas to remain suitable post-management.

Road construction and reconstruction activities will follow best management practices R01 – R24 to prevent erosion and sedimentation of aquatic systems and minimize the area disturbed to complete the road. This will minimize the potential for adverse effects to turtle nesting areas and nearby aquatic habitat and will likely allow most nesting areas to remain suitable post-management. However, these newly constructed roads may further fragment nesting and overwintering habitat, hampering dispersal, nesting forays, and other movements.

Impacts on Recovery

Implementation-level subactivities and activities will be evaluated in a separate project-level consultation with the Service pursuant to the Act and Bureau policy. During project-level consultation, conservation measures would be developed for turtle that would minimize the potential for adverse effects during such projects. Turtle distribution is wide-spread, and they occur throughout Bureau lands in the Action Area. Impacts to turtle from the above activities are generally dispersed throughout the Action Area and over time, thereby further limiting adverse effects. Furthermore, the restoration of aquatic habitat and terrestrial nesting and overwintering habitat could improve habitat quality and increase the amount of suitable habitat for the turtle throughout the Action Area. This would contribute to the long-term conservation of the turtle in northern California. However, adverse effects discussed above are likely to occur and the Proposed Action is likely to adversely affect the turtle in the Action Area at least in the short-term during project implementation.

Amphibians

Foothill Yellow-legged Frog, North Feather River DPS

Effects

The Plan programs consist of a wide variety of activities that could adversely affect the frog and its habitat. The potential effects from activities implemented for Vegetation and Forestry, Water Resources, Riparian Restoration Area, Wildlife, Wildland Fire Management, Livestock and Grazing, and Travel and Transportation Management and Recreation include harm, harassment, capture, injury, and death of egg masses, tadpoles, subadults, and adults. Individuals can be displaced, crushed, injured, or killed by earthmoving, yarding, skidding, construction of temporary roads, skid trails and landings; activities associated with falling trees, piling or burning; directly injuring or killing individuals; or trapping, injuring and killing individuals in burrows. The use of plastic netting and similar materials for erosion control could result in the entanglement and death of the four amphibians due to exposure, starvation, strangulation, or predation (Stuart et al. 2001). Prescribed fire activities could result in direct mortality from burning or crushing. Individuals using downed wood for cover may be killed, injured or disturbed during treatments for removal, piling, or burning.

Direct fire related mortality of adult amphibians is rare, either because of the timing of the fire or because individuals are able to take refuge from fire in burrows, moist ground, or water sources such as ponds (Forest Service 2013). The immediate effects of wildfire in the form of mortality of individuals and failed reproduction is expected to be a small threat to most healthy populations, unless stressors such as drought or persistent habitat change have left populations isolated or with an extremely limited distribution (Forest Service 2013). The more severely burned areas had warmer surface and burrow temperatures even 3 years after the fire event (Hossack et al. 2009). In the Pacific Northwest, prescribed fire may increase the mortality of terrestrial amphibians by fire because prescribed burning usually occurs in fall to spring when amphibians are active (Bury 2004). Prescribed fires are expected to be short lived and fire intensity should be low enough to allow some retention of duff layers and riparian vegetation that will prevent soil erosion and expedite recovery.

The frog likely will be adversely affected by ground disturbing activities that include end-lining, skidding, dozer piling, mechanical equipment use such as road maintenance, skid trail construction, timber cutting, log prep, skidding, loading, and landing creation and general ground related access to cutting trees with mechanical equipment or conventional logging. However, mechanical treatments alter riparian vegetation differently than prescribed fire and effects can be more complex and longer lasting depending on the magnitude of disturbance created by mechanized equipment and crews (Dwire et al. 2016).

Potential effects from activities associated with vegetation management include disturbance and destruction of breeding, basking, refuge, and overwintering sites. Potential habitat alterations include changes to canopy and other vegetative and non-vegetative cover, air and water microclimates including temperature, water quantity and quality, hydro periods, increased nutrients, sedimentation, woody debris, and channel scour. The reduction of canopy cover may benefit frogs by increasing the amount of available warm water and basking sites or may adversely affect them if temperatures increase higher than their thermal tolerances or if cover is not available. The importance of canopy cover may vary among streams, lakes, meadows, and other suitable habitats.

Fuels and other toxic materials such as oil will be required to operate the machines and equipment utilized for vegetation management, timber harvest, fuels management, and watershed restoration. Frogs may potentially be exposed to these toxic materials in their terrestrial environments if vehicles leak these substances into habitat occupied. Chemical pollutants leaking or spilling from road maintenance may affect the foothill yellow-legged frog. Vehicle emissions, oil and gas leaks or spills, road degradation by-products, and chemicals used during road and trail maintenance can enter occupied or suitable habitat. The adverse effects of these pollutants to foothill yellow-legged frog include reduced survival, growth, and metamorphosis, altered physiology and behaviors, deformities in tadpole oral cavities, and elevated levels of stress hormones (Beebee 2013, Brown et al. 2014).

Ground-disturbing activities and changes in vegetation can affect soil stability, erosion, and sediment loading to aquatic habitats. Sedimentation can result from disturbance of stream banks, activities in upland areas, or activities in upstream seasonal drainages. Exposed, unprotected soil has the potential to erode into aquatic systems, particularly with the season's first significant rain or during overland flows following snowmelt. One study found reduced amphibian densities in streams following road construction (Brown et al. 2014), and other studies have demonstrated impacts to fish, macroinvertebrates, and periphyton (Brown et al. 2014). Sedimentation can affect all life history stages by altering habitat (Brown et al. 2014).

The frog may be affected by activities that result in any change to the hydrology of their aquatic habitats. A decrease or elimination in perennial water could affect breeding frogs. Fuels and vegetation management may benefit the species through the reduction of high intensity wildfire and its effects on hydrology and stream sediment.

Several characteristics of the frog make them vulnerable to effects from roads and trail maintenance. First, they move among multiple habitats during their active season which may require crossing roads and trails; second, they move slowly and thus cannot easily avoid maintenance vehicles or equipment; third, they are relatively small and hard to see which makes them difficult to avoid; and fourth, they have permeable skin which may make them more susceptible to the toxic effects of chemicals from vehicles or used for road maintenance (Andrews et al. 2008). Potential adverse effects from motorized and non-motorized road and trail maintenance near or within occupied or suitable habitat include harassment, injury, and death of the animals. Road and trail maintenance may result in increased sedimentation levels. Higher levels of sedimentation in aquatic habitat utilized by the foothill yellow-legged frog (Brown et al. 2014) likely will result in adverse effects.

Drafting of water for road and trail maintenance may result in adverse effects to aquatic habitat. In-stream water drafting can substantially affect water flow or configuration of the bed, bank, or channel of streams that results in rapid changes or sustained reductions in flow, reduced dissolved oxygen, or increased water temperatures which could affect the frog. In addition to direct hydro-geomorphic impacts, water-quality impacts can occur because of road approaches that access the water drafting site. Many water drafting sites have steep approaches and in the absence of adequate drainage or surfacing, these approaches can become chronic sources of sediment and runoff to the channel. Vehicles can leak oil, and sometimes fuel, onto drafting pads, becoming a source of petroleum product contamination to surface waters.

The routine maintenance of existing facilities is not likely to cause further loss of suitable and occupied habitat but may affect cover, hydrology, water quality, and sedimentation in

surrounding areas, or result in the displacement, injury, and death of the frog. Maintenance of developed recreation and infrastructure sites that require earth moving or soil disturbance may cause erosion that can increase siltation and sedimentation. Sedimentation can alter the morphology of habitats, such as filling in pools in streams and creeks, and reduce cover by filling interstitial spaces in stream, creek, and lake substrates. Equipment and human activity associated with vegetation clearing and other routine maintenance also may destroy or alter cover components such as burrows, logs, tree roots, or stumps. These activities may result in a decrease in vegetative cover along stream and lake shores and in meadows and dislodge rocks, wood and other cover utilized by the species.

The maintenance of facilities may affect the availability and quality of water in suitable or occupied habitats. Water storage facilities may serve as habitat for invasive species such as bullfrogs or crayfish. Water quality may be affected by special use permit activities associated with existing infrastructures such as campgrounds.

Livestock grazing occurs in the Action Area and could impact the frog. Studies have found positive, negative, and no association between livestock grazing and amphibians (Adams et al. 2017). The available literature suggests that the effects of livestock grazing on individuals, populations, and community structure may be variable and there is considerable variability in the responses of different amphibian species. Ecosystem type (e.g., low elevation grasslands, high alpine meadows) may play a role in this variation. Further complicating the ability to distinguish a species' response to livestock grazing is the fact that livestock-related impacts vary significantly in terms of timing, intensity, and duration on an annual basis and many of the processes related to livestock effects on aquatic habitats are long-term.

The frog spends all or part of their life in aquatic and meadow systems that also are preferred by livestock (Vredenburg et al. 2005). The frog has biological and ecological characteristics that make them vulnerable to livestock and associated activities. In general, they are small, cryptic, move relatively slowly, and often exhibit an immobilization response to danger (Andrews et al. 2008). This species moves among multiple habitats during the active season and may encounter livestock and associated activities away from aquatic habitats.

Frogs may be injured or killed by trampling and other movements by cattle, or entrapment in deep hoof prints. Cattle can step on adults, juveniles, metamorphs, and tadpoles while accessing water along streambanks, lakeshores, or meadows, or while foraging for riparian vegetation in these habitats which can result in injury or death. Although eggs are most vulnerable to trampling and disturbance, cattle are not usually present during this period. Tadpoles, subadults, and adults are relatively mobile and generally occur in habitats with continuous and deep water that provides avenues for escape. Tadpoles will rapidly swim away to deeper water in lakes or stream channels. Adults and subadults will leap from the shoreline and submerge themselves under water to hide under stream banks or on the bottom of the lake or stream. However, all life stages commonly bask on shallow shorelines or on stream and lake banks and are vulnerable to trampling by cattle utilizing these occupied habitats to drink water, cross through habitats (e.g., streams), or forage on emergent or shoreline vegetation.

Activities associated with management of allotments may also affect the frog. These activities include maintenance of allotment structures (e.g., fences, corrals, permanent and temporary camps), herding or monitoring individuals by foot or horseback, keeping of horses in meadows, maintenance of stock trails, and the operation of vehicles to support allotment operations. Like

those described for livestock above, these activities may injure or kill individuals by trampling, crushing, or affect behavior through disturbance.

Various rangeland management practices that are associated with the management of allotments may reduce the likelihood of potential effects to frogs. For instance, grazing systems, forage utilization and streambank alteration standards can influence the amount of time that livestock are allowed to linger in a particular area. Range improvements like fences, water developments, and salting as well as other techniques like herding may be used to distribute livestock away from areas where interactions with frogs are more likely to occur. New facilities may be constructed outside of meadows and conservation areas where the likelihood of potential effects on individuals may be greater.

Aquatic habitat can be degraded by livestock grazing. Mass erosion from trampling and hoof slide causes streambank collapse and an accelerated rate of soil transport to streams (Meehan and Platts 1978). Accelerated rates of erosion lead to elevated instream sediment loads and depositions, and changes in stream-channel morphology (Meehan and Platts 1978, Kauffman and Krueger 1984). Livestock grazing may lead to diminished perennial streamflows (Armour et al. 1994). Livestock can increase nutrient-loading in water bodies due to urination and defecation in or near the water and can cause elevated bacteria levels in areas where cattle are concentrated (Meehan and Platts 1978, Kauffman and Krueger 1984). With increased grazing intensity, these adverse effects to the aquatic ecosystem increase proportionately (Meehan and Platts 1978, Clary and Kinney 2002). Livestock tend to concentrate along streams and wet areas where there is water and herbaceous vegetation; grazing impacts are, therefore, most pronounced in these habitats (Meehan and Platts 1978). Concentration of livestock contributes to the destabilization of streambanks, causing undercuts and bank failures (Knapp and Matthews 2000).

Livestock grazing can reduce the abundance of protective vegetation, destroy peat layers in meadows, and accelerate streambank erosion which can lead to downcutting of stream channels and lowered water tables (Service 2014b). Downcut channels become confined within narrow, incised channels and are no longer connected to their historical, meadow floodplains. As water tables fall in meadows, their water storage capacity lessens, and they become less suitable for riparian vegetation which may be supplanted by drought-tolerant communities. Acceleration of erosion and gullying of meadows resulting from overgrazing (Kattelmann 1996 in Service 2014b) may lead to increased siltation and more rapid meadow succession ultimately resulting in faster meadow drying and encroachment of conifers into meadows (Service 2014b). In some cases, formerly perennial streams may become intermittent (Service 2014b). These interrelated processes which result in lowered water tables, reduced inundation of flood plains, and faster drying can lead to reduced amounts of surface water that may not remain for sufficient time periods to provide for the ecological requirements of the foothill yellow-legged frog.

Activities implemented to achieve management goals of Wildlife and Riparian Management Areas could result in long-term beneficial effects for the frog; however, it is likely that there will be short-term adverse effects. Survey and monitoring, along with associated handling and marking of individuals, and enhancement of habitat may result in short-term disturbance and harassment and, rarely, inadvertent injury or death of individual animals.

The increase in human activity associated with handling, marking, swabbing individuals of the frog, and habitat enhancement or restoration has the potential to spread diseases such as chytrid fungus.

Certain restoration activities designed and intended for other purposes have the potential to indirectly adversely affect the frog. Projects that may eliminate or reduce pooling of surface water, such as the removal of user-created dams, could result in the desiccation of tadpoles and egg masses leading to injury, death, and the loss of recruitment. Removal of barriers to fish passage (e.g., the creation or enhancement for the passage of aquatic organisms) can facilitate the invasion of predatory fish, including trout, into areas where they had previously not inhabited or from which they have been eradicated. Restoration activities that create ponded water may create additional habitat for the frog, but also may benefit American bullfrogs, predatory fish, or other nonnative species (Brown et al. 2014). American bullfrogs and other exotic species, such as non-native crayfish, have an adverse effect because they are predators on other related ranids. Predator management may minimize these potential effects.

When designing projects, the Bureau would consider the need for restrictions of activities that could adversely affect frogs. Best management practices for Operations in or near Aquatic Ecosystems (AQ 01-27) and Spill Prevention and Abatement (SP 01-08) are designed to prevent adverse effects to aquatic ecosystems caused by spills or sedimentation. These best management practices minimize the chances of a hazardous spill in suitable aquatic habitat for frogs. Best management practices RST 01 – 06 are designed to minimize ground disturbance and soil compaction by heavy equipment in aquatic areas and during riparian restoration activities. This will minimize the potential for adverse effects to aquatic habitats used by frogs.

Road construction and reconstruction activities will follow best management practices R01 – R24 to prevent erosion and sedimentation of aquatic systems and minimize the area disturbed to complete the road. This will minimize the potential for adverse effects to aquatic habitats.

Impacts on Recovery

Harassment, harm, injury, or death of the frog could result from activities intended to restore, protect, maintain, or improve aquatic and riparian habitats, such as the restoration of streams and meadows, prevention of conifer encroachment, planting, blocking or disguising unauthorized vehicle or trail routes, fencing, and the removal of trash, etc. However, these projects are designed to improve habitats, and the long-term benefits to the frog likely will outweigh the initial short-term adverse effects. For example, meadow restoration that increases water tables and the connectivity of water to floodplains is likely to increase the amount and duration of occupied or suitable habitat.

Management of invasive species could result in initial short-term adverse effects to the frog in the form of displacement, injury, and death. Invasive species management could result in harm through changes in water quality and sedimentation at and downstream of areas of activities. The physical removal of non-native or undesirable plants may result in displacement, injury and death caused by the disturbance and trampling of native riparian vegetation, trampling of streambanks and shorelines, heavy equipment, and increased sedimentation. However, physical removal and control of non-native plants or unwanted plant growth will be a beneficial effect to the frog by allowing native vegetation to recover, reverse or halt the drying of meadows and water depletion, and eliminate or slow the unwanted expansion of vegetative growth into suitable and occupied habitats.

Western Spadefoot, Northern DPS

Effects

The primary program areas that may affect the spadefoot includes Vegetation and Forestry, Wildland Fire Management, Wildlife Management, Livestock and Grazing, and Travel and Transportation Management and Recreation. Many of the specific activities and sub-activities for these Management Categories overlap. Best Management Practices including Wild 1-3, WRH 1-10, WF 1-3, and G 1-11, as described in the Conservation Measures section of the Proposed Action will be applied to appropriate activities to minimize or avoid impacts to spadefoot.

Depending on the type of project and its location, activities to enhance and restore vernal pool landscapes can have adverse effects on spadefoot. For example, site access to vernal pool landscapes during the rainy season (generally, October to May) may lead to the disturbance of spadefoots, disrupting breeding behavior and success. Site access in vernal pool landscapes could also injure or kill spadefoots in shallow underground burrows through burrow collapse. Effects on the spadefoot toad from activities in vernal pool landscapes during the dry season will be unlikely since the species will be inactive in relatively deep underground burrows.

The Bureau would not use prescribed fire in and around vernal pools during the desiccation period when vernal pool spadefoot would be most sensitive to disturbances; prescribed fire during this time may disrupt or prevent breeding or otherwise harm the species, primarily because there would be personnel, vehicles, and equipment present in and around vernal pools during treatments. Heat from the fire itself may also injure or kill individual spadefoot or egg masses.

Prescribed fire during the spadefoot's dry season inactivity period may injure or kill newly metamorphosed spadefoots that are moving into adjacent upland areas to underground burrows. However, prescribed fire in vernal pool landscapes could also have benefits on vernal pool associated wildlife. Prescribed fire at appropriate time periods would be expected to reduce the buildup of invasive annual grass in and around vernal pools, which has been identified as a factor in shortened vernal pool hydroperiods. This will help extend vernal pool hydroperiods, which will benefit spadefoots by ensuring pools exist long enough for these species to complete breeding for the season.

Detrimental effects on the species or their habitat could also occur if occupied habitat was subject to inappropriate grazing regimes (e.g., overgrazing, under grazing, or inappropriately timed grazing). In the case of overgrazing and inappropriately timed grazing, physical trampling by livestock during key periods – for example, during pool desiccation – could disturb, injure, or kill spadefoot larvae in drying pools or around drying pools as newly metamorphosed juveniles make their way to adjacent upland burrows.

Under the Proposed Action, suitable vernal pool habitat for the spadefoot will overlap Bureau-administered subsurface mineral estate, as well as Bureau-administered surface in the Action Area. Where allocations lead to future project-level mineral exploration and development, this will have the potential to adversely affect the spadefoot through habitat loss or modification.

Impacts on Recovery

Implementation of activities to achieve management goals may have short- and long-term adverse effects on spadefoot through short-term habitat modification, injury and mortality, and

disturbance. In addition to these impacts, there may be some long-term habitat modification or loss from certain activities such as mining or facility development that changes hydrology. However, the restoration and management proposed in the Plan will likely result in the long-term conservation of the spadefoot through habitat improvements, reductions in predation and invasive species, and the use of best management practices and conservation measures. The Bureau will conduct implementation-level consultation with the Service that will identify additional conservation measures to ensure management is compatible with the species' recovery and conservation, and that would avoid or minimize potential adverse effects.

Fish

Tidewater Goby

Effects

The primary program areas that may affect this species include Water Resources, Riparian Management Areas, Fish and Wildlife Management, Minerals, and Travel and Transportation Management and Recreation. Many of the specific activities and sub-activities for these Management Categories overlap.

The goby does not directly overlap with potential project areas so the Proposed Action would not directly affect the species or its critical habitat. Nonetheless, sedimentation or impacts to the aquatic environment within the project area and adjacent to where the species occurs could adversely affect the species. In particular, the Mad River Slough in Arcata Bay next to the Humboldt Bay North Spit, which is directly adjacent to Bureau administered surface lands at the Ma-le'l Dunes.

Activities occurring directly adjacent to occupied goby habitat have the greatest potential to impact the species, through actions such as using heavy equipment or disturbing soil, which could cause sedimentation or negatively affect the water quality of their habitat in the case of hazardous spills. Direct effects to the species are not expected since no work will occur within occupied goby habitat, meaning there will be no dewatering of habitat or relocation of individuals.

When designing projects, the Bureau would consider the need for restrictions of activities that could adversely affect fish. Best management practices for Operations in or near Aquatic Ecosystems (AQ 01-27) and Spill Prevention and Abatement (SP 01-08) are designed to prevent adverse effects to aquatic ecosystems caused by spills or sedimentation. These best management practices minimize the chances of a hazardous spill in suitable aquatic habitat for fish. Best management practices RST 01 – 06 are designed to minimize ground disturbance and soil compaction by heavy equipment in aquatic areas and during riparian restoration activities. This will minimize the potential for adverse effects to aquatic habitats used by fish.

Road construction and reconstruction activities will follow best management practices R01 – R24 to prevent erosion and sedimentation of aquatic systems and minimize the area disturbed to complete the road. This will minimize the potential for adverse effects to aquatic habitats.

Impacts on Recovery

Future project-level restoration actions will likely contribute to long-term protection and enhancement of goby habitat in the Mad River Slough. Still, temporary adverse effects on the

species and critical habitat Elements are possible during habitat restoration. Implementation-level actions would be evaluated in a separate project-level consultation with the Service pursuant to the ESA and Bureau policy. During project-level consultation, conservation measures would be developed that would avoid or minimize the potential for residual or unavoidable effects during such projects. However, some adverse effects discussed above are still likely to occur during construction or project implementation.

Tidewater Goby Critical Habitat

Goby critical habitat is not within Bureau-administered lands; however, effects from projects implemented on those lands may have effects that extend into goby critical habitat (i.e., the critical habitat may be within the Action Area because effects of the projects extend to those areas). Plan programs that may affect goby critical habitat include Soils, Water Resources, Riparian Management Areas, Wildlife and Fish, and Travel and Transportation Management and Recreation.

Activities implemented to achieve the management goals of these programs could result in changes to water quality (e.g., sedimentation and salinity), aquatic vegetation, or the introduction of contaminants from equipment within or adjacent to water. Generally, activities implemented to protect soil and restore habitats will minimize sedimentation issues or disrupt the substrate (Element 1). In turn, the minimization of threats like sedimentation should improve conditions for aquatic vegetation, which would maintain or improve Element 2 of critical habitat. There may be short-term increases in adverse effects of sedimentation and damage to Elements; however, it is likely that critical habitat Elements will remain stable or increase within the Action Area through the implementation of the Plan.

Future project-level restoration actions will likely contribute to long-term protection and enhancement of critical habitat in the Mad River Slough. Still, temporary adverse effects on the species and critical habitat Elements are possible during habitat restoration. Implementation-level actions would be evaluated in a separate project-level consultation with the Service pursuant to the ESA and Bureau policy. During project-level consultation, conservation measures would be developed that would avoid or minimize the potential for residual or unavoidable effects during such projects. However, potential adverse effects discussed above may not be fully mitigated in future implementation-level consultations.

Insects

Franklin's Bumble Bee

Effects

The species needs, importance of substantial floral resources, definitions of nesting and overwintering habitat, and HPZs are described in the Status of the Species section. To date, the bumble bee has not been detected on Bureau-administered lands in the Action Area. The primary program areas that may affect the bumble bee include Livestock and Grazing, Riparian Management Areas, Vegetation and Forestry, Wildland Fire Management, and Wildlife. In addition, there may be effects from Soils, Land and Realty, Travel and Transportation Management and Recreation. The Action Area does include seven of the 23 mapped HPZs across the range to date (encompassing 215,436 acres). Surveys for floral resources and bumble bee have not been completed to date for the Plan consultation, but the Service recommends

surveys be completed in areas that may contain substantial floral resources (Service 2024). There are approximately 37,400 acres of potential habitat for the bumble bee in the Action Area.

Of the 37,400 acres of potential habitat in the Action Area on Bureau-administered lands, approximately 33,400 acres would be available for livestock grazing. The Plan consultation includes conservation measures to avoid or minimize livestock trampling of active nests, where possible. To achieve this, the Bureau will consider adjusting livestock grazing dates to the fall or winter when most flowering plants are dormant and bumble bees are least active. The Bureau may also consider methods to avoid grazing in habitat with high-quality floral resources or substantial floral resources, which includes riparian zones and mesic meadows. The Bureau will also consider incorporating exclosures to protect areas most likely to be utilized by bumble bees for nesting and foraging.

The Service expects beneficial effects from projects that restore riparian habitats, including wet meadows, stream courses, or wetlands. These areas may contain substantial floral resources, or nesting or overwintering habitats within 100 meters of substantial floral resources. If the species is present, riparian restoration activities may also result in insignificant, discountable, or adverse effects to its substantial floral resources, nesting, or overwintering habitats. The effects to bumble bee habitat will wholly depend on the location and timing of activities. In some cases, there may be no effect.

In some instances, riparian management, wet meadow enhancement, or wetland restoration include timber or small tree harvest or thinning to remove encroaching conifers. These activities may result in insignificant, discountable, or adverse effects. Effects may include the crushing or caving-in of burrows used by colonies, or other similar underground cavities or decaying logs that offer resting and sheltering. Restoration treatments may also reduce or remove large and small logs during implementation. There could be a direct loss of substantial floral resources (e.g., crushing or uprooting) from heavy equipment use, though this loss is considered temporary and limited to one to two seasons after implementation. This short-term loss is not expected to cause a wide-spread reduction of substantial floral resources. As demonstrated in similar restoration projects and monitoring, removing encroaching conifers results in varied reductions of canopy cover on the periphery of meadow areas or wetlands, or meadow interiors where conifer trees have established. Creating small or large canopy gaps and removing smaller understory vegetation is expected to promote improved growing conditions for substantial floral resources. Canopy reduction is also expected to increase solar radiation to the ground and support plant and shrub growth, considered favorable to pollinators. On the periphery, tree removal may reduce some shade and cover considered important for maintaining overwintering and nesting sites. Overwintering queens have been found mostly in shaded areas under trees and in banks without dense vegetation or direct sunlight (Alford 1969, Liczner and Colla 2019).

The Bureau will comply with policy for pollinators, including integrating pollinator-friendly practices in line with the Bureau Strategic Plan for Pollinator Conservation (Bureau 2022). This could include integrating native plant species that provide pollen and nectar in riparian or other restoration actions. This may include post-fire rehabilitation and stabilization, fuels treatments, or other projects that utilize seeds or seedlings. Additional conservation measures during riparian restoration may include planting pollinator-friendly vegetation, limiting mowing practices, and avoiding pesticide use in sensitive habitats.

When riparian restoration activities are proposed, project-level surveys for substantial floral resources are recommended, either within HPZs or outside of them, to determine the presence and extent of substantial floral resources. These surveys can assist the Bureau with determining the likelihood of possible use by bumble bee colonies (Service 2024). While surveys for pollinators can be informative, negative surveys cannot be used to ‘lift’ seasonal restrictions on restoration actions or other operations. In addition, negative surveys do not provide assurance the species is not present, given the low detection probability of bumble bees and other pollinators (Service 2024). If a riparian restoration project is within an HPZ, the Service recommends implementing a limited operating period during the critical colony period from May 15 through August 31 (Service 2024).

As with riparian restoration, the Service expects insignificant, discountable, beneficial, or adverse effects from vegetation management activities or projects, depending on the location and timing of activity. In some cases, there may be no effect. These may include, but are not limited to, commercial timber harvest or thinning; fuels reduction; prescribed fire to burn piles or underburn areas; or dry meadow restoration projects. The likelihood of these actions influencing or affecting the bumble bee, and its nesting or overwintering habitats, is higher when treatment areas are in close proximity to meadow areas or other openings with substantial floral resources.

Effects from vegetation and forestry activities may consist of a temporary loss of substantial floral resources with possible long-term benefits, disturbance or removal of overwintering or nesting habitat, disturbance or impacts to individuals if they are present, or the introduction and establishment of non-native invasive or noxious weeds that can outcompete native floral resources. Meadow restoration actions are generally expected to result in additional substantial floral resources by removing encroaching and established conifer and long-term beneficial effects. There may also be short- or long-term adverse effects.

Vegetation management can result in a moderate-to-high potential to introduce and spread non-native or invasive plant species on heavy equipment, other tools, or worker’s clothing and footwear. Conservation measures can help minimize the spread and reduce impacts to substantial floral resources. While non-native or invasive plants can provide resources for bumble bees, minimizing the spread of non-native, noxious weeds helps maintain native substantial floral resources in meadow or other openings with SFR. The establishment and spread of invasive plants can result in competition with native flowering vegetation for light, water, and nutrients. These invasive weeds can indirectly threaten bees by outcompeting native plants that provide a superior source of nectar and pollen and reducing overall floral diversity (McKinney and Goodell 2010).

In addition, when the European honeybee (*Apis mellifera*) was intentionally introduced to California in the early 1850s (Service 2018a) there was overlap in the resources used by *A. mellifera* and native bumble bees. This created the potential for increased competition for both native and non-native floral resources (Thomson 2004, Thomson 2006, Thomson 2016). Where this competition occurs, the effects are local in space and time; and are most pronounced where floral resources are limited and where large numbers of commercial *A. mellifera* colonies are introduced (Service 2018a). There is no current information to indicate any area of Franklin’s bumble bee habitat in its range has limited native or non-native floral resources in combination with large numbers of *A. mellifera* (Service 2018a). Based on this, we do not expect a potential

localized introduction of non-native floral resources in the Action Area's HPZs or other potential habitat for the bumble bee to result in competition for these resources between the two species.

Most vegetation management is completed using heavy equipment such as mechanical harvesters, skidders, dozers, graders, or excavators. Chainsaws, other manual tools, shovels, or handsaws may also be used. The primary concern for effects to substantial floral resources and nesting and overwintering habitats are from the impacts of heavy equipment operations in and around meadows or other openings to remove trees, decommission roads, or implement prescribed fire actions. Heavy equipment to log or remove trees, or decommission roads and areas around them, can displace or compact the soil, crush small and large downed wood, and uproot or crush shrubs and forbs. This can degrade or destroy root systems and soil conditions for substantial floral resources and remove or crush rodent burrows or downed wood used for nesting or overwintering. We expect most heavy equipment use to restore roads or unauthorized routes would occur on already compacted soils, but this equipment could also be used to complete actions in proximal undisturbed meadow habitats or openings.

Piling and burning lopped or cut trees, burning pile concentrations, and broadcast burning is expected to result in beneficial effects in terms of rejuvenating soil nutrients and helping to reduce and remove smaller size class trees that were not cut initially, or that continue to grow in treated meadow areas or other openings. Repeat underburning (e.g., every 5 to 10 years) can be beneficial to substantial floral resources. Depending on the seasonal timing however, prescribed fire may burn hotter in certain areas depending on fuel concentrations. It can also reduce important substantial floral resources during critical flowering times when they are providing nectar and pollen before the bumble bee queens overwinter, or after the new queens emerge from overwintering to initiate new colonies in the spring.

Burning in the late fall right before rain events can ameliorate negative impacts to soil and root systems by avoiding high intensity fire. This is because burning in cool, humid conditions minimizes peak soil temperatures and reduces impacts to nests and overwintering sites below the ground's surface.

Conservation measures can minimize soil disturbance when removing encroaching conifers from the periphery of meadows or openings (or near riparian areas), or when removing or thinning trees that have grown and established in a meadow or opening. Some measures include operating ground-based mechanical equipment (e.g., feller bunchers, tractors, skidders, masticators) only when meadow soils are dry, on snowpack greater than 12 inches deep or over 6 inches of frozen ground, or away from areas containing standing water or saturated soils. Conservation measures can also avoid or reduce the spread of noxious weeds. These may include cleaning equipment and other tools before entry into a project area and when moving equipment from one treatment area to a different treatment area, avoiding staging or parking equipment in infested areas, using weed-free materials (e.g., seeds and mulch), and monitoring and treating non-native, invasive weed infestations.

The Biological Assessment describes the following conservation measures specific to the bumble bee: 1) To avoid direct mortality and loss of floral resources during the active flight season, the Bureau would consider conducting prescribed fire activities when bumble bees are dormant, between October 1 and May 14 each year; 2) Prescribed burning should be done during cool, humid conditions to avoid high intensity fire, thus minimizing peak soil temperatures and the potential for impacts to nests and overwintering sites below the ground surface; 3) Prescribed

burns should leave skips and unburned areas as bumble bee refugia; 4) After burning, the Bureau should consider seeding with a diverse assortment of native floral resources.

Within transitional zones (defined as forest or woodland edges up to 100 m beyond habitat with substantial floral resources), the Bureau would consider the following measures: 1) Treating no more than one third of an overall site capable of sustaining Franklin's bumble bees, or within a specific habitat feature at a time, to maintain "islands" of undisturbed habitat. A specific habitat feature is a nesting, foraging, or overwintering area; 2) Avoiding treating an entire site (or entire portion of a habitat feature) in a single year, to reduce likelihood of eliminating a site's utility to the species in each season; 3) If an area is suspected to function as potential bumble bee nesting habitat, preserving areas of undisturbed ground, particularly in areas where rodent activity is observed; 4) Maintaining and enhancing surface-level structural complexity such as downed wood, rock piles, moss, leaf and needle litter, and native bunchgrasses; and 5) Considering re-seeding disturbed areas with a diversity of native, flowering species appropriate for the location to enhance floral resource availability over the long-term.

In addition, the Service recommends the surveys for substantial floral resources and implementing seasonal restrictions in HPZs during the critical colony period from May 15 through August 31, as described above for Riparian Restoration.

The treatments under Wildland Fire Management would be done to varying degrees in upland and riparian vegetation types. Treatments may include fuels reduction, prescribed fire, and postfire management or restoration. The Biological Assessment also describes management of naturally occurring wildfires and fire suppression, but these two actions are typically considered an emergency response and would require separate emergency consultation under the Act. The Proposed Action does not specify acres or miles of anticipated treatments for wildland fire management but includes goals and objectives to move vegetation toward the desired condition.

In addition to effects from prescribed fire, the Service finds effects under this program may occur when implementing mechanical or manual fuels management, constructing fuel breaks, and during post-fire restoration. Effects may also occur if the Bureau utilizes meadows or openings during wildfire suppression activities for spike-camps or other uses, though this specific action and any effects would be addressed under a separate emergency consultation. Any emergency response during wildfire suppression would be addressed under emergency consultation, and the Redding Field Office receives an annual Partner Memo from the Service which documents the recommended conservation measures for the bumble bee during suppression.

Using prescribed fire may also result in direct effects to the bumble bee and short-term adverse effects on floral resources. For instance, controlled burns could cause death of individual bumble bees and negative effects to a colony. Depending on the time of year prescribed fire was implemented, fire could temporarily reduce the abundance of floral resources on the landscape. Incorporating the conservation measures as well as best management practices during prescribed fire would lessen the intensity of potential effects on the bumble bee, its substantial floral resources, and nesting and overwintering habitat. For example, the Bureau would conduct prescribed burns in the range of the species from October 1 to May 14, to avoid direct mortality and loss of floral resources during the flight season. Carrying out prescribed fire during cool, humid conditions would also reduce peak soil temperatures, lessening effects on overwintering bees underground. Leaving skips of unburned areas would also maintain refugia, helping to ensure an entire population would not be affected at one time. Per the best management practices

described in the Biological Assessment, the Bureau would burn relatively small areas, and will consider weather conditions (e.g., relative humidity, windspeed, precipitation forecast) and fuel load, moisture content, and type, to minimize adverse effects of prescribed burns.

The effects of Wildlife Management on bumble bee are primarily beneficial. This program element may include inventorying and monitoring special status species and their habitats to better understand abundance and distribution, and to facilitate conservation and recovery actions in the Action Area. Where carried out, inventories and monitoring to better understand the distribution of the bumble bee would provide information to better manage the species to meet recovery criteria. In addition, habitat restoration may also benefit pollinators, and depending on where, when, and how these activities occur, the Service finds the effects may be insignificant, discountable, wholly beneficial, or adverse.

Some activities associated with Soils that could affect the bumble bee or its substantial floral resources, nesting, or overwintering habitat include: 1) Implementing proactive stabilization or other appropriate rehabilitation measures in response to human-caused or non-human-caused events (e.g., stabilization of wet spring areas or slopes above roads that may contain substantial floral resources); 2) Road maintenance activities to reduce sediment and promote resiliency to storm impacts, administrative use, and public use. If the species is present, road construction, maintenance or decommissioning, and slope or soil stabilization, activities may affect it or its nesting or overwintering habitats. Effects will depend on where, when, and how activities are implemented.

Habitat for proposed, candidate, and federally listed species would be retained under Bureau ownership and would not be considered for disposal. The Bureau will also retain small or isolated parcels that provide natural resource refugia and contribute to climate change resilience, or that provide high biological value, such as connectivity corridors. This will avoid the potential for future adverse effects to the species from nonfederal management or projects. It would also ensure habitat for proposed, candidate, and federally listed species remains subject to long-term management by the Bureau. An exception would be made for disposal of lands if disposal would enhance habitat values. Given this, we expect no effects to the bumble bee under land tenure and use authorizations. As land use authorizations for renewable energy such as wind, solar, hydropower, or biomass are analyzed separately from other types of land use authorizations, there may be insignificant, discountable, or adverse effects to the species or its substantial floral resources from these types of activities, depending on their location.

In general, actions associated with travel and transportation, recreation, and visitor services could affect listed species. Effects would be the result of vehicle use (for example, off-highway vehicles), human presence, and surface disturbance, which can cause behavioral disturbance, injury, or mortality of individuals along with habitat loss, degradation, and fragmentation. Roads that have been established near and through meadow areas or openings with substantial floral resources may be proposed for active (mechanical or manual soil manipulation) or passive decommissioning (blocking with large boulders, gates, or other material). Some roads may be decommissioned by blocking the entrance, revegetating and installing water bars, removing road fill and culverts, establishing drainage and removing unstable road shoulders, or full obliteration, or installing large berms. These activities include disturbing and moving compacted road surface soils in order to recontour and restore natural slope. Methods will be determined on a case-by-case basis.

Trail work may require the use of mini excavators, small backhoes, shovels, bowsaws, loppers, or chainsaws. Constructing a trail, or trail segments, in meadow areas or openings with substantial floral resources may consist of clearing the vegetation, compacting soil to create trail tread, placing rock aggregate or constructing boardwalks over wetter areas, and constructing channels in a meadow or opening.

If the species is present, travel and recreation management, including trail construction, reconstruction, or maintenance may affect it or its nesting or overwintering habitats, depending on where, when, and how activities are implemented.

Impacts on Recovery

For the program elements described above, we anticipate effects if individuals are present. It is possible an active colony (nest) or hibernating female could be disturbed, crushed, or burned during implementation of these activities. Despite annual surveys in some past detection areas and high-quality habitat, the bumble bee has not been detected since 2006. The species is also most likely to be detected in a HPZ, but it has a low detection probability. While the likelihood of direct and indirect effects to individuals is considered low, effects to individuals, colonies, and substantial floral resources are still possible if individuals are present. The Bureau has included several conservation measures and best management practices to help minimize or avoid effects. Site-specific projects that may affect the bumble bee will require an implementation-level consultation and compliance with applicable laws and regulations.

Monarch Butterfly

Effects

Due to the widespread distribution of monarchs and their use of many habitat types, programs that may affect monarch include Soils, Riparian Management Areas, Vegetation and Forestry, Wildlife, Wildland Fire Management, Renewable Energy, Minerals, Travel and Transportation Management and Recreation, and Livestock and Grazing. Activities implemented to achieve the management goals of these programs could result in injury or mortality of monarchs or result in habitat modifications that impact resources monarchs rely on. Best Management Practices for Wildlife (Wild 1-8) will benefit monarchs by restoring disturbed areas using native seed mixes. Additionally, the Bureau will implement P-1 when using pesticides to minimize effects to wildlife species.

Activities may result in ground disturbance that removes vegetation, including nectar plants and milkweed (*Asclepias* species). Project activities may temporarily change local environments where monarch butterfly is present. These local changes may temporarily result in decreased reproductive success from a small number of individuals that are exposed to the changes. We expect that project activities could affect all eggs and larva present on host plants within a project area, however, any lost productivity associated with the loss of those host plants is not likely to affect the species' reproductive capacity overall because effects are primarily temporary and of a short duration (i.e., project activities will not occur in a local area for longer than one reproductive cycle).

Impacts on Recovery

The Proposed Action contains goals and objectives to improve the habitat for pollinators the Action Area. These include restoring habitats with a diverse variety of floral resources, including milkweed. Managing the Action Area with these goals and objectives will generally maintain or

increase the amount of suitable monarch habitat over time and contribute to the species' recovery. This will come about by increasing the density and distribution of native floral resources in the Action Area. These projects, while providing for the long-term conservation of the species, may result in short-term adverse effects to the monarch.

The Proposed Action includes best management practices that the Bureau will apply as needed to specific projects. Additional mitigation measures to avoid or reduce effects may be developed as needed; these may include spatial or temporal habitat avoidance or other conservation measures developed in consultation with the Service during project-level consultation.

Valley Elderberry Longhorn Beetle

Effects

Plan programs that may affect the beetle include Soils, Water Resources, Riparian Management Areas, Vegetation and Forestry, Wildlife, Wildland Fire Management, Minerals, Travel and Transportation Management and Recreation, and Livestock and Grazing. Best Management Practices Wild 1-8, MC 1-4, and P-1 will benefit the beetle by minimizing effects to elderberry shrubs and adults.

It is possible that implementation-level restoration actions could have adverse, direct effects on the beetle and its habitat. The types and intensity of potential effects will vary based on the activity and location, but the primary effects would be from actions requiring surface disturbance (e.g., to recontour or reconnect waterways with historical floodplains). Effects could result from disturbance to or disruption of adult beetles, including breeding or feeding behavior. Individuals or eggs could be crushed or killed by equipment or buried by soil during recontouring of elderberry shrubs. Riparian vegetation could be temporarily altered or reduced in cover, temporarily altering physical habitat characteristics, or reducing the density and distribution of elderberry shrubs. Activities that damage or remove elderberry shrubs could result in the loss of vigor or mortality of the plant. Elderberry shrub injury or mortality could impact the beetle by reducing available forage and resources or increase fragmentation of habitat.

The beetle spends most of its life 1- to 2-year lifespan in the larval stage living within the stems of the elderberry shrubs and it is not always possible to know which elderberry shrubs are currently inhabited by the beetle. If elderberry shrubs containing larvae are removed or damaged during vegetation treatments, larvae in the shrub stems could be killed. Transplantation of elderberry shrubs that are reasonably likely to be occupied by beetle larvae could also adversely affect the beetle because the elderberry shrub may experience stress due to changes in the soil, hydrology, microclimate, or associated vegetation.

While fuel reduction projects in beetle habitat in the Action Area will help maintain and enhance riparian habitat condition, some types of fuel treatments will have greater potential for adverse effects on the beetle. If elderberry shrubs are burned, larvae and eggs in the shrub stems could be injured or killed. Mortality of elderberry shrubs may decrease connectivity of beetle habitat and limit dispersal of the species, impacting genetic connectivity of populations.

Impacts on Recovery

The Proposed Action contains several broad goals and objectives to improve the connectivity, condition, and resilience of the Action Area waterways and riparian areas. These include restoring and reconnecting floodplains, limiting development in current and historical floodplains, and promoting hydrologic resilience in the face of climate change. Managing the

Action Area waterways toward these goals and objectives will generally maintain or increase the amount of suitable riparian habitat for the beetle over time and contribute to the species' recovery. This will come about by increasing the density and distribution of native elderberry shrubs in riparian areas in the Action Area. These projects, while providing for the long-term conservation of the species, may result in short-term adverse effects to the beetle.

The Proposed Action includes best management practices that the Bureau will apply as needed to specific projects. Additional mitigation measures to avoid or reduce effects may be developed as needed; these may include spatial or temporal habitat or elderberry shrub avoidance or other conservation measures developed in consultation with the Service during project-level consultation.

Crustaceans

Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

Effects

Plan programs that may affect fairy shrimp and tadpole shrimp include Soils, Vegetation and Forestry, Wildlife, Renewable Energy, Minerals, Travel and Transportation Management and Recreation, and Livestock and Grazing. Activities implemented to achieve the management goals of these programs will be distributed throughout Bureau-administered lands and over time. Best Management Practices Wild 1-8 and WRH 1-10 will be implemented to minimize effects to the fairy shrimp and tadpole shrimp. Specifically, WRH-4 and WRH-8 will maintain a natural hydrologic period for vernal pools, and WRH-10 designates that work will occur during the dry season to minimize impacts to breeding adults.

Depending on the type of project and its location, activities to enhance and restore vernal pool landscapes can have adverse effects on the fairy shrimp and tadpole shrimp. For example, workers entering inundated vernal pools on foot, or using off-road vehicles to access vernal pool landscapes when soils are moist (i.e., to facilitate invasive plant treatments or conduct monitoring activities), could crush individual fairy shrimp or tadpole shrimp, or compact soils, crushing or otherwise damaging cysts. Soil disturbance in dry vernal pools, even in limited amounts, could expose cysts leading to desiccation.

The Bureau will not use prescribed fire in and around vernal pools during the desiccation period when vernal pool invertebrates will be most sensitive to disturbances; prescribed fire during this time may disrupt or prevent breeding or otherwise harm the species, primarily because there would be personnel, vehicles, and equipment present in and around vernal pools during treatments. Heat from the fire itself may also injure or kill individual crustaceans or damage or desiccate cysts. Implementing prescribed fire may result in the temporary alteration of critical habitat Elements in a manner similar to that described above. Prescribed fire in vernal pool landscapes could also have benefits on vernal pool associated wildlife. Prescribed fire at appropriate time periods will be expected to reduce the buildup of invasive annual grass in and around vernal pools, which has been identified as a factor in shortened vernal pool hydroperiods. This will help extend vernal pool hydroperiods, which could benefit vernal pool crustaceans by ensuring pools exist long enough for these species to complete breeding for the season.

Detrimental effects on the fairy shrimp and tadpole shrimp habitat could also occur if occupied habitat was subject to inappropriate grazing regimes (overgrazing, under grazing, or inappropriately timed grazing). In the case of overgrazing and inappropriately timed grazing,

physical trampling by livestock during key periods – for example, during pool desiccation – could injure or kill individual crustaceans during critical breeding periods, or damage cysts.

Constructing or maintaining fences, corrals, gates, other temporary grazing structures, and water sources could result in localized ground disturbance, increasing the potential for invasive plant establishment and erosion, which could reduce water quality in vernal pools. The use of vehicles and off-highway vehicles during herding or loading of livestock could have similar effects. Most acres of fairy shrimp and tadpole shrimp critical habitat in the Action Area will remain available for livestock grazing. Elements for critical habitat for these vernal pool crustaceans that will be affected by livestock grazing and associated activities include an appropriate hydrologic regime and hydroperiods in vernal pools.

Under the Proposed Action, suitable vernal pool habitat for the fairy shrimp and tadpole shrimp will overlap Bureau-administered subsurface mineral estate, as well as Bureau-administered surface, in the Action Area. Where allocations lead to future project-level mineral exploration and development there is a potential to adversely affect the fairy shrimp and tadpole shrimp and through habitat loss or modification. However, there are several considerations that make the likelihood of adverse effects on the fairy shrimp and tadpole shrimp unlikely and the intensity of any residual effects very small. Due to the minimal or absent resource potential, the expected level of mineral exploration and development will be low within the Action Area on Bureau-administered surface lands or subsurface mineral estate in the next 20 years. Further, there is no indication that mineral exploration or development will occur on the Bureau-administered subsurface mineral estate with private landownership where critical habitat is designated. Nonetheless, it is not impossible that future site-specific exploration and development of federal mineral resources could be proposed in or near occupied habitat or critical habitat for these species. In this case, site-specific projects would require an implementation-level consultation, and compliance with applicable laws and regulations.

Impacts on Recovery

Implementation of activities to achieve management goals may have short- and long-term adverse effects on fairy shrimp and tadpole shrimp through short-term habitat modification, injury and mortality, and disturbance. In addition to these impacts, there may be some long-term habitat modification or loss from certain activities such as mining or facility development that changes hydrology. However, the restoration and management proposed in the Plan will likely result in the long-term conservation of the fairy shrimp and tadpole shrimp through habitat improvements, reductions in predation and invasive species, and the use of best management practices and conservation measures. The Bureau will conduct implementation-level consultation with the Service that will identify additional conservation measures to ensure management is compatible with the species' recovery and conservation, and that would avoid or minimize potential adverse effects.

Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp Critical Habitat

Plan programs that may affect fairy shrimp and tadpole shrimp designated critical habitats include Soils, Vegetation and Forestry, Renewable Energy, Minerals, Travel and Transportation Management and Recreation, and Livestock and Grazing. Activities implemented to achieve the management goals of these programs will be distributed throughout Bureau-administered lands and over time.

Activities implemented to achieve the management goals that may affect Elements of critical habitat include ground-disturbing activities, such as installation of renewable energy facilities and roads, and trampling and contamination by livestock. While vegetation projects would not be expected to alter Elements related to the vernal pool landscape, topography, or substrate of the pools themselves, changes to the surrounding vegetation could affect the Elements related to the crustaceans' food sources. Elements could also be affected by organic or inorganic debris that provides habitat structure being washed or blown into pools. Soil disturbance in uplands surrounding pools could result in erosion, which could decrease water quality in the pools. In comparison, activities like invasive species management and erosion control would improve Elements by maintaining or improving hydrology and inundation period, providing food resources from native plants, and improving structure within vernal pools.

Plants

Beach Layia

Effects

Plan management categories that may affect beach layia include Vegetation and Forestry and Travel and Transportation Management and Recreation. The Plan proposes removal of non-native invasive species using a number of tools including mechanical and manual removal, as well as herbicide and fire treatments. Current management within the Plan area has mostly consisted of manual removal and pile burning, which can result in crushing, injury and mortality of individual layia plants. Monitoring of the layia populations in active management areas indicates that the removal of invasive non-native species including but not limited to European beachgrass (*Ammophila arenaria*) and iceplant (*Carpobrotus* spp.) has resulted in an expansion of the occupied area as well as the density of layia. The long-term benefits of habitat restoration to the populations of the layia within the Plan area are expected to outweigh the short-term impacts to individual plants. The Bureau will employ post restoration monitoring following project completion to determine efficacy and impacts of treatment (Wild-4). Native plants from local ecotypes will be used when needed for restoration of disturbed sites (Wild-5).

Road maintenance and recreational activities can also impact individual plants. Layia occurs in areas of open sand and often occurs on the edges of roads and trails. Plants can be displaced, crushed, injured, or killed by people using and maintaining the roads and trails. Habitat can be disturbed and removed by these activities. The Bureau will use existing roadways or trails for access to project sites which will reduce impacts to native plants including beach layia (Wild-3). New facilities will be sited in previously disturbed areas, to the extent feasible, and will be designed to avoid sensitive habitats and affect the least amount of native vegetation (Wild-8).

During project-level consultation, conservation measures will be developed to minimize the potential for effects and minimize the intensity of any unavoidable effects to beach layia. Surveys will be conducted to document the extent of occupied habitat in the vicinity of planned projects, and avoidance buffers will be implemented to avoid populations.

Impacts on Recovery

The vegetation management activities proposed under the Plan in occupied layia habitat are in alignment with the recovery actions outlined in the recovery plan (Service 1998). Continued invasive species management is likely to benefit the long-term conservation of layia as previous monitoring has demonstrated an increase in distribution and density. Invasive plant removal,

road and trail maintenance, and recreation may result in adverse effects to layia. The Bureau will implement appropriate best management practices (Appendix B) and conservation measures developed during project-level consultation to avoid or minimize adverse effects to the species. Overall, the Plan may benefit the layia through habitat restoration and management.

Gentner's fritillary

Effects

The primary Plan program areas that may affect this species include Vegetation and Forestry, Wildland Fire Management, Livestock and Grazing, Lands and Realty, and Travel and Transportation Management and Recreation. Under these programs ground-disturbing activities, prescribed fire, fire suppression activities, timber harvest and thinning, manual and mechanical vegetation removal and reduction, temporary road and landing construction, fuels management, post-fire management, herbicide use, and overgrazing by livestock and feral horses could have adverse effects on the fritillary, by killing or injuring individual plants, disturbing soils, and destroying habitat, or affecting entire populations by introducing competitive invasive non-native species. However, prescribed fire, thinning, manual vegetation removal, and fuels management may benefit the species by preventing encroachment by dense shrubs and trees that could lead to the loss and extirpation of fritillary plants and associated understory species. The Bureau will employ post restoration monitoring following project completion to determine efficacy and impacts of treatment (Wild-4). Native plants from local ecotypes will be used when needed for restoration of disturbed sites (Wild-5).

To prevent the spread of invasive non-native plants, the Vegetation and Forestry program will restrict travel in weed-infested areas and clean vehicles and equipment to remove weed seeds before entering public lands, inventory and treat weeds in operating areas, minimize soil disturbance, use weed-free staging areas, monitor for weeds during and after activities, and treat to control them. Under the Land and Realty Program, occupied fritillary lands will be retained and not considered for disposal. The Bureau will use existing roadways or trails for access to project sites to reduce impacts to native plants including fritillary (Wild-3). New facilities will be sited in previously disturbed areas, to the extent feasible, and will be designed to avoid sensitive habitats and affect the least amount of native vegetation (Wild-8).

During project-level consultation, conservation measures will be developed to minimize the potential for effects and minimize the intensity of any unavoidable effects to the fritillary. Surveys will be conducted to document the extent of the fritillary in the vicinity of planned projects, and avoidance buffers will be implemented to avoid populations and seed banks during those projects and treatments.

Impacts on Recovery

Implementation of activities to achieve the management goals of the Plan may result in adverse effects to individuals through injury or mortality, habitat modification and competition. The Bureau will implement best management practices identified in Appendix B and other conservation measures identified in project-level consultation to avoid or minimize impacts to the fritillary. Despite the adverse effects identified above, many of the management actions proposed under the Plan may result in long-term benefits to the fritillary by improving habitat conditions, removing competitive invasive species, and managing for the species.

McDonald's Rock-cress

Effects

Within the Plan area, this species is limited to the Red Mountain ACEC in Mendocino County. Plan programs that may affect this species include Vegetation and Forestry, Wildland Fire Management, Minerals Development, Travel and Transportation Management and Recreation, and Livestock and Grazing.

The primary threat to this species is wildfire and any associated suppression activities. Installation of fire lines and roads to access the area could displace individuals if a fire were to occur there. Individual plants could be crushed, injured and killed from fire suppression activities. Fuels reduction activities such as prescribed fire could have an impact on the species as well. While these activities could provide long-term conservation for the rock-cress by reducing the threat of a catastrophic wildfire, there could be some direct impacts similar to the activities associated with wildfire suppression. Rock-cress could be displaced, crushed, injured, or killed. The Bureau will employ post restoration monitoring following project completion to determine efficacy and impacts of treatment (Wild-4). Native plants from local ecotypes will be used when needed for restoration of disturbed sites (Wild-5). The Bureau will use existing roadways or trails for access to project sites which will reduce impacts to native plants including rock-cress (Wild-3).

No mining currently occurs in the Red Mountain ACEC, nor is any proposed under the Plan but the presence of heavy metals, particularly nickel, has made the area of interest for mining claims in the past and could continue to be of interest in the future. Under the Plan, Red Mountain will be designated as a Wilderness Study Area and will be closed to mineral leasing. Due to the designation as a Wilderness Study Area, recreation use is limited, and recreation is anticipated to remain at low levels. There is some risk of plants being trampled by people using and maintaining the trails in the area.

During project-level consultation, conservation measures will be developed to minimize the potential for effects and minimize the intensity of effects to the rock-cress. Surveys will be conducted in the vicinity of planned project, and buffers may be implemented to avoid populations and seed banks during those projects and treatments.

Impacts on Recovery

Implementation of activities to achieve the management goals of the Plan may result in adverse effects to the rock-cress through injury or mortality, habitat modification and competition. The Bureau will implement best management practices identified in Appendix B and other conservation measures identified in project-level consultation to avoid or minimize impacts to the rock-cress. Despite the adverse effects identified above, many of the management actions proposed under the Plan may result in long-term benefits to the rock-cress by improving habitat conditions, minimizing the risk of catastrophic wildfire, minimizing damage to rock-cress from trails and recreation, and managing for the species.

Menzies' Wallflower

Effects

The management categories that may affect the species include Vegetation and Forestry and Travel and Transportation Management and Recreation. The Plan proposes removal of non-native invasive species using a number of tools including mechanical and manual removal as

well as herbicide and fire treatments. Current and management within the Plan area has mostly consisted of manual removal and pile burning which can result in crushing, injury and mortality of individual plants. Monitoring of the wallflower populations in areas where habitat restoration has occurred indicates that the removal of invasive non-native species including but not limited to European beachgrass and iceplant has had a beneficial effect on the species. The Bureau will employ post restoration monitoring following project completion to determine efficacy and impacts of treatment (Wild-4). Native plants from local ecotypes will be used when needed for restoration of disturbed sites (Wild-5).

Trail and road maintenance and recreational activities can also impact individual plants. Wallflower occurs in areas of open sand and often occurs on the edges of trails. Plants can be displaced, crushed, injured, or killed by people using and maintaining the trails. The Bureau will use existing roadways or trails for access to project sites which will reduce impacts to native plants (Wild-3). New facilities will be sited in previously disturbed areas, to the extent feasible, and will be designed to avoid sensitive habitats and affect the least amount of native vegetation (Wild-8).

During project-level consultation, conservation measures will be developed to minimize effects to the wallflower. Surveys will be conducted to document the extent of occupied habitat in the vicinity of planned projects, and buffers may be implemented to avoid populations.

Impacts on Recovery

The vegetation management activities proposed under the Plan in occupied wallflower habitat are in alignment with the recovery actions outlined in the recovery plan (Service 1998). Continued invasive species management is likely to benefit the long-term conservation of the wallflower. Invasive plant removal, road and trail maintenance, and recreation may result in adverse effects to the wallflower. The Bureau will implement appropriate best management practices (Appendix B) and conservation measures developed during project-level consultation to avoid or minimize adverse effects to the species. Overall, the Plan may benefit the wallflower through habitat restoration and management.

Slender Orcutt Grass

Effects

Slender Orcutt grass and is distributed in the Action Area on Bureau-administered surface lands and subsurface mineral estate. Plan management categories that may affect the species include Vegetation and Forestry, Wildland Fire Management, Travel and Transportation Management and Recreation, and Livestock and Grazing. Best Management Practices WRH 1-10 will be implemented to minimize effects to the grass. Specifically, WRH-4 and WRH-8 will maintain a natural hydrologic period for vernal pools.

Where management direction due to the proposed project results in future implementation-level habitat restoration or enhancement activities in vernal pool landscapes that support the grass could result in localized adverse effects on the species. The Proposed Action contains several overarching goals and objectives for vegetation that will have the potential to affect grass. The Bureau will manage vegetation to optimize plant community health and resilience to landscape-wide effects, including the effects from climate change, and to implement recovery actions and contribute to the conservation of listed species. Managing for the resilience of vernal pool

landscapes in response to climate change and its associated threats will help contribute to the continued persistence of suitable habitat for the grass on Bureau-administered lands.

The Proposed Action also contains management direction to manage vegetation cover types for the conservation of federally listed plant species and manage the grasslands, vernal pools, and wetland vegetation cover types in particular. The purpose of this direction is to promote native species composition and pollinator diversity and to maintain hydrologic connectivity and flow. Applying this management direction to the management of Bureau-administered vernal pool landscapes will help maintain and enhance the grass's suitable and occupied habitat with long-term beneficial effects.

However, where management direction results in future implementation-level habitat restoration activities, depending on the type of activity, this could result in localized direct removal or damage to individuals and seed banks, and temporary habitat alterations. For example, inappropriately timed management actions, such as mowing or prescribed burning during the desiccation period, may result in deleterious effects such as reduced flowering and seed set. Future implementation-level restoration, particularly those activities that will mimic the historical, low-intensity, periodic fire regimes in this species' fire-adapted habitat, will be likely to maintain, expand, and improve habitat for the grass in the long term. However, in the short term, restoration actions could increase the potential for small-scale, direct removal of or damage to individuals and seed banks, and temporary adverse habitat alterations. Because the goal of future restoration will be to benefit the species and its habitat, the Bureau would avoid or minimize the potential for these effects.

The Bureau would not use prescribed fire in vernal pool habitats during the desiccation period. This is when vernal pool plant species may be most sensitive to disturbance; prescribed fire during this time may disrupt or prevent seed production or otherwise harm the species. Using appropriately timed prescribed fire in vernal pools may enhance habitat for and populations of slender Orcutt grass by reducing competing invasive plants.

The Bureau would manage the Sacramento River Bend as an Extensive Recreation Management Area (ERMA) focused on providing sustainable, multiuse, nonmotorized trails and other nonmotorized recreational opportunities. Approximately 58 acres of occupied grass habitat would be in the ERMA (Bureau 2024b). The Bureau would identify areas within the ERMA where no trails would be developed to retain the relevant and important values of the ACEC, which include the grass. Given this, it is unlikely that trail development, maintenance, or nonmotorized use would result in adverse effects on the grass, such as trampling or localized soil disturbance and removal of individuals or seed bank during trail development.

Under the Proposed Action, 56 ac of grass occupied habitat would be open to grazing, while 12 acres of occupied habitat would be closed to grazing, including the Hawes Corner ACEC (Bureau 2024b). Generally, appropriately managed livestock grazing would be compatible with maintaining vernal pool habitat conditions if it were carried out outside of the sensitive parts of the growing season, such as during periods when plants bloom or set seed, and if it were carried out at appropriate stocking levels. In areas closed to grazing, there could be long-term habitat degradation for the grass from invasive species expansion into occupied habitat unless other vegetation management, such as mowing or prescribed burning, is implemented in these areas.

Due to the minimal or absent resource potential, the expected level of mineral exploration and development will be low within the Action Area on Bureau-administered lands or mineral estate in the next 20 years. Nonetheless, it is not impossible that future site-specific exploration and development of federal mineral resources could be proposed in or near occupied habitat for the slender Orcutt grass. In this case, site-specific projects will require an implementation-level consultation with the Service, and compliance with applicable laws and regulations. For permitted mineral activities, the Bureau would include stipulations, best management practices, and permit conditions to avoid adverse effects and habitat degradation in sensitive habitats, including the vernal pool habitats that support grass.

Impacts on Recovery

Implementation of activities to achieve management goals may have short- and long-term adverse effects on the through short-term habitat modification, injury and mortality. In addition to these impacts, there may be some long-term habitat modification or loss from certain activities such as facility development that changes hydrology. However, the restoration and management proposed in the Plan will likely result in the long-term conservation of the grass through habitat improvements, reductions in invasive species, and the use of best management practices and conservation measures. The Bureau will conduct implementation-level consultation with the Service that will identify additional conservation measures to ensure management is compatible with the species' recovery and conservation, and that would avoid or minimize potential adverse effects.

Slender Orcutt Grass Critical Habitat

Slender Orcutt grass critical habitat is distributed in the Action Area on Bureau-administered surface lands and subsurface mineral estate. Plan management categories that may affect the species include Vegetation and Forestry, Wildland Fire Management, Travel and Transportation Management and Recreation, and Livestock and Grazing. Elements for slender Orcutt grass include an appropriate hydrologic regime and hydroperiods in vernal pools. While some activities will adversely affect the Elements of critical habitat, the restoration and management of vernal pool habitats under the Plan will likely maintain or improve Elements throughout the Action Area.

Livestock can help maintain hydroperiods in vernal pool habitats for listed species by reducing nonnative, invasive annual grass species that can accumulate in and around pools, reducing the hydroperiod (Service 2005b). In areas closed to grazing, maintenance of the Elements may require other vegetation or hydrologic management. Most acres (14,800 acres) of grass critical habitat in the Action Area would be open to livestock grazing, and about 1,000 acres would be closed (Bureau 2024a).

Implementation-level vegetation management is unlikely to substantially alter the condition of grass critical habitat Elements, as the Elements relate to the topographical characteristics of vernal pool habitats, such as mound-intermound-swale topography and pool depressions with restrictive soil substrates that seasonally pond water. While vegetation management would not alter the physical landscape characteristics, it could affect pool hydroperiod, which is an inherent characteristic of vernal pool habitat.

Under the Proposed Action, critical habitat on Bureau-administered surface lands for the grass will be allocated as open for fluid leasable mineral, locatable mineral, and mineral material

exploration and development. Critical habitat for the grass also occurs on Bureau-administered subsurface mineral estate (split estates) in the Action Area. Mineral exploration and development will have the potential to adversely affect critical habitat through detrimental changes to the Elements of critical habitat. However, the Bureau will implement appropriate best management practices described in Appendix B and additional conservation measures may be developed during project-level consultations.

Stebbins' Morning-Glory

Effects

At this time, there are no known populations on Bureau-administered lands addressed under this Plan consultation but surveys for the morning-glory are pending. If it is present in the Action Area, the management categories that may affect the species include Soils, Vegetation and Forestry, Wildland Fire Management, Minerals Development, Travel and Transportation Management and Recreation, and Livestock and Grazing. Under these programs, ground-disturbing activities, prescribed fire, fire suppression activities, timber harvest and thinning, manual and mechanical vegetation removal and reduction, temporary road and landing construction, fuels management, post-fire management, and herbicide use could have adverse effects on the morning-glory by killing or injuring individual plants, disturbing soils, and destroying habitat, or affecting entire populations by introducing competitive invasive non-native species.

The effects to the morning-glory will depend on the location and timing of activities. In some cases, there may be no effect. For the program elements described above, we anticipate effects if individuals are present. The Bureau will employ monitoring following project completion to determine efficacy and impacts of treatment (Wild-4). Native plants from local ecotypes will be used when needed for restoration of disturbed sites (Wild-5). The Bureau will use existing roadways or trails for access to project sites which will reduce impacts to native plants (Wild-3). New facilities will be sited in previously disturbed areas, to the extent feasible, and will be designed to avoid sensitive habitats and affect the least amount of native vegetation (Wild-8). Site-specific projects that may affect the morning-glory will require an implementation-level consultation, and compliance with applicable laws and regulations.

Impacts on Recovery

Morning-glory occupancy of the Action Area is uncertain, but monitoring is planned to determine the status on Bureau-administered lands. Ground-disturbing activities and vegetation management may cause short- and long-term adverse effects to individuals if they are present within the project area. Monitoring will provide valuable insight into the status and distribution of the species, and management from this Plan may be beneficial for the long-term conservation of the species.

Yreka phlox

Effects

The primary Plan program areas that may affect this species include Soils, Vegetation and Forestry, Wildland Fire Management, Lands and Realty, and Travel and Transportation Management and Recreation. Under these programs ground-disturbing activities, prescribed fire, fire suppression activities, timber harvest and thinning, manual and mechanical vegetation removal and reduction, temporary road and landing construction, fuels management, post-fire management, and herbicide use could have adverse effects on phlox by killing or injuring

individual plants, disturbing soils, and destroying habitat, or affecting entire populations by introducing competitive invasive non-native species, like dyer's woad (*Isatis tinctoria*) or yellow star-thistle (*Centaurea solstitialis*). The Bureau will employ post restoration monitoring following project completion to determine efficacy and impacts of treatment (Wild-4). Native plants from local ecotypes will be used when needed for restoration of disturbed sites (Wild-5).

The serpentine soils management direction will prohibit mineral exploration and development in phlox habitat. To prevent the spread of invasive non-native plants, the Vegetation and Forestry program may restrict travel in weed-infested areas and clean vehicles and equipment to remove weed seeds before entering public lands, inventory and treat weeds in operating areas, minimize soil disturbance, use weed-free staging areas, monitor for weeds during and after activities, and treat to control them. Under the Land and Realty program, occupied phlox habitat will be retained and not considered for disposal. In addition, phlox populations will be avoided where rights-of-way access could be designated on serpentine and ultramafic soils.

Impacts on Recovery

Implementation of activities to achieve management goals may have short- and long-term adverse effects on the through short-term habitat modification, injury and mortality of phlox. In addition to these impacts, there may be some long-term habitat modification or loss from certain activities such as timber harvest resulting in type-conversion of the vegetation. However, the restoration and management proposed in the Plan will likely result in the long-term conservation of the phlox through habitat improvements, reductions in invasive species, reduction of the risk of catastrophic wildfire, and the use of best management practices and conservation measures. The Bureau will conduct implementation-level consultation with the Service that will identify additional conservation measures to ensure management is compatible with the species' recovery and conservation, and that would avoid or minimize potential adverse effects.

Cumulative Effects

Cumulative effects are those "effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the Action Area of the Federal action subject to consultation" (50 CFR 402.02). Future federal actions are not considered cumulative effects because they are subject to consultation, pursuant to section 7 of the Act. Cumulative effects will also be analyzed during project level consultations.

Forest management activities are reasonably certain to occur on the private timberlands located within the planning area primarily on lands managed by Green Diamond Resource Company, Humboldt Redwood Company, Sierra Pacific Industries, and other landowners. Some of these landowners, including Green Diamond Resource Company, Humboldt Redwood Company, and Sierra Pacific Industries, have Section 10(a) permits issued by the Service for listed and non-listed species. Forest management activities also typically require a Timber Harvest Plan that is reviewed and approved by the State of California.

The State of California Department of Fish and Wildlife and Department of Parks and Recreation are engaged in efforts to recover species in the planning area. Some of these activities, such as restoration projects, are anticipated to have long-term beneficial effects but can have temporary impacts. Other actions include engaging in efforts to acquired occupied habitat from private landowners to protect the species from threats such as development or timber harvest.

The California Department of Forestry and Fire Protection serves to safeguard the people and the property and resources of California. They work with the Service and other agencies during fire emergencies to avoid and minimize impacts to listed species, where feasible. They are also responsible for reviewing timber harvest plans and use Service guidance to develop plans that avoid take in areas where listed species are known to occur.

Vegetation management may also occur on individual private properties, primarily to reduce fire risk around structures to comply with State laws for fire clearance around properties. This activity may or may not require permits by the county or state depending upon the magnitude and scale of activities.

Maintenance activities will occur throughout the planning area on roads managed by the California Department of Transportation, counties, and private landowners. These activities may require consultation when listed species could be affected.

Conclusion

The regulatory definition of “to jeopardize the continued existence of the species” focuses on assessing the effects of the Proposed Action on the reproduction, numbers, and distribution, and their effect on the survival and recovery of the species being considered in this Opinion. For that reason, we have used those aspects of the species’ status as the basis to assess the overall effect of the Proposed Action on the species.

Biological Opinion – Species

After reviewing the current status of the coastal DPS of Pacific marten, marbled murrelet, northern spotted owl, Pacific Coast population DPS of western snowy plover, western DPS of yellow-billed cuckoo, North Feather River DPS foothill yellow-legged frog, tidewater goby, Franklin’s bumble bee, valley elderberry longhorn beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, beach layia, Gentner’s fritillary, McDonald’s rock-cress, Menzies’ wallflower, slender Orcutt grass, Stebbins’ morning-glory, and Yreka phlox, the environmental baseline for the Action Area, the effects of the Proposed Action, and the cumulative effects, it is the Service’s biological opinion that the Northwestern Integrated Resource Management Plan, as proposed, is not likely to jeopardize the continued existence of the covered species. The Service reached this conclusion based on the following:

Pacific Marten, Coastal DPS

- 1) The Plan contains management of late successional reserves and other forested lands with the primary objective of accelerating the development of late-seral forest characteristics that should contribute towards the recovery of marten. The overall quality of marten habitat may be improved through vegetation management. These activities could have short-term impacts but would be beneficial in the long-term.
- 2) Current distribution of marten in the Action Area is limited, though may expand in part due to habitat restoration efforts outlined in the Plan.
- 3) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species across the range.

- 4) Future projects will be designed to avoid or minimize effects to martens. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 5) The Plan includes goals, objectives, and best management practices that emphasize ecological conditions that contribute to the recovery of threatened and endangered species.

Marbled Murrelet

- 1) The Plan contains management of late successional reserves with the primary objective of accelerating the development of late-seral forest characteristics that should contribute towards the recovery of murrelet within the Plan area. The overall quality of murrelet nesting habitat may be improved through vegetation management. These activities could have short-term impacts but would be beneficial in the long-term.
- 2) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species across the range. We do not expect Bureau activities to disrupt murrelet nesting if it occurs in the Action Area as the Bureau will time activities to avoid nesting and use appropriate buffers.
- 3) Future projects will be designed to avoid or minimize effects to murrelets. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 4) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Northern Spotted Owl

- 1) The Plan contains management of late successional reserves and matrix lands with the primary objective of accelerating the development of late-seral forest characteristics that should contribute towards the recovery of NSO within the Plan area. The overall quality of NSO nesting and roosting and foraging habitat may be improved through vegetation management. These activities could have short-term impacts but would be beneficial in the long-term.
- 2) The Bureau has proposed predator management as part of the Proposed Action. The lethal control of barred owl within the range of the NSO will ameliorate the primary threat to the NSO at this time.
- 3) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species across the range. We do not expect Bureau activities to disrupt NSO nesting in the Action Area as the Bureau will time activities to avoid nesting and use appropriate buffers.
- 4) Future projects will be designed to avoid or minimize effects to NSO. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 5) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Western Snowy Plover, Pacific Coast Population DPS

- 1) The Plan contains management activities in coastal habitats specifically designed to contribute towards the recovery of plovers. These include the management of plover

protection areas and occupied habitat to reduce or remove threats such as invasive non-native species, off road vehicles and human activity. The overall quality of plover nesting habitat may be improved through vegetation management. These activities could have short-term impacts but would be beneficial in the long-term.

- 2) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species across the range. We do not expect Bureau activities to disrupt plover nesting in the Action Area as the Bureau will time activities to avoid nesting and use appropriate buffers.
- 3) Future projects will be designed to avoid or minimize effects to plovers. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 4) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Yellow-billed Cuckoo, Western DPS

- 1) The Plan contains management activities in riparian management areas specifically designed to improve habitat for cuckoo and to expand their distribution in the planning area. The overall quality of cuckoo habitat may be improved through vegetation management. These activities could have short-term impacts but would be beneficial in the long-term.
- 2) Current distribution of cuckoo in the Action Area is limited though may expand in part due to habitat restoration efforts outlined in the Plan.
- 3) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species across the range.
- 4) Future projects will be designed to avoid or minimize effects to cuckoos. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 5) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Foothill Yellow-legged Frog, North Feather River DPS

- 1) The Plan has developed adequate conservation measure components that, when properly implemented, will provide for ecological conditions that would contribute towards the recovery of the foothill yellow-legged frog.
- 2) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species on Bureau lands or across the range.
- 3) Future projects will be designed to avoid or minimize effects to frogs. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 4) The Plan includes objectives and goals to minimize aquatic and riparian vegetation impacts within buffers around streams and rivers.
- 5) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Tidewater Goby

- 1) The Plan has developed adequate conservation measure components that, when properly implemented, will provide for ecological conditions that would contribute towards the recovery of goby.
- 2) Current distribution of goby in the Action Area is limited.
- 3) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species on Bureau lands or across the range.
- 4) Future projects will be designed to avoid or minimize effects to gobies. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 5) The Plan includes objectives and goals to minimize aquatic and riparian vegetation impacts within buffers around streams and rivers.
- 6) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Franklin's bumble bee

- 1) The Plan includes specific measures for the conservation and recovery of Franklin's bumble bee in addition to general measures for the conservation of pollinators.
- 2) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species on Bureau lands or across the range.
- 3) Future projects will be designed to avoid or minimize effects to Franklin's bumble bee. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 4) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Valley Elderberry Longhorn Beetle

- 1) The Plan has developed adequate conservation measure components that, when properly implemented, will provide for ecological conditions that would contribute towards the recovery of the beetle.
- 2) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species on Bureau lands or across the range.
- 3) Future projects will be designed to avoid or minimize effects to beetles. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 4) The Plan includes objectives and goals to minimize aquatic and riparian vegetation impacts within buffers around streams and rivers.
- 5) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Vernal Pool Fairy Shrimp

- 1) The Plan has developed adequate conservation measure components that, when properly implemented, will provide for ecological conditions that would contribute towards the recovery of vernal pool fairy shrimp.

- 2) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species on Bureau lands or across the range.
- 3) Future projects will be designed to avoid or minimize effects to vernal pool crustaceans. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 4) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Vernal Pool Tadpole Shrimp

- 1) The Plan has developed adequate conservation measure components that, when properly implemented, will provide for ecological conditions that would contribute towards the recovery of vernal pool fairy shrimp.
- 2) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species on Bureau lands or across the range.
- 3) Future projects will be designed to avoid or minimize effects to vernal pool crustaceans. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 4) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Beach Layia

- 1) The Plan contains management activities in coastal habitats specifically designed to contribute towards the recovery of beach layia including the removal of non-native invasive species. The overall quality of beach layia habitat may be improved through vegetation management. These activities could have short-term impacts but would be beneficial in the long-term.
- 2) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species.
- 3) Future projects will be designed to avoid or minimize effects to beach layia. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 4) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Gentner's Fritillary

- 1) The Plan includes components specifically to reduce impacts to listed species from recreation, grazing, and road maintenance activities. Fuels management projects may have short-term impacts but will provide a long-term benefit for the species by reducing high-severity wildfire, reducing the frequency and extent of future wildfire suppression activities, and by preventing encroachment by dense shrubs and trees that could lead to the loss and extirpation of Gentner's fritillary individuals and populations.
- 2) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species.

- 3) Future projects will be designed to avoid or minimize effects to Gentner's fritillary. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 4) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

McDonald's Rock-cress

- 1) The Plan has developed adequate conservation measure components that, when properly implemented, will provide for ecological conditions that would contribute towards the recovery of McDonald's rock-cress.
- 2) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species.
- 3) Future projects will be designed to avoid or minimize effects to McDonald's rock-cress. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 4) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Menzies' Wallflower

- 1) The Plan contains management activities in coastal habitats specifically designed to contribute towards the recovery of Menzies' wallflower including the removal of non-native invasive species. The overall quality of Menzies' wallflower habitat may be improved through vegetation management. These activities could have short-term impacts but would be beneficial in the long-term.
- 2) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species.
- 3) Future projects will be designed to avoid or minimize effects to Menzies' wallflower. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 4) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Slender Orcutt Grass

- 1) The Plan has developed adequate conservation measure components that, when properly implemented, will provide for ecological conditions that would contribute towards the recovery of slender Orcutt grass.
- 2) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species.
- 3) Future projects will be designed to avoid or minimize effects to slender Orcutt grass. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 4) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Stebbins' Morning-Glory

- 1) The Plan includes objectives to contribute to the recovery of threatened and endangered species.
- 2) Currently Stebbins' morning-glory is not known in the Action Area but is known in the planning area and suitable habitat is present. Projects implemented under the Plan will include surveys for the species in suitable habitat. If the species is found future projects will be designed to avoid or minimize effects to Stebbins' morning-glory. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 3) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Yreka Phlox

- 1) The Plan has developed adequate conservation measure components that, when properly implemented, will provide for ecological conditions that would contribute towards the recovery of Yreka phlox.
- 2) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species.
- 3) Future projects will be designed to avoid or minimize effects to Yreka phlox. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 4) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Biological Opinion – Critical Habitat

“Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species” (50 CFR 402.02). We determine whether a Proposed Action is likely to result in the destruction or adverse modification of critical habitat as a whole through an analysis of how a Proposed Action affects the physical and biological features of critical habitat within the Action Area in relation to the entirety of designated critical habitat. For the covered critical habitats, this process involves considering the effects at the level of the Action Area, then at the level of critical habitat unit, and then finally for the entirety of the critical habitat designation.

After reviewing the current status of designated critical habitat for the Pacific marten (coastal DPS), marbled murrelet, northern spotted owl, western snowy plover (Pacific coast population DPS), tidewater goby, vernal pool fairy shrimp, vernal pool tadpole shrimp, slender Orcutt grass, the environmental baseline for the Action Area, the effects of the Proposed Action, and the cumulative effects, it is the Service's biological opinion that the Plan, as proposed, is not likely to destroy or adversely modify designated critical habitat. The Service reached this conclusion because the project-related effects to the designated critical habitat, when added to the environmental baseline and analyzed in consideration of all potential cumulative effects, will not rise to the level of precluding the function of the critical habitat to serve its intended conservation role for the species based on the following:

Pacific Marten Coastal DPS Critical Habitat

- 1) The effects to marten critical habitat are small and discrete, relative to the entire area designated (approximately 0.5%) and are not expected to appreciably diminish the value of the critical habitat or prevent it from sustaining its role in the conservation of the marten.
- 2) Vegetation management activities planned within designated critical habitat will require project level consultation to protect Features and will be designed to improve habitat for marten.

Marbled Murrelet Critical Habitat

- 1) The effects to murrelet critical habitat are small and discrete, relative to the entire area designated (approximately 1.2%) and are not expected to appreciably diminish the value of the critical habitat or prevent it from sustaining its role in the conservation of the murrelet.
- 2) The Plan contains management of late successional reserves with the primary objective of accelerating the development of late-seral forest characteristics which would improve habitat for murrelets. Activities planned within designated critical habitat will require project level consultation to protect Features.

Northern Spotted Owl Critical Habitat

- 1) The effects to NSO critical habitat are small and discrete, relative to the entire area designated, and are not expected to appreciably diminish the value of the critical habitat or prevent it from sustaining its role in the conservation of the NSO.
- 2) The Plan contains management of late successional reserves and matrix lands with the primary objective of accelerating the development of late-seral forest characteristics that should contribute towards the recovery of NSO within the Plan area.

Western Snowy Plover, Pacific Coast Population DPS Critical Habitat

- 1) The effects to plover critical habitat are small and discrete, relative to the entire area designated, and are not expected to appreciably diminish the value of the critical habitat or prevent it from sustaining its role in the conservation of the plover.
- 2) The Plan contains management activities in coastal habitats that have been, and are expected to continue to, benefit plovers. This includes maintenance of plover protection areas and the ongoing effort to remove invasive non-native species.

Tidewater Goby Critical Habitat

- 1) The effects to goby critical habitat are small and discrete, relative to the entire area designated, and are not expected to appreciably diminish the value of the critical habitat or prevent it from sustaining its role in the conservation of the goby.

Vernal Pool Fairy Shrimp Critical Habitat

- 1) The effects to vernal pool fairy shrimp critical habitat are small and discrete, relative to the entire area designated, and are not expected to appreciably diminish the value of the critical habitat or prevent it from sustaining its role in the conservation of the vernal pool fairy shrimp.

Vernal Pool Tadpole Shrimp Critical Habitat

- 1) The effects to vernal tadpole shrimp critical habitat are small and discrete, relative to the entire area designated, and are not expected to appreciably diminish the value of the

critical habitat or prevent it from sustaining its role in the conservation of the vernal pool tadpole shrimp.

Slender Orcutt Grass Critical Habitat

1. The effects to slender Orcutt grass critical habitat are small and discrete, relative to the entire area designated, and are not expected to appreciably diminish the value of the critical habitat or prevent it from sustaining its role in the conservation of the slender Orcutt grass.

Conference Opinion

This Opinion includes our conference opinion addressing Sierra Nevada DPS of California spotted owl, northwestern pond turtle, Northern DPS of western spadefoot, and monarch butterfly. Regulations allow for an opinion issued at the conclusion of a conference to be adopted as a biological opinion when the species is listed or critical habitat is designated, but only if no significant new information is developed (including that developed during the rulemaking process on the proposed listing or critical habitat designation) and no significant changes to the Federal action are made that would alter the content of the opinion (50 CFR 402.10(d)).

California Spotted Owl, Sierra Nevada DPS

- 1) The Plan contains management of late successional habitat and matrix lands with the primary objective of accelerating the development of late-seral forest characteristics that should contribute towards the recovery of CSO within the Plan area. The overall quality of CSO nesting and roosting and foraging habitat may be improved through vegetation management. These activities could have short-term impacts but would be beneficial in the long-term.
- 2) Current distribution of CSO in the Action Area is limited though may expand in part due to habitat restoration efforts outlined in the Plan.
- 3) The Bureau included lethal predator control within the Proposed Action. The lethal removal of barred owl from Bureau lands in the northern Sierra Nevada mountains would protect the CSO from competition, predation, and interbreeding.
- 4) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species across the range. We do not expect Bureau activities to disrupt CSO nesting if it occurs in the Action Area as the Bureau will time activities to avoid nesting and use appropriate buffers.
- 5) Future projects will be designed to avoid or minimize effects to CSO. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 6) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Northwestern Pond Turtle

- 1) The Plan has developed adequate conservation measure components that, when properly implemented, will provide for ecological conditions that would contribute towards the recovery of pond turtle.
- 2) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species on Bureau lands or across the range.

- 3) Future projects will be designed to avoid or minimize effects to turtles. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 4) The Plan includes objectives and goals to minimize aquatic and riparian vegetation impacts within buffers around streams and rivers.
- 5) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Western Spadefoot, Northern DPS

- 1) The Plan has developed adequate conservation measure components that, when properly implemented, will provide for ecological conditions that would contribute towards the recovery of the western spadefoot.
- 2) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species on Bureau lands or across the range.
- 3) Future projects will be designed to avoid or minimize effects to frogs. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 4) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

Monarch Butterfly

- 1) The Plan includes specific measures for the conservation and recovery of monarch butterfly in addition to general measures for the conservation of pollinators.
- 2) The low level of impacts anticipated will not result in an appreciable reduction in the reproduction, numbers, or distribution of the species on Bureau lands or across the range.
- 3) Future projects will be designed to avoid or minimize effects to monarchs. If effects cannot be avoided the Bureau will initiate consultation with the Service to ensure specific actions do not jeopardize the continued existence of the species.
- 4) The Plan includes goals, objectives, and best management practices that emphasize that ecological conditions contribute to the recovery of threatened and endangered species.

INCIDENTAL TAKE STATEMENT

The Proposed Action addressed in this biological opinion conforms to a "framework programmatic action" as that term is defined at 50 CFR 402.02 of the implementing regulations for section 7. On that basis, no take is anticipated to be caused by the Proposed Action. Pursuant to the authority under 50 CFR 402.14(i)(7), an incidental take statement is not required at the programmatic level for such an action. Incidental take resulting from any action subsequently authorized, funded, or carried out under such a program will be addressed in subsequent section 7 consultation(s), as appropriate, on that action(s). For these reasons, no take exemption is provided herein for the Proposed Action.

No exemption from Section 9 of the Act is granted in this biological opinion related to the Bureau's implementation of the Northern California Integrated Management Plan. The programs and activities described in this biological opinion are likely to adversely affect the Pacific marten, Coastal DPS; marbled murrelet; California spotted owl; northern spotted owl; western

snowy plover, Pacific Coast population DPS; yellow-billed cuckoo, western DPS; northwestern pond turtle; foothill yellow-legged frog, North Feather River DPS; western spadefoot, northern DPS; tidewater goby; Franklin's bumble bee; monarch butterfly; valley elderberry longhorn beetle; vernal pool fairy shrimp; and vernal pool tadpole shrimp. The likelihood of incidental take, and the identification of reasonable and prudent measures and terms and conditions to minimize such take, will be addressed in future project-level consultations. Any incidental take and measures to reduce such take cannot be effectively identified at the programmatic level because of the general nature, broad geographic scope, and the lack of site-specific information. Rather, incidental take and reasonable and prudent measures may be identified adequately through subsequent actions subject to future section 7 consultations at the project level.

"Take" as defined in section 3(19) of the Act applies only to listed animal species. For beach layia, Gentner's fritillary, McDonald's rock-cress, Menzies' wallflower, slender Orcutt grass, Stebbins' morning glory, and Yreka phlox, Section 9 of the Act prohibits removing or reducing to possession, or maliciously damaging or destroying listed plant species from areas under federal jurisdiction.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. The conservation recommendations below are discretionary agency activities to minimize or avoid adverse effects of a Proposed Action on listed species or critical habitat, to help implement recovery plans, or to develop information that can be used by the Bureau to fulfill their 7(a)(1) obligations. The Service recommends the following actions:

- 1) The Bureau should support actions outlined in the recovery plans for covered species, including barred owl removal and predator management wherever possible.
- 2) The Service recommends surveys for substantial floral resources and implementing a seasonal restriction in Franklin's bumble bee Habitat Protection Zones during the critical colony period from May 15 through August 31.
- 3) The Service recommends the Bureau implement and maintain monitoring for rare and listed species to understand distribution and status throughout Bureau owned and managed lands.
- 4) The Service recommends the Bureau conduct habitat assessments and protocol level surveys for listed species during project planning where habitat is present to determine species presence or absence.
- 5) The Service recommends avoiding project activities in occupied habitat during the breeding seasons for listed wildlife species and blooming periods for listed plant species, when reasonable.
- 6) The Service recommends the Bureau retain topsoil in areas with rare and listed plants to revegetate after disturbance.
- 7) The Service recommends protecting Late Successional Reserves from timber harvest, commercial thinning, and other substantially altering activities.

- 8) The Service recommends that the Bureau develop a section 7(a)(1) program or programs to protect and recover listed and at-risk species in addition to section 7(a)(2) consultation requirements.
- 9) The Service recommends the Bureau inventory weed infestations prior to ground-disturbing activities, identify areas for avoidance to prevent the spread of weeds, keep soil disturbance to a minimum, and use native species to inhibit the spread of invasive weeds on areas of exposed soil after operations have been completed.
- 10) The Service recommends all project personnel wash tools, vehicles and equipment as necessary to prevent the spread of noxious weeds, invasive species and plant diseases.
- 11) The Service recommends the Bureau use native plant species found within the project area that provide diverse floral resources for pollinators when planning revegetation.
- 12) The Service recommends all mature shrubs and other potential nest sites be inspected for active bird nests during the breeding season (generally February 1 through September 15) if project activities are to occur during the breeding season.
- 13) The Service recommends all water, food and trash be kept in closed containers inaccessible to wildlife during project implementation.
- 14) The Service recommends night lighting be kept to a minimum and when needed be directed downward and away from riparian areas, wetlands and ponds.
- 15) The Service recommends the Bureau avoid project-related noise greater than ambient noise levels or 90 dB within 0.25 miles of known or likely occupied habitat during the breeding season for federally listed or proposed federally listed mammals or birds.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION—CLOSING STATEMENT

This concludes formal consultation and conference on the Bureau of Land Management's Northwest California Integrated Resource Management Plan. You may ask the Service to confirm the conference opinion as a biological opinion issued through formal consultation if the species are listed. The request must be in writing. If the Service reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the conference, the Service will confirm the conference opinion as the biological opinion on the project. As provided in 50 CFR §402.16(a), reinitiation of consultation is required and shall be requested by the federal agency where discretionary federal involvement or control over the action has been retained or is authorized by law, and:

- 1) If the amount or extent of incidental take is exceeded;
- 2) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered in this opinion;
- 3) If the Project proponent is unable to implement the conservation measures as described in the Proposed Action of this opinion;
- 4) If the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or

5) If a new species is listed or critical habitat designated that may be affected by the action.

If you have any questions regarding this opinion, please contact Laurel Goldsmith at laurel_goldsmith@fws.gov or (707) 825-5101, or Nora Papian at nora_papian@fws.gov or (707) 825-5182, or either at the letterhead address.

Sincerely,

Vicky Ryan
Acting Field Supervisor

ecc:

Jenny Ericson, Field Supervisor, Yreka Fish and Wildlife Office
Michael Fris, Field Supervisor, Sacramento Fish and Wildlife Office
Jennie Land, Field Supervisor, Klamath Falls Fish and Wildlife Office
Jennifer Mata, Field Manager, Redding Field Office

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









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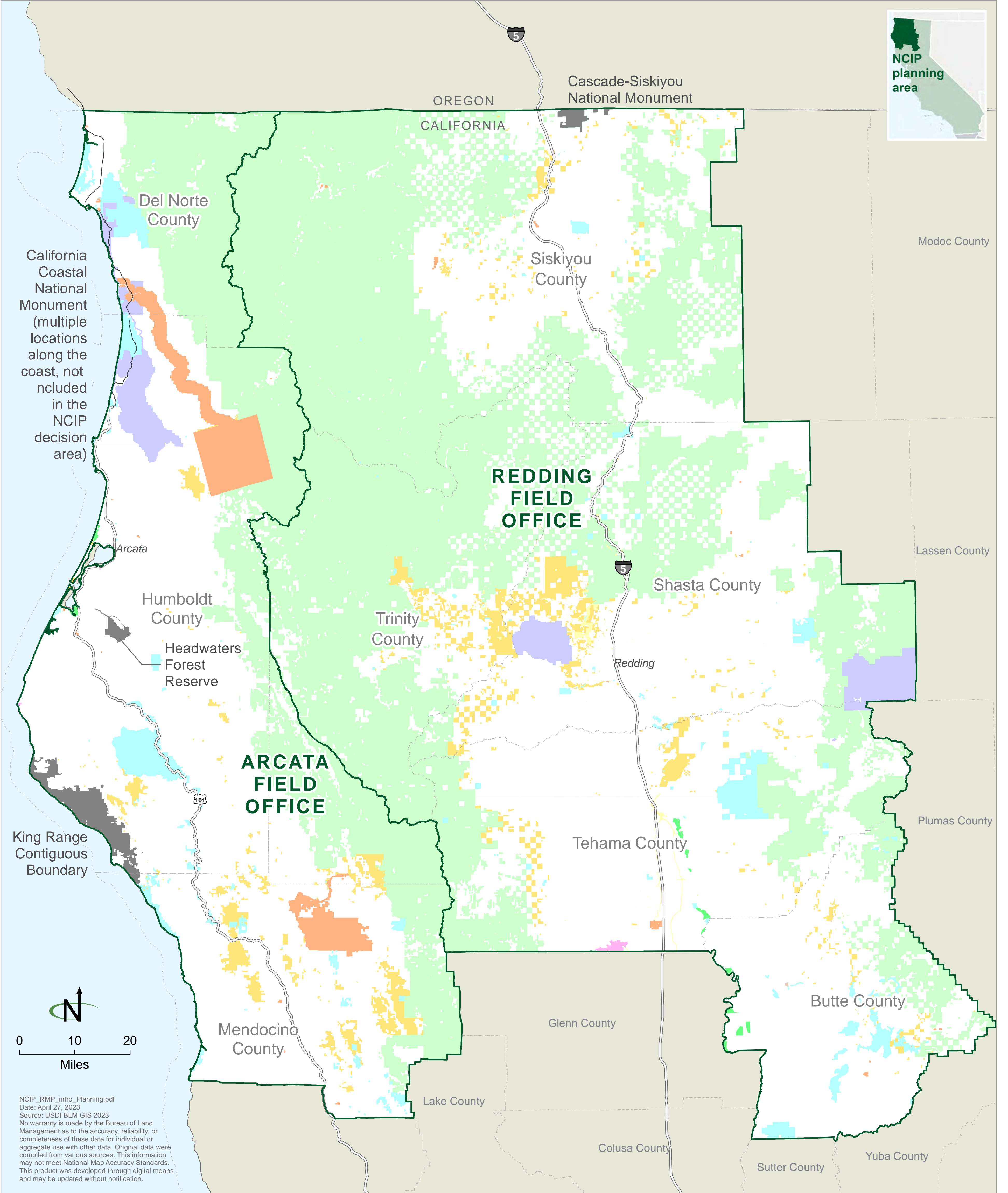
APPENDIX A – MAPS FROM PROGRAMMATIC BIOLOGICAL ASSESSMENT

Map 1-1 Planning Area

The NCIP planning area, approximately 14.4 million acres in northwest California, encompasses all lands within the Arcata and Redding Field Office boundaries, regardless of ownership. Eight counties fall within the planning area: Mendocino, Humboldt, Del Norte, Siskiyou, Trinity, Shasta, Tehama, and Butte.

 Bureau of Land Management (i.e., the BLM surface decision area)

-  Forest Service
-  Private
-  Tribal Land
-  State
-  US Fish and Wildlife Service
-  National Park Service
-  Department of Defense
-  Bureau of Reclamation
-  Other federal
-  BLM-administered land not included in the NCIP decision area



NCIP_RMP_intro_Planning.pdf
 Date: April 27, 2023
 Source: USDI BLM GIS 2023
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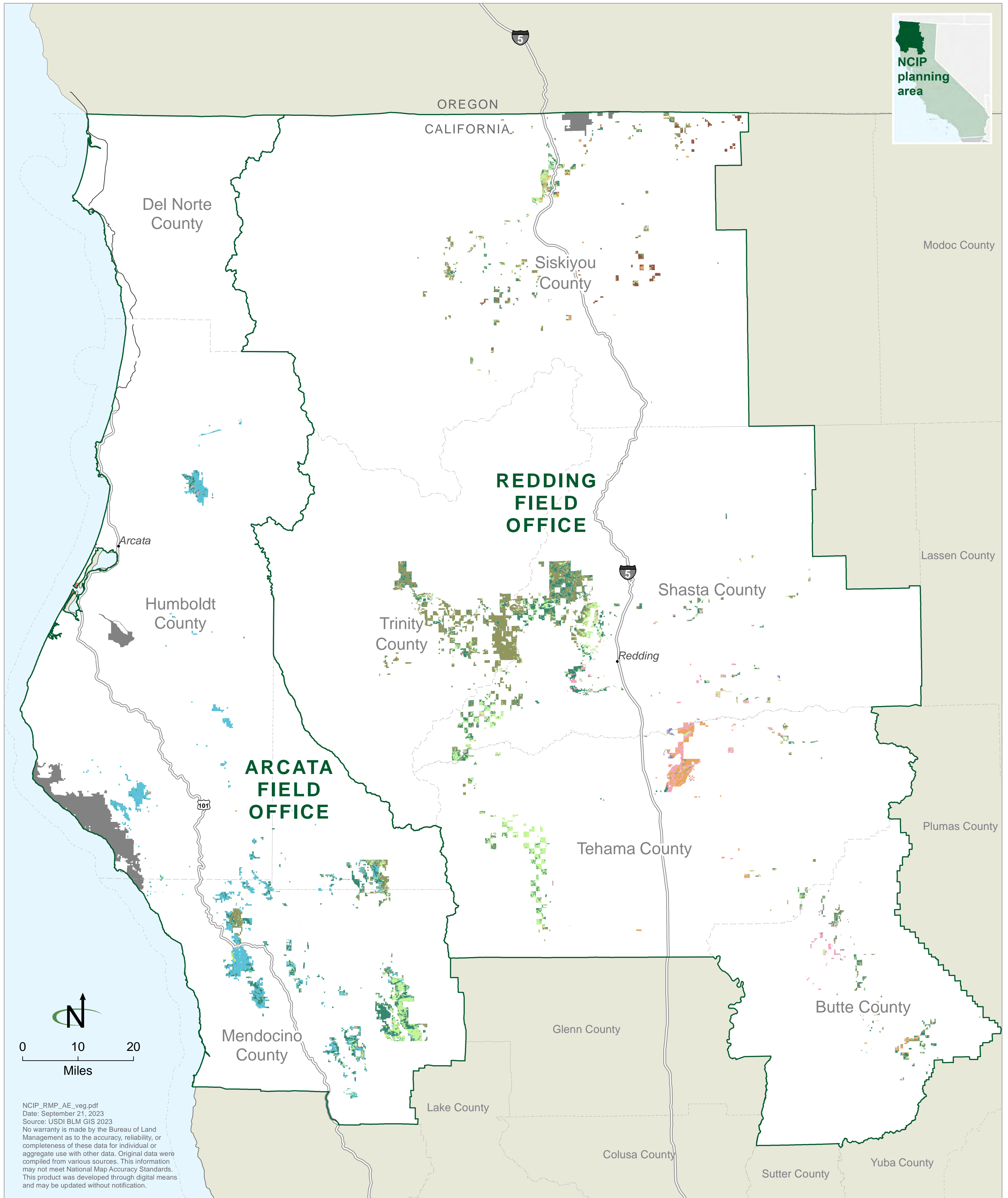


Northwest California Integrated Management Plan (NCIP)

BLM Arcata and Redding Field Offices

Map 2-1 Vegetation Cover Types

- Mixed Conifer
- Foothill Pine and Oak Woodland
- Chaparral Shrubland
- Douglas Fir and Tanoak Forest
- Grasslands, Vernal Pools, and Wetlands
- Oak Savannas and Open Woodlands
- Juniper and Sagebrush
- Other - Not Defined
- Fallow Fields and Croplands
- Valley Foothill Riparian
- Late Successional Forest
- Coastal Prairies
- Dunes
- Coastal Forests
- BLM-administered land not included in the NCIP decision area



NCIP_RMP_AE_veg.pdf
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APPENDIX B – BEST MANAGEMENT PRACTICES

Category	Number	Best Management Practices
Operations in or near Aquatic Ecosystems	AQ 01	For BLM-permitted activities, no hazardous materials storage with 0.25 mile of centerline of designated Wild and Scenic Rivers, within Riparian Management Areas and near permanent water sources.
Operations in or near Aquatic Ecosystems	AQ 02	For short term projects (up to 2 weeks), small amounts of fuel (up to 20 gallons) for staging activities associated with restoration activities may be stored outside the Riparian Management Areas. If fuel over 20 gallons is left at staging area, ensure proper signage is present and provide secondary containment to prevent accidental movement of fuel over the surface to a stream or water body. Fuel and service equipment used for instream, Riparian Management Areas, or riparian work (including chainsaws and other hand power tools) only in designated areas more than 300 feet from stream or another aquatic habitat. On a case-by-case basis, fueling inside the Riparian Management Areas could occur (i.e., when a road is present so that during the dry season that location might be the safest place to refuel). A Spill kit must be present when fueling within 300 ft of a stream.
Operations in or near Aquatic Ecosystems	AQ 03	Fuels, chemicals, or fertilizer shall not be stored on the active floodplain or Riparian Management Areas of any waterbody. All hazardous materials and petroleum products will be stored in durable containers located at least 500 feet from streams, springs, and wetlands. Spill kits will be present. Secondary containment would be required to prevent fuel or other materials from moving down slopes into streams.
Operations in or near Aquatic Ecosystems	AQ 04	Conduct equipment maintenance outside Riparian Management Areas, wetlands, or stream to avoid contamination of water. Locate equipment washing sites in areas with no potential for runoff into wetlands, Riparian Management Areas, floodplains, and Waters of the State. Do not use solvents or detergents to clean equipment on site.
Operations in or near Aquatic Ecosystems	AQ 05	Use non-oil-based dust suppressants such as water, within Riparian Management Areas to prevent contamination of surface and groundwater water quality.
Operations in or near Aquatic Ecosystems	AQ 06	Locate all new high recreational use sites outside Riparian Management Areas to protect water quality.
Operations in or near Aquatic Ecosystems	AQ 07	Plan, locate, design, construct, operate, inspect, and maintain sanitary facilities to minimize water contamination. Sanitation facilities should not be placed within the 100- year floodplain or Riparian Management Areas.

Category	Number	Best Management Practices
Operations in or near Aquatic Ecosystems	AQ 08	Require self-contained sanitary facilities when long-term camping (greater than 14 days) is involved with permit or contract implementation.
Operations in or near Aquatic Ecosystems	AQ 09	Provide self-contained sanitary facilities when there is high recreational use (campgrounds or dispersed camp areas, temporary camp for an OHV recreational activity, temporary camp due to horse roundup) inside Riparian Management Areas.
Operations in or near Aquatic Ecosystems	AQ 10	Locate pack animal and riding facilities outside Riparian Management Areas to protect water quality.
Operations in or near Aquatic Ecosystems	AQ 11	Water Sources: when locating proposed water developments for livestock or other uses, evaluate feasibility of use; and techniques for protecting original water source. Springs used for water source should retain enough water for riparian vegetation and water for rare plant species. Water sources designed for permanent installation, such as piped diversions to off-site trough, are preferred over temporary, short-term-use developments especially when wildlife friendly fences are built to protect the original source.
Operations in or near Aquatic Ecosystems	AQ 12	Basins shall not be constructed at culvert inlets for the purpose of developing a waterhole for drafting, as these can exacerbate plugging of the culvert.
Operations in or near Aquatic Ecosystems	AQ 13	Water sources: excavation of lakeshore, streambed, or bank materials for approaches for permanent water intakes are subject to State or federal restrictions on streambed alteration and ground-disturbing activities that can contribute sediment to a watercourse or aquatic habitat. Therefore, without the appropriate permits, these excavations should not occur. In addition, the following restrictions may apply: Permitted excavations should not occur during wet season. The wet season will vary dependent on location risk and timing of storms. Generally, from October 15-May 15 is when storms can come and runoff from snow occurs, but this can vary dependent on location. Prior to excavation, federally listed threatened and endangered species, BLM sensitive species (including State-listed), management indicator species, and aquatic organisms of interest shall be considered and appropriate avoidance, minimization, and mitigation measures shall be implemented based on federal, state or local permitting agency requirements.
Operations in or near Aquatic Ecosystems	AQ 14	Water sources: avoid use of road fills for permanent water impoundment dams unless specifically designed for that purpose. Impoundments over 9.2-acre-feet or 10 feet in depth will require a dam safety assessment by a registered engineer. Upgrade existing road fill impoundments to pass 100- year flood events.

Category	Number	Best Management Practices
Operations in or near Aquatic Ecosystems	AQ 15	<p>Water sources: locate access approaches for water developments as perpendicular as possible to prevent spring or stream bank damage.</p> <p>Access approaches are stabilized with appropriate materials, depending on expected life and use frequency of the developed water source. Use a drafting pad for water source placed above the bank full elevation of the channel with little or no excavation and/or fill placement to create drafting pad.</p> <p>Protections to reduce erosion from rain or snowmelt should spread flows off pad and not directly into watercourse. Site should be rehabilitated when pad is no longer needed to minimize erosion.</p>
Operations in or near Aquatic Ecosystems	AQ 16	<p>All water intake, screening, and pumping should comply with NMFS Fish Screening criteria (NMFS 2022): https://www.fisheries.noaa.gov/resource/document/anadromous-salmonid-passage-facility-design-manual</p> <p>For dewatering or similar activities:</p> <ul style="list-style-type: none"> - All pumps, pipes and other diversion materials, and any construction debris and materials shall be removed from the stream channel upon in-water work completion. - Water from pumps should be discharged to an upland location in a manner that the water does not drain overland back to the stream channel (or another method that does not degrade water quality). <p>When diverting water from streams for water sources, in stream flows shall be maintained that ensure unimpeded fish passage. The channel must not be dewatered to the point of isolating pools and dewatering riffles or to hinder any life stage of fish. Sensitive plants habitat must be maintained.</p>
Operations in or near Aquatic Ecosystems	AQ 17	<p>Water sources, if gravity-fed storage tanks or troughs are employed, shall utilize the following: Water storage tanks shall be fitted with properly sized pipes designed to bring minimal flows to the tank.</p> <p>Outflow pipes shall be sized to fully contain the tank overflow and cleanly return to the downstream areas of the spring or streams. It should be designed to withstand trampling.</p> <p>Water storage tank return pipes at the water outfall area shall be armored to prevent erosion of watercourse banks or wetlands.</p>
Operations in or near Aquatic Ecosystems	AQ 18	<p>Water sources: File Initial Statement of Water Diversion and Use with State Water Resource Control Board as required. Claim riparian use and record point of diversion (POD) location, water source name, place of use location, purpose of use, diversion works description, quantity of water diverted per month in gallons using on-line reporting.</p>
Operations in or near Aquatic Ecosystems	AQ 19	<p>Drafting Operations: for dust control or water tanker: if an existing off-site storage or more permanent water source such as a reservoir or manmade pond is not available, then the following locations shall be considered for drafting water:</p> <p>Use sites where approaches are hydrologically disconnected from streams.</p> <p>Flowing side channels rather than the main thread of the channel can be used for drafting if access is easier.</p> <p>Areas with existing deeper pools if access is close by.</p>

Category	Number	Best Management Practices
Operations in or near Aquatic Ecosystems	AQ 20	Temporary dams created to divert flows (e.g., around a culvert or bridge being replaced) shall be removed when operations are complete or before winter weather, whichever comes first. Flow should be put into a large temporary pipe and sent down stream as this is often necessary even for small streams. Downstream temporary dams should be placed to catch sediment coming from site Removal of all temporary dams shall be done so that accumulated sediment is not discharged into the stream flow.
Operations in or near Aquatic Ecosystems	AQ 21	Drafting Operations: All water drafting within anadromous streams will follow the most recent NMFS guidelines.
Operations in or near Aquatic Ecosystems	AQ 22	Drafting Operations: Trucks directly drafting from the channel shall utilize the following practices: No more than one truck at the same location or stream reach and time shall occur. No truck will enter the area below the high-water elevation and will stay on an existing road when feasible. Road approaches and drafting pads shall be treated to prevent sediment production and delivery to a watercourse or waterhole. This will include armoring as necessary from the end of the approach nearest a stream for a minimum of 50 feet, or to the nearest drainage structure (for example, waterbars or rolling dip) or point where road drainage does not drain toward the stream. Intakes for trucks, shall be placed parallel to the flow of water.
Operations in or near Aquatic Ecosystems	AQ 23	Drafting Operations: When drafting from the channel utilize the following practices: Do not place pump intakes on the substrate or edges of the stream channel. When placing intakes instream, place on hard surfaces (e.g., shovel and rocks) to minimize turbidity. Where overflow runoff from water trucks or storage tanks may enter the stream, effective erosion control devices shall be installed (for example, gravel berms or waterbars). Areas subject to high flood events shall be armored to prevent erosion and sediment delivery to water courses. At the end of drafting operations, intake screens shall be removed, and drafting pipes plugged, capped, or otherwise blocked or removed from the active channel to terminate water drafting during the off season. Use a temporary liner to create intake site. After completion of use, remove liner and restore channel to natural condition. Screen intakes with opening size consistent with the protection of aquatic species
Operations in or near Aquatic Ecosystems	AQ 24	Drafting Operations: Trucks directly drafting from the channel shall utilize the following practices: All water-drafting vehicles shall be checked daily and shall be repaired as necessary to prevent leaks of petroleum products and aquatic invasive species from entering Riparian Management Areas. Water-drafting vehicles shall contain petroleum-absorbent pads, which are placed under vehicles or portable pumps before drafting. Water-drafting vehicles shall contain petroleum spill kits. Dispose of absorbent pads according to the

Category	Number	Best Management Practices
		Hazardous Response Plan.
Operations in or near Aquatic Ecosystems	AQ 25	Minimize the frequency and number of passes for heavy equipment through low water crossings. Restrict heavy equipment watercourse crossings to designated locations only. Time operations near streams or Riparian Management Areas to driest time of year to reduce soil compaction and erosion from banks and sedimentation in streams water crossing timing may be adjusted to provide species and life stage-specific protections (e.g., avoid winter-run Chinook during dry season).
Operations in or near Aquatic Ecosystems	AQ 26	Revegetate disturbed areas to prevent soil erosion and stream sedimentation in the fall prior to the wet season or when vegetation has the greatest chance of successful transplant or germination. Otherwise treat disturbed areas by covering with straw or other methods to protect soil. Leave cut stumps/roots intact where appropriate to help stabilize soil.
Operations in or near Aquatic Ecosystems	AQ 27	When invasive species cannot be effectively eliminated by hand pulling, selective herbicide use within Riparian Management Areas must follow all guidelines in Herbicide PEIS or the most recent agency guidance. Restrict herbicide use to only those that are designed for use within 100 feet of Waters of the State and have been shown to have no effects on aquatic species.
Spill Prevention and Abatement	SP 01	Have absorbent containment materials present at work sites and places where fueling or use of other hazardous materials may take place. Take immediate action to stop and contain leaks or spills of chemicals and other petroleum products. Notify the California Department of Fish and Wildlife Office of Spill Prevention and Response, through the office's Hazardous Materials specialist, and the State Water Board of any spill that enters the Waters of the State.
Spill Prevention and Abatement	SP 02	Spill Prevention, Control, and Countermeasure Plan (SPCCP): All operators, contractors, and all other individuals involved in work shall develop a modified SPCCP prior to initiating project work if there is a potential risk of chemical or petroleum spills near waterbodies. The SPCCP will include the appropriate containers and design of the material transfer locations.
Spill Prevention and Abatement	SP 03	Spill Containment Kit (SCK): All operators, contractors, and all other individuals involved in work shall have a SCK as described in the SPCCP on-site during any operation with potential for run-off to adjacent waterbodies. The SCK will be appropriate in size and type for the oil or hazardous material carried by the operator.
Spill Prevention and Abatement	SP 04	All operators, contractors, and all other individuals involved in work shall be responsible for the clean-up, removal, and proper disposal of contaminated materials from the site.
Spill Prevention and Abatement	SP 05	Prevent spills of hazardous materials by requiring: Spill Prevention, Control, and Countermeasure Plan (SPCCP) when applicable (1,320 gallons cumulative capacity for storage of oil and/or hazardous material, potential impact to Waters of the U.S., or causing unnecessary or undue degradation, as required by federal law), and secondary containment of all hazardous

Category	Number	Best Management Practices
		materials in 55-gallon drum capacity and greater. Material to absorb a spill of fuel or other hazardous liquids if working near Riparian Management Areas or streams is required.
Spill Prevention and Abatement	SP 06	Inspect and clean heavy equipment as necessary prior to moving on to the project site, to remove oil and grease, noxious weeds, and excessive soil. Inspect hydraulic fluid and fuel lines on heavy-mechanized equipment for proper working condition daily before entering Riparian Management Areas or streams or other waterbodies. Equipment refueling will follow guidelines in Aquatic Resources section to prevent toxic materials from entering waterways. Refuel small equipment (e.g., chainsaws and water pumps) at least 300 feet from waterbodies (In certain situations, fueling within 300 feet of a stream or Riparian Management Areas would be acceptable (i.e., when a road or other feature makes fueling at that location the safest and most logical place to refuel or as far as possible from the waterbody where local site conditions do not allow a setback) to prevent direct delivery of contaminants into a waterbody. Refuel small equipment from no more than 5-gallon containers. Use absorbent material or a containment system to prevent spills when re-fueling small equipment within the stream margins or near the edge of waterbodies. If large amounts of fuel or other hazardous liquids are stored use secondary containment requirements for fuel storage areas such as a catchment basin or soil berms.
Spill Prevention and Abatement	SP 07	In the event of a spill or release, take all reasonable and safe actions to contain the material. Specific actions are dependent on the nature of the material spilled. Notify the State's Water Board or other environmental regulator when fuel is spilled with the potential to impact surface or ground water.
Spill Prevention and Abatement	SP 08	Use spill containment booms or as required. Have access to booms and other absorbent containment materials. Immediately remove waste or spilled hazardous materials (including but not limited to diesel, oil, hydraulic fluid) and contaminated soils and dispose of it/them in accordance with the applicable regulatory standard. Notify the California Department of Fish and Wildlife Office of Spill Prevention and Response of any spill over the material reportable quantities, and any spill not totally cleaned up after 24 hours. Store equipment containing reportable quantities of toxic fluids outside of Riparian Management Areas.
Restoration Activities	RST 01	Confine work in the stream channels to the in-water work period. Construct new stream crossings when streams are dry or when stream flow is at its lowest. These times may vary if sensitive aquatic species are present or in differing parts of the state. This may be extended if no precipitation is forecast over the following three days and mulch and erosion control materials are stockpiled onsite to be deployed in the event of rainfall occurring.
Restoration Activities	RST 02	In meadows and other aquatic habitat (e.g., meadow streams), do not drive heavy equipment in flowing channels and floodplains when wet. Do not drive heavy equipment in the Riparian Management Areas in wet conditions when such use could result in soil compaction and displacement. Prohibit heavy equipment from

Category	Number	Best Management Practices
		entering flowing water, unless at a preapproved crossing. Avoid and minimize heavy equipment passage at crossings where water is flowing.
Restoration Activities	RST 03	In well-armored channels that are resistant to damage (e.g., bedrock, small boulder, and cobble- dominated), consider conducting the majority of heavy- equipment work from within the channel, during low streamflow, to minimize damage to sensitive Riparian Management Areas.
Restoration Activities	RST 04	Design access routes for individual work sites to reduce exposure of bare soil and to minimize compaction and soil disturbance to wet meadows and floodplains.
Restoration Activities	RST 05	Limit the number and length of equipment access points through Riparian Management Areas. Locate equipment storage areas outside of Riparian Management Areas, including machinery used in stream channels for more than one day, following BMPs in the Spill Prevention and Abatement section.
Restoration Activities	RST 06	Limit the amount of stream bank excavation to the minimum necessary to ensure stability of enhancement structures. Avoid working in the wetted channel by diverting flow around work site. Excavated material should be removed and placed where it cannot reenter the stream during precipitation or flood events. If materials will remain on site, they should have permanent stabilization measures applied (such as regrading to match surrounding and revegetation).
Restoration Activities	RST 07	Rehabilitate headcuts and gullies. Use large wood in preference to rock weirs if available. Enter these areas during the driest time to minimize soil compaction and diversion of flows.
Restoration Activities	RST 08	Prior to the wet season, stabilize disturbed areas where soil will support seed growth, with the potential for sediment delivery to wetlands and streams. Apply native seed and certified weed-free mulch or erosion control matting in steep or highly erodible areas, or within Riparian Management Areas. Adjust techniques if amphibians present due to entanglement in matting.
Restoration Activities	RST 09	Implement measures to control turbidity. Measures may include installation of turbidity control structures (e.g., isolation, diversion, and silt curtains) immediately downstream of instream restoration work areas. Remove these structures following completion of turbidity-generating activities. Ensure that sediment trapped does not discharge into watercourse and dispose of in location where sediment will not move after precipitation into the waterbody.
Restoration Activities	RST 10	When replacing culverts, consider using larger culverts and embedding (see definition p. 48) the culvert to 30 percent bedload. Use bridges on high-gradient stream channels.

Category	Number	Best Management Practices
Restoration Activities	RST 11	When mowing of meadow edges or pockets of dry areas of meadows is required to reduce encroachment by upland species, enter during the driest time of year.
Restoration Activities	RST 12	Use low-PSI equipment for work in meadow environments. For meadow restoration enter with heavy equipment during the driest period.
Restoration Activities	RST 13	Use waterbars, barricades, seeding, and mulching to stabilize bare soil areas along project access routes prior to the wet season. Since access routes can become compacted to the point that vegetative recovery is difficult consider loosening the topsoil layer on slopes less than 1 percent prior to seeding or mulching
Stream Crossings for Roads	SC 1	Conduct all nonemergency in-water work during the instream work window to avoid effects on listed or sensitive aquatic species. In-water work should be done when flows are at their lowest. If water is flowing at the time of stream crossing removal, divert and/or isolate flows from the active work area. Avoid sediment and turbidity entering streams during in-water work to the extent practicable. Remove stream crossing culverts and entire in-channel fill material during the instream work period and/or when the there is no water flowing through the channel. The instream work period is defined as the period when low base flows occur. June 15 through September 30 could be considered a base flow period where no summer or monsoonal rains occur. It is preferable to time the work when ephemeral or desert streams are dry These times may vary if sensitive aquatic species are present or in differing parts of the state. This may be extended if no precipitation is forecast over the following three days and mulch and erosion control materials are stockpiled onsite to be deployed in the event of rainfall occurring.
Stream Crossings for Roads	SC 2	Design the stream crossings to pass the 100-year flood flow plus associated sediment and debris; armor to withstand designed flows and to provide desired passage of fish and other aquatic organisms.
Stream Crossings for Roads	SC 3	When it is necessary to divert or dewater stream flow during crossing installation ensure that: All crossings whether structures are being placed or removed shall be protected from siltation, all stages of life for fish or amphibians must be protected. Suitable measures are used to divert or partition channelized flow around the site or to dewater the site as needed. Aquatic organisms are removed from the construction area before dewatering and prevent organisms from returning to the site during construction. Clean flows are returned to channel or water body downstream of the activity. Direct pass-through flow or overflow from in-channel and any connected off-channel water developments go back into the stream downstream of the site.

Category	Number	Best Management Practices
		<p>Flows are restored to their natural stream course as soon as possible after construction or prior to seasonal closures.</p> <p>Downstream collection basins, retention facilities, or filtering systems are installed as needed to capture and retain turbid water.</p> <p>Collected sediment is removed as needed to maintain their design capacity during the life of the project.</p>
Stream Crossings for Roads	SC 4	<p>Reduce hydrologic connection between road surface drainage or ditchline and stream crossings. Locate and design crossings to minimize disturbance to the waterbody.</p> <p>Use structures appropriate to the site conditions and traffic levels:</p> <p>Favor bridges, bottomless arches, or buried pipe-arches for those streams with identifiable floodplains and elevated road prisms, instead of pipe culverts.</p> <p>Place bridge and arch footings below the scour depth for the 100-year flood flow plus the appropriate factor of safety as determined by road engineers.</p> <p>Favor armored fords for those streams where vehicle traffic is either seasonal or temporary. For perennial streams, use vented fords, so that the crossing can pass low flows.</p>
Stream Crossings for Roads	SC 5	<p>Minimize fill volumes at permanent stream crossings by restricting width and height of fill to amounts needed for safe travel and adequate cover for culverts.</p> <p>For deep fills (generally greater than 15 feet deep), incorporate additional design criteria (e.g., rock blankets, buttressing, bioengineering techniques) to reduce the susceptibility of fill failures.</p> <p>A rolling dip, or simple diversion prevention dip) will eliminate stream diversion potential. For very small stream crossings and for cross drains, a waterbar may suffice.</p>
Stream Crossings for Roads	SC 6	<p>Prevent culvert plugging and failure in areas of active debris movement with measures such as beveled culvert inlets, flared inlets, wingwalls, over-sized culverts, trash racks, or slotted risers. Larger culverts or arched culverts will pass debris better and accommodate bed movement. Trash racks can be high maintenance; it is more effective to size the crossing for 100-year floods and debris from watershed.</p>
Stream Crossings for Roads	SC 7	<p>To reduce the risk of loss of the road crossing structure and fill causing excessive sedimentation, use bridges or low-water fords when crossing debris-flow susceptible streams. Avoid using culverts when crossing debris-flow susceptible streams when practicable.</p>
Stream Crossings for Roads	SC 8	<p>Locate stream-crossing culverts on well defined, unobstructed, and straight reaches of stream. Locate these crossings as close to perpendicular to the streamflow as stream allows. When structure cannot be aligned perpendicular, provide inlet and outlet structures that protect fill, and minimize bank erosion. Choose crossings that have well-defined stream channels with erosion-resistant bed and banks.</p>
Stream Crossings for Roads		<p>Install culverts at the natural stream grade, unless a lessor gradient is required for fish, amphibian, or reptile passage. Stream crossings with ESA-listed fish must meet NMFS fish passage design criteria unless barriers to passage are required to protect from invasive species. Aquatic Organism Passage Projects include culvert and</p>

Category	Number	Best Management Practices
	SC 9	bridge replacements or removals. Head cut and grade stabilization may need to be done to ensure fish amphibian, reptile, and other species passage. Improperly designed/installed culverts could impede movements of federal or state listed amphibian or reptile species.
Stream Crossings for Roads	SC 10	Design stream crossings to prevent diversion of water from streams into downgrade road ditches or down road surfaces if the crossing is blocked by debris or overtopped during storm events. This protection could include hardening crossings, armoring fills, dipping grades, diversion prevention dips, oversizing culverts, hardening inlets, and outlets, and lowering the fill height. Place instream grade control structures above or below the crossing structure, if necessary, to prevent stream head cutting, culvert undermining and downstream sedimentation. Sizing the structure to fit the watershed 100-year floods tends to prevent these issues.
Stream Crossings for Roads	SC 11	Utilize stream diversion and isolation techniques when installing stream crossings. Evaluate the physical characteristics of the site, volume of water flowing through the project area and the risk of erosion and sedimentation when selecting the proper techniques.
Stream Crossings for Roads	SC 12	Limit activities and access points of mechanized equipment to streambank areas or temporary platforms when installing or removing structures. Keep equipment activity in the stream channel to an absolute minimum.
Stream Crossings for Roads	SC 13	Minimize streambank and riparian area excavation during construction of crossings: Install temporary culverts and washed rock with sufficient size to avoid erosion on top of a low- water ford to reduce vehicle contact with water during active haul. Remove culverts promptly after use or before high flows unless culvert built to the 100-year flood capacity. Stabilize adjacent areas disturbed during construction using surface cover (mulch), retaining structures, and or other stabilization methods. Stabilization of the approaches usually require 50 or more feet of rock materials to prevent tracking of sediment into the watercourse. See Weaver 2015 (p.213 Guidelines for erosion and sediment control application) or similar guidance. Keep excavated materials out of channels, floodplains, wetlands, and lakes. Excavated material should be removed and placed where it cannot reenter waterbodies during precipitation or flood events. Banks of the stream, water body, or in Riparian Management Areas are not appropriate. Install silt fences or other sediment- and debris-retention barriers between the water body and construction material stockpiles and wastes. Use only clean, suitable materials that are free of toxins and invasive species for fill. Size competent rock fills to avoid or minimize erosion. Fill must be free of organic materials and preference should be to use locally sources fill.

Category	Number	Best Management Practices
Stream Crossings for Roads	SC 14	Install stream crossing structures before heavy equipment moves beyond the crossing area.
Stream Crossings for Roads	SC 15	Use no-fill structures (e.g., portable mats, temporary bridges, or improved hardened crossings) for temporary stream crossings. Harden low-water ford approaches with durable materials that can withstand erosive forces. These low water fords are not appropriate in high energy systems nor where moderate traffic occurs. For small first and second order streams this may be appropriate. When not practicable, design temporary stream crossings with the least amount of fill and construct with coarse material to facilitate removal upon completion. Provide cross drainage on approaches. Limit temporary ford crossings to the instream work period (see SC 01 for definition).
Stream Crossings for Roads	SC 16	Restrict access to temporary unimproved low-water stream crossings. Improve crossings where traffic indicates frequent use. Use bridges where traffic is heavy to protect the streams.
Stream Crossings for Roads	SC 17	When installing temporary culverts, use washed rock of a size to withstand erosion as a backfill material. Rock must be large enough to withstand normal flows. Use geotextile fabric as necessary where washed rock will spread with traffic and cannot be practicably retrieved. Remove culverts promptly after use and prior to the wet season or when storms are expected.
Stream Crossings for Roads	SC 18	Temporary fill crossings must be removed after use and prior to the wet season. Removal shall be done so that accumulated sediment is not discharged into the stream flow. Follow practices under the Closure/Decommissioning section for removing stream crossing drainage structures and reestablishing the natural drainage.
Stream Crossings for Roads	SC 19	When removing temporary crossings, restore the waterbody profile and substrate to pre-project conditions.
Stream Crossings for Roads	SC 20	When removing silt fences and other non-biodegradable sediment controls care must be taken not to release sediment into water courses. Banks of the stream, water body, or in Riparian Management Areas are not appropriate. Place sediment where it cannot wash back into waterbody after rain.
Road Construction and Reconstruction	R 01	Implement an approved Best Management Practices checklist, operating or erosion control plan that covers all disturbed areas, including borrow areas and stockpiles used during road management activities. Follow operations for wet weather (below). The need for an Erosion Control Plan will be set by the scope and complexity of the project and its potential to cause erosion and deposition in streams.

Category	Number	Best Management Practices
Road Construction and Reconstruction	R 02	Maintain erosion-control measures to function effectively throughout the project area during road construction and reconstruction, and in accordance with the approved Best Management Practices and erosion control plan.
Road Construction and Reconstruction	R 03	When new roads or reconfigurations of old roads are necessary, locate roads and landings to reduce total transportation system mileage. Relocate roads and landings outside of Riparian Management Areas wherever possible. Renovate or improve existing roads or landings when it would cause less adverse environmental impact. Where roads traverse land in another ownership, investigate options for using those roads before constructing new roads. Locate temporary (see definitions p. 48) and permanent roads and landings on stable locations, e.g., ridge tops, stable benches, or flats, and gentle-to-moderate side slopes to minimize erosion impacts. Minimize road construction on steep slopes (> 50 percent).
Road Construction and Reconstruction	R 04	Confine new roads to the construction limits of the permanent roadway to reduce the amount of area disturbed and do not design for deposition in wetlands, Riparian Management Areas, floodplains, and Waters of the State.
Road Construction and Reconstruction	R 05	Avoid road or landing locations in Riparian Management Areas. If no other feasible options exist, prevent and minimize discharges of sediment to surface waters (see BMPs for Operations in or near Aquatic Ecosystems, spill prevention and abatement, and stream crossings for additional BMPs). Do not put landings in Riparian Management Areas.
Road Construction and Reconstruction	R 06	Avoid locating landings in areas that contribute to runoff and erosion. Use methods to minimize erosion. Hydrologic connectivity between landings and waterbodies should be kept to an absolute minimum or completely reduced. Install temporary drainage, erosion, and sediment control structures to route runoff from the road to a stabilized area (i.e., vegetated area, sediment basin or riprap lined ditch), and away from watercourses. In unstable areas, stabilize slopes with straw wattles or rock. When on steep or unstable slopes (follow methods Table 1a and Table 2b listed below this section) in order to avoid erosion from road surfaces. Storm proof (see section below in the Road Construction and Reconstruction section) or close roads under construction or reconstruction prior to the onset of the wet season.
Road Construction and Reconstruction	R 07	Design (prior to building) temporary roads to either avoid or access sensitive areas at specific locations. Decommission temporary roads upon completion of use. Storm proof before the wet season if project is not completed. Subsoil (i.e., rip) temporary roads where needed to lessen detrimental soil conditions, minimize surface runoff, improve soil structure, and water movement through the roadbed. See also Road Maintenance section for Road Closure and Decommissioning BMPs.
Road Construction and Reconstruction	R 08	Design roads to the minimum width needed for the intended use as referenced in BLM Manual 9113 – 1 – Roads Design Handbook (USDI BLM 2011). Where in-sloped roads are proposed, design inboard ditches to reduce hydrologic connectivity and maintenance requirements.

Category	Number	Best Management Practices
Road Construction and Reconstruction	R 09	Design road cut and fill slopes with stable angles, to reduce erosion and prevent slope failure. Locate and designate waste areas before operations begin.
Road Construction and Reconstruction	R 10	Design and construct sub-surface drainage (e.g., trench drains using geo-textile fabrics and drainpipes) in landslide-prone areas and saturated soils. Minimize or eliminate new road construction in these areas.
Road Construction and Reconstruction	R 11	<p>To protect Waters of the State from sedimentation and other pollutants from roadways: Locate roads and landings away from wetlands, Riparian Management Areas, floodplains, and other Waters of the State. Minimize roads within Riparian Management Areas, use only for stream crossings. See Stream Crossings below.</p> <p>Locate temporary and permanent road construction or improvement to minimize the number of stream crossings.</p> <p>Do not fill wetlands, do not design roads through meadows. If a wetland or meadow must be crossed use a bridge design that does not block floodplain flows.</p> <p>If a road must go through a Riparian Management Areas, use bridges or spans, and elevate road over drainages to minimize disruption of floodplain flows in Riparian Management Areas.</p>
Road Construction and Reconstruction	R 12	<p>Excavated material should be removed and placed where it cannot reenter the stream or water bodies during precipitation or flood events. Do not place such materials on slopes with a high risk of mass failure, in areas subject to overland flow or seasonally saturated areas, or within 100 feet of perennial streams or wetlands, floodplains, and unstable areas to minimize risk of sediment delivery to Waters of the State. Apply surface erosion control prior to the wet season.</p> <p>Deposit and stabilize excess and unsuitable materials only in designated site where there are no potential for sediment to discharge to a watercourse.</p> <p>Provide adequate surface drainage and erosion protection at disposal sites.</p> <p>Construct road fills to prevent fill failure using inorganic material, compaction, buttressing, sub-surface drainage, rock facing, or other effective means.</p>
Road Construction and Reconstruction	R 13	<p>Use controlled blasting techniques to minimize loss of material on steep slopes or into wetlands, Riparian Management Areas, floodplains, and Waters of the State.</p> <p>Restrict blasting after intense storms when soils are saturated.</p>
Road Construction and Reconstruction	R 14	<p>Schedule operations when rain, runoff, wet soils, snowmelt, or frost melt are less likely. Follow seasonal restrictions, as outlined in an approved Best Management Practices checklist, operating or erosion control plan.</p> <p>Stabilize project area during normal operating season when the National Weather Service predicts a 30 percent or greater chance of precipitation, such as localized thunderstorm or approaching frontal system.</p> <p>Complete all necessary stabilization measures prior to predicted precipitation that could result in surface runoff.</p>

Category	Number	Best Management Practices
		Close roads during wet weather conditions when ground conditions could result in excessive rutting (greater than 2 inches), soil compaction (except on the road prism or other surface to be compacted), or runoff of sediments directly to streams
Road Construction and Reconstruction	R 15	Use temporary sediment control measures (e.g., check dams, silt fencing, bark bags, filter strips, and mulch) to slow runoff and contain sediment from road construction areas. Remove any accumulated sediment and the control measures when work or haul is complete. When long-term structural sediment control measures are incorporated into the approved Best Management Practices checklist, operating or erosion control plan, remove any accumulated sediment to retain capacity of the control measure.
Road Construction and Reconstruction	R 16	Do not permit sidecasting within or close to streams or wetlands. Prevent stockpiled excavated materials from entering water ways or within 100 feet of perennial or intermittent streams.
Road Construction and Reconstruction	R 17	Fully suspend logs, pipes, posts, and other transported materials when crossing waterbodies, or streams and their Riparian Management Areas.
Road Construction and Reconstruction	R 18	Construct new stream crossings when streams are dry or when stream flow is at its lowest. Install sediment controls to reduce sedimentation. See Stream Crossings section for additional BMPs.
Road Construction and Reconstruction	R 19	On slopes greater than 40 percent, the organic layer of the soil shall be removed prior to fill placement, according to project specifications. Soil can then be reused where needed to establish vegetation.
Road Construction and Reconstruction	R 20	Stabilize all disturbed areas with mulch, erosion fabric, vegetation, rock, large organic materials, engineered structures, or other stabilization measures according to the approved Best Management Practices checklist, operating or Erosion Control Plan, and project specifications and drawings for permanent controls (e.g., crib walls, gabions, or riprap placement).
Road Construction and Reconstruction	R 21	Waste organic material, such as uprooted stumps, cull logs, accumulations of limbs and branches, and unmerchantable trees, shall not be buried in logging road or landing fills. Dispose of waste organic material according to project specifications, in locations designated for waste disposal. Assure compliance with the project approved Best Management Practices checklist, operating or erosion control plan.
Road Construction and Reconstruction	R 22	Monitor contractor's plans and operations to assure contractor does not open more ground than can be substantially completed before expected wet seasons shutdowns unless erosion- control measures are implemented.

Category	Number	Best Management Practices
Road Construction and Reconstruction	R 23	Scatter construction-generated slash on other disturbed areas to help control erosion. Windrow slash at the outlet of water bars on outsloped roads Do not use slash in -inboard ditches Windrow slash at the base of fill slopes to reduce sedimentation. Ensure that windrows are placed along the contour and that there is ground contact between slash and disturbed slope.
Road Construction and Reconstruction	R 24	Accommodate drainage with adequate temporary crossings (addressed in the Stream Crossings section) during construction. Disconnect road runoff to the stream channel by outsloping the road approach. If outsloping is not possible, use runoff control, erosion control and sediment containment measures. These may include using additional cross drain culverts, ditch lining, and catchment basins. Prevent or reduce ditch flow conveyance to the stream through cross drain placement above the stream crossing (see section below on Surface Drainage).
Surface Drainage including Cross drains Road Activities	R 25	Effectively drain the road surface by using crowning, insloping or outsloping, grade reversals (rolling dips), and waterbars or a combination of these methods. Avoid concentrated discharge onto fill slopes unless the fill slopes are stable, and erosion proofed.
Surface Drainage including Cross drains Road Activities	R 26	Outslope temporary and permanent low volume roads to provide surface drainage on road gradients up to 6 percent unless there is a traffic hazard from the road shape.
Surface Drainage including Cross drains Road Activities	R 27	Consider using broad-based drainage dips or leadoff ditches in lieu of cross drains for low volume roads. Locate these overland drainage measures where they will not drain into wetlands, floodplains, and Waters of the State.
Surface Drainage including Cross drains Road Activities	R 28	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. Use armoring or slash placed at outside berm breeches to prevent erosion
Surface Drainage including Cross drains Road Activities	R 29	Construct variable road grades and alignments (e.g., roll the grade and grade breaks) which limit water concentration, velocity, flow distance, and associated stream power.
Surface Drainage including Cross drains Road	R 30	Install underdrain structures when roads cross or expose springs, seeps, or wet areas rather than allowing intercepted water to flow down gradient in ditch lines.

Category	Number	Best Management Practices
Activities		
Road Construction and Reconstruction	R 31	Design roads crossing low-lying areas so that water does not pond on the upslope side of the road. Provide cross drains at short intervals to ensure free drainage.
Road Construction and Reconstruction	R 32	Divert road and landings used for vehicle storage runoff water away from headwalls, slide areas, high landslide hazard locations, or steep erodible fill slopes.
Road Construction and Reconstruction	R 33	Limit the construction of temporary in-channel water drafting sites for dust abatement.
Road Construction and Reconstruction	R 34	Locate cross drains or relief culverts, to prevent or minimize runoff and sediment conveyance to Waters of the State. Implement sediment reduction techniques such as brush filters, sediment fences, and check dams to prevent or minimize sediment conveyance. Locate cross drains to route ditch flow onto vegetated and undisturbed slopes. If on unstable slopes use rocks and other means to reduce erosion and stabilize water flow off road.
Road Construction and Reconstruction	R 35	Space cross drain culverts at intervals sufficient to prevent water volume concentration and accelerated ditch erosion. At a minimum, space cross drains at intervals referred to in the BLM Road Design Handbook 9113-1 (USDI BLM 2011), Illustration 11 –‘Spacing for Drainage Lateral.’ Increase cross drain frequency through erodible soils, or steeper grades. Use guidelines in Table 2b to stabilize soils below drainage structures in steeper areas.
Road Construction and Reconstruction	R 36	Choose cross drain culvert diameter and type according to predicted ditch flow, debris and bedload passage expected from the ditch. Minimum diameter is 18”. When species needs for passage are present, sizes should be larger (e.g., for desert tortoise or other wildlife, the minimum size is 36”).
Road Construction and Reconstruction	R 37	Locate surface runoff drainage measures (e.g., cross drain culverts, rolling dips, and water bars) where water flow will be released on convex slopes or other stable and non-erodible areas that will absorb road drainage and prevent sediment flows from reaching wetlands, floodplains, and Waters of the State. Where possible locate surface runoff drainage structures above road segments with steeper downhill grade. Locate cross drains at least 50 feet from the nearest stream crossing and allow for a sufficient non-compacted soil and vegetative filter.
Road Construction and Reconstruction	R 38	Armor surface drainage structures (e.g., broad-based dips, and leadoff ditches) to maintain functionality in areas of erodible and low-strength soils.

Category	Number	Best Management Practices
Road Construction and Reconstruction	R 39	Discharge cross drain culverts at ground level on non-erodible material. Install downspout structures or energy dissipaters at cross drain outlets or drivable dips where alternatives to discharging water onto loose material, erodible soils, fills, or steep slopes are not available.
Road Construction and Reconstruction	R 40	Cut protruding 'shotgun' culverts at the fill surface or existing ground. Install downspout or energy dissipaters to prevent erosion.
Road Construction and Reconstruction	R 41	Skew cross drain culverts 45–60 degrees from the ditch line and provide pipe gradient slightly greater than ditch gradient to reduce erosion at cross drain inlet.
Road Construction and Reconstruction	R 42	Provide for unobstructed flow at culvert inlets and within ditch lines during and upon completion of road construction prior to the wet season.
Recreation Management	REC 01	Motorized use of unpaved roads, staging areas, and watercourse crossings will not be permitted during saturated soils conditions in order to reduce sediment discharge.
Recreation Management	REC 02	Implement erosion control measures at high use recreation sites to stabilize exposed soils where water flows or sediment, may reach waterbodies.
Recreation Management	REC 03	Restrict development of recreation facilities that are not water-dependent (e.g., boat ramps and docks) in the Riparian Management Areas.
Recreation Management	REC 04	Use self-contained sanitary facilities at all developed recreational facilities unless a sewage system and drain field is approved through the NEPA process.
Recreation Management	REC 05	When conducting recreation site maintenance, do not cut portions of logs or coarse woody debris that fall across the active stream channel unless such wood would cause potential flooding hazards with downstream road crossings. Keep adequate lengths of material on the banks to anchor it in place. If not possible to make the log stable, it may be removed.
Recreation Management	REC 06	Construct boat ramps and approaches with hardened surfaces. For approaches, ramps or any construction element, avoid use of rubberized asphalt concrete (i.e. crumb rubber) to prevent mobilization of 6PPD-quinone into fish-bearing streams. Minimize riprap to a 4- foot width to protect concrete ramps. For constructed boat ramps on rivers and perennial streams, write plan to avoid sedimentation in the river from construction and use. Docks should be as narrow as possible and not include any treated wood.

Category	Number	Best Management Practices
Recreation Management	REC 07	Locate new OHV trails on stable locations (e.g., ridge tops, benches, and gentle-to- moderate side slopes). Minimize trail construction on steep slopes where runoff could channel to a waterbody. Close trails appropriately when rerouting trails. Ensure closed trails are blocked from OHV access.
Recreation Management	REC 08	Design, construct, and maintain trail width, grades, curves, and switchbacks suitable to the terrain and designated use. Use and maintain surfacing materials suitable to the site and use, to withstand traffic and to minimize runoff and erosion.
Recreation Management	REC 09	Suspend construction or maintenance of trails at the time of year when erosion and runoff into waterbodies would occur.
Recreation Management	REC 10	Locate staging areas outside Riparian Management Areas. Design or upgrade staging areas to prevent sediment/pollutant delivery to wetlands, floodplains, and waterbodies, (e.g., rocking or hardening and drainage through grading or shaping).
Recreation Management	REC 11	Designate class of vehicle suitable for the trail location, width, trail surfaces, and waterbody crossings, to prevent erosion and potential sediment delivery.
Recreation Management	REC 12	Designate season of use if the trail bed is prone to erosion, rutting, gullyng, or compaction, due to high soil moisture, standing water or snowmelt.
Recreation Management	REC 13	Design and space trail drainage structures to remove storm runoff from the trail surface before it concentrates enough to initiate rilling. Design trails to dissipate intercepted water by rolling dips. Where trails intersect road ditches, provide erosion resistant crossings. Divert water from the trail to keep from reaching wetlands, floodplains, and waterbodies.
Recreation Management	REC 14	Design trails to be no wider than necessary to provide the recreation experience. Incorporate design elements that discourage off-route use (for example, taking shortcuts, cutting new lines). Avoid public motorized vehicle use in ponds and wetlands and navigating up or down wetted streams and side-channels. Use suitable barriers where feasible.
Recreation Management	REC15	Use existing road crossings of streams and floodplains on low-volume roads and partially decommissioned roads that tie with the trail system, where safety permits.
Recreation Management	REC 16	Design improved stream crossings (culverts and bridges) for the 100-year flood event. Stream crossings with ESA- listed fish must meet NMFS fish passage design criteria. Design stream crossings for other ESA and State listed and sensitive aquatic species. See Roads and Landings section for stream crossing BMPs.

Category	Number	Best Management Practices
Recreation Management	REC 17	Use existing road crossings of streams and floodplains on low-volume roads and partially decommissioned roads that tie with the trail system, where safety permits.
Recreation Management	REC 18	Minimize low-water stream crossings for constructed or existing trails. Cross streams on stable substrate (e.g., bedrock, cobble) in areas of low streambanks. Block alternate stream-crossing routes where OHV wheel slippage (acceleration / braking) would tear down banks or deliver sediment. Avoid long, steep OHV trail segments on approaches to watercourse crossings.
Recreation Management	REC 19	Orient stream crossings perpendicular to the channel in straight and resilient stream reaches. Where trails cannot be effectively drained by rolling dips or using reverse grades, provide additional drainage structures. Where needed to prevent connectivity to a water body, incorporate sediment basins at OHV rolling dip outlets instead of lead off ditches. Sediment basins can be used to retrieve eroded material to maintain trail surface and mitigate trail incision. Clean sediment basins regularly. Sediment basins need to be cleaned before reaching a capacity at which sediment is no longer collected and is at risk of delivering to a waterbody. Dispose of materials by using to fill gullies or repair trail tread. Where sediment basins cannot be installed, provide energy dissipaters at OHV rolling dip outlets. Extend drainage outlets beyond the toe of fill or side-cast. Place stable materials below the outlets of cut-off water breaks to dissipate energy. Space cross drains more closely on approaches to stream crossings to reduce storm water volume and potential erosional energy. Install surface armoring on trail sections that are steep and or erodible. Favor native materials.
Recreation Management	REC 20	If OHV use is permitted in desert dry washes, protect dry wash woodland vegetation, and ensure that excessive bank erosion and is not occurring in areas where listed or sensitive species are present or downstream.
Recreation Management	REC 21	In OHV bridge structures, avoid chemically treated materials at water level contact points where leachate or solids may enter waterbodies.
Recreation Management	REC 22	Use a temporary flow diversion bypass to minimize downstream turbidity, when constructing in perennial stream crossings (See Roads and Landings section for Stream Crossing BMPs).
Recreation Management	REC 23	If trail width is too wide for the designated use (such as old roads converted to trails), consider tilling one side of the trail, covering with brush, and seeding or planting with native vegetation.

Category	Number	Best Management Practices
Recreation Management	REC 24	Monitor trail condition to identify surface maintenance and drainage needs to prevent or minimize sediment delivery to waterbodies. Repair rills and gullies to keep sediment from reaching wetlands, floodplains, and waterbodies.
Recreation Management	REC 25	Hydrologically disconnect trails from waterbodies to the extent practicable. Construct and repair water bars, drain dips, and leadoff ditches. These features may need rock reinforcement to promote longevity. Self-maintaining drain dips or leadoff features are the preferred design.
Recreation Management	REC 26	Harden trail approaches to stream crossings using materials such as geotextile fabric and rock aggregate. Harden fords with gravel or cobble of sufficient size and depth to prevent movement by traffic. Construct watercourse crossings to sustain bankfull dimensions of width, depth, and slope, and to maintain streambed and bank resiliency. Cross wet areas with naturally high-water tables with permeable fills, perched culverts, and/or culvert arrays to maintain hydrologic function. If possible, reroute trail away from seeps or wetlands. Bridge wetlands if trail reroute not possible and damage to wetland is occurring due to trails.
Recreation Management	REC 27	Rehabilitate unauthorized and decommissioned trails, where needed, to protect sensitive areas and water quality.
Recreation Management	REC 28	When constructing or maintaining trails within Riparian Management Areas, do not cut any portion of logs or coarse woody debris that extend into the active stream channel unless they pose a flooding hazard. Use alternative passage options, such as earthen ramps, small notch steps, or slight trail realignments, to facilitate maintenance of intact logs. Cut and stabilize if necessary, for safety.
Recreation Management	REC 29	Position fill or waste material in a location that would avoid direct or indirect sediment discharge to streams or wetlands.