United States Department of the Interior

FISH AND WILDLIFE SERVICE

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In Reply Refer To:
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June 26, 2020

Memorandum

To: Field Supervisors, SFWO, VFWO, AFWO, YFWO, BDFWO, KFFWO

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Date: 2020.06.26 14:11:05 -07'00'

From: Assistant Regional Director, Ecological Services, Interior Regions 8/10

Subject: Intra-Service Biological and Conference Opinion on the Issuance of a Section 10(a)(1)(B) Incidental Take permit to the Pacific Gas and Electric Company for the Pacific Gas and Electric Company Multiple Region Operations & Maintenance Habitat Conservation Plan

In accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (ESA or Act) and its implementing regulations (50 CFR §402), this document transmits the intra-service biological and conference opinion (Opinion) of the U.S. Fish and Wildlife Service (Service), Pacific Southwest Regional Office, regarding proposed federal discretionary action of issuance of a section 10(a)(1)(B) incidental take permit (Permit or Proposed Permit) to Pacific Gas and Electric Company (PG&E)(Applicant). The permit would be for the implementation of the Pacific Gas and Electric Company Multiple Region Operations & Maintenance Habitat Conservation Plan (MRHCP or PG&E Multi-Region O&M HCP). The Service proposes to issue the Permit to the Applicant for a period of 30 years.

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants or the malicious damage of such plants on areas under Federal jurisdiction or the destruction of endangered plants on non-Federal areas in violation of State law or regulation (i.e. Fish & Game Code §§2050-2085) or in the course of any violation of a State criminal trespass law (i.e. Penal Code §§ 594-625c). Therefore, although federally listed plants do not need to be included in an incidental take permit, plant species will be covered by the Proposed Permit in recognition of the conservation benefits provided by the Plan. In addition, the Service is still required to review the effects of its own actions on listed plants, even when those listed plants are found on private lands. This intra-Service section 7 consultation will also determine if issuing the Proposed Permit could

"jeopardize the continued existence" of any federally listed plant. Assurances provided under the Service's "No Surprises" rule at 50 CFR. §17.13, 17.22(b)(5) and 17.32(b)(5) will extend to all Covered Species, including all plants proposed for coverage.

The Applicant is requesting a permit to incidentally take 24 wildlife species and are seeking assurances for 12 plant species, for a total of 36 species (collectively Covered Species). Twenty-three wildlife species proposed for coverage are currently listed as federally threatened (T) or endangered (E), with one non-listed species proposed, and twelve plant species proposed for coverage are currently listed as threatened or endangered. The Covered Species list is provided below:

Wildlife

1. Blunt-nosed leopard lizard (*Gambelia sila*) (E)
2. California tiger salamander - Central California distinct population segment (DPS) (*Ambystoma californiense)* (T)
3. California tiger salamander - Santa Barbara DPS (*Ambystoma californiense)* (E)
4. California red-legged frog (*Rana draytonii)* (T)
5. Conservancy fairy shrimp (*Branchinecta conservatio*) (E)
6. Foothill yellow-legged frog (*Rana boylii*) (NL)
7. Giant gartersnake (*Thamnophis gigas*) (T)
8. Giant kangaroo rat (*Dipodomys ingens*) (E)
9. Longhorn fairy shrimp (*Branchinecta longiantenna*) (E)
10. Marbeled murrelet (*Brachyramphus marmoratus*) (T)
11. Morro shoulderband snail (*Helminthoglypta walkeriana*) (E)
12. Mount Hermon June beetle (*Polyphylla barbata*) (E)
13. Mountain yellow-legged frog – Northern DPS (*Rana muscosa*) (E)
14. Northern spotted owl (*Strix occidentalis caurina*) (T)
15. Ohlone tiger beetle (*Cicindela ohlone*) (E)
16. Point Arena mountain beaver (*Aplodontia rufa nigra*) (E)
17. San Joaquin kit fox (*Vulpes macrotis mutica*) (E)
18. Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*) (E)
19. Sierra Nevada Yellow-Legged Frog (*Rana sierrae*) (E)
20. Smith's blue butterfly (*Euphilotes enoptes smithi*) (E)
21. Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (T)
22. Vernal pool fairy shrimp (*Branchinecta lynchi*) (T)
23. Vernal pool tadpole shrimp (*Lepidurus packardi*) (E)
24. Yosemite toad (*Anaxyrus canorus*) (T)
25. Zayante band-winged grasshopper (*Trimerotropis infantilis*) (E)

Plants

1. Beach layia (*Lavia cornosa*) (E)
2. Ione manzanita (*Arctostaphylos myrtifolia*) (T)
3. Kern mallow (*Eremalache parryi* ssp. *kernensis*) (E)
4. Layne's ragwort (*Packera layneae*) (T)
5. Monterey gilia (*Gilia tenuiflora* ssp. *arenaria*) (E)
6. Monterey spineflower (*Chorizanthe pungens* var. *pungens*) (T)
7. Pine Hill ceanothus (*Ceanothus roderickii*) (E)
8. Pine Hill flannelbush (*Fremontodendron decumbens*) (E)

9. Robust spineflower (*Chorizanthe robusta* var. *robusta*) (E)
10. San Benito evening-primrose (*Camissonia benitensis*) (T)
11. Stebbins' morning-glory (*Calystegia stebbinsii*) (E)
12. Yadon's rein orchid (*Piperia yadonii*) (E)

This Opinion was prepared using the following information, and portions are hereby incorporated by reference:

1. September 2020 Final PG&E Multiple Region Operations and Maintenance Habitat Conservation Plan;
2. September 2020 Pacific Gas & Electric Company Multiple Region Operations and Maintenance Habitat Conservation Plan Final Environmental Assessment;
3. Electronic mail correspondence, telephone conversations, site visits, and meetings between the Service and the Applicants between 2006-2020;
4. References cited in this Opinion; and
5. Other information available to the Service

Fourteen wildlife species and three plant species presently have Critical Habitat designated. The Covered Species with designated Critical Habitat are: Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, Morro shoulderband snail, valley elderberry longhorn beetle, Zayante band-winged grasshopper, California red-legged frog, California tiger salamander (Central California DPS), California tiger salamander (Santa Barbara County DPS), Sierra Nevada yellow-legged frog, Yosemite toad, marbled murrelet, northern spotted owl, Monterey spineflower, robust spineflower, and Yadon's rein orchid. If the Service determines that PG&E and the HCP meets the statutory requirements for an HCP the Service will issue the Permit. Upon issuance of the Permit, incidental take, as defined in the Act, will be authorized for all Covered Species, and the PG&E will implement the HCP for all Covered Species.

There are numerous listed species with the potential to exist in the action area that have not been included for coverage in the HCP. The final list of covered species that PG&E is requesting incidental take for was refined through the application of the following criteria, as described in HCP Chapter 1, Introduction, section 1.5.2 Covered Species, and summarized here: 1) the species is known to occur or likely to occur within the Plan Area; 2) the species is currently listed as threated or endangered under the Act, or was judged to have a high probability of being listed during the permit term; 3) the species may be adversely affected by PG&E's covered activities even with the implementation of avoidance and minimization measures; and 4) sufficient data exists on the species' life history, habitat requirements, and occurrence within the Plan Area to estimate the effects on species and develop conservation measures to avoid or minimize those effects. The Service reviewed all federally listed species that may occur within the action area as well as PG&E's list of proposed Covered Species. The Service's determination of may affect, but not likely to adversely affect these species is identified in our intra-Service consultation evaluation form (see Appendix A). If an individual project, that would also be a Covered Activity, is likely to adversely affect (pursuant to section 7) or is reasonably certain to result in take (pursuant to section 10) one or more of these species, that project is not covered by the HCP or Permit and will be analyzed on a project-by-project basis by the Service via a separate section 7 consultation, or separate section 10 permit, as appropriate. See the Service's intra-Service evaluation form for a list of other non-covered federally listed species that have the potential to occur within the action area and the Service's determination for each of those species (Appendix A).

The remainder of this document provides our biological opinion on the effects of the proposed action on the 36 covered species listed above.

Consultation History

November 25, 2008:	The Service published a Notice of Intent to prepare an Environmental Impact Statement and to initiate scoping in the Federal Register.
October 29, 2010:	The Service published a revised Notice of Intent to prepare an Environmental Impact Statement and an announcement of a public scoping meeting to be held on Wednesday, November 17, 2010.
October 2010 - February 2020:	Meetings, correspondence, and telephone calls between the Service and PG&E on the development of the HCP.
March 2, 2020:	The Service published a Notice of Availability in the Federal Register initiating a 30-day public comment period for the draft HCP and draft Environmental Assessment.
March 26, 2020:	The Service published a 15-day extension of the public comment period for the draft HCP and draft Environmental Assessment in the Federal Register.
April 16, 2020	The public comment period for the draft Environmental Assessment closed.

BIOLOGICAL OPINION

Role of the Service

The MRHCP overlaps the boundaries of multiple Service jurisdictions within Region 10 of the Service, encompassing areas within the geographical boundaries of the Arcata, Bay-Delta, Klamath Falls, Sacramento, Ventura, and Yreka Fish and Wildlife Offices (FWO). The roles of the Arcata, Bay-Delta, Klamath Falls, Sacramento, Ventura, and Yreka FWOs with regard to providing technical assistance, evaluating and approving restoration plans and other mitigation proposals, reviewing annual reports, and providing recommendations for improved plan implementation are spelled out in MRHCP Chapter 6, section 6.8.1, Role of Field Offices, and as follows.

<u>HCP Implementation</u>

On behalf of the Regional Office, the Sacramento Fish and Wildlife Office will act as the lead on day-to-day implementation of the MRHCP. Day-to-day implementation will involve tasks such as resolving differences of opinion between the Service and PG&E regarding MRHCP interpretation, and performing compliance and enforcement actions. The Sacramento FWO will also be the first point of contact for resolving disagreements about MRHCP language and other disputes between other field offices and PG&E. If agreement between the Sacramento FWO and other field offices cannot be reached, dispute resolution during implementation will follow the procedures described in MRHCP Chapter 6, section 6.8.3, *Dispute Resolution Process*.

Role of the Regional Office

The Regional Office's roles are described in MRHCP Chapter 6, section 6.8.2, *Role of the Regional Office*.

Additional Mitigation Responsibilities Not Described in the MRHCP

Once any mitigation proposal has been finalized, PG&E will furnish copies of all final documents to the FWO that has primary responsibility over the geographic area in which the mitigation is to be completed, and to the Sacramento FWO for inclusion into the decision record for implementation of the MRHCP. For example, if mitigation is to occur in the geographic area overseen by the Ventura FWO, PG&E will furnish final documents to the Ventura FWO and the Sacramento FWO.

Inter-Agency Section 7 Consultations

Each FWO will be responsible for responding to inter-agency section 7 consultations for PG&E projects that occur within their geographic boundaries that analyze the effects of federal actions on species and covered activities covered under the MRHCP. For example, if an action agency initiates consultation for a project that occurs within the geographic area overseen by the Arcata FWO, the Arcata FWO will be responsible for responding to that request for consultation. The Sacramento FWO does not need to be notified or involved in section 7 consultations that occur outside the boundaries of the Sacramento FWO except as necessary to resolve disputes between PG&E and the Service.

Compliance and Enforcement

The Sacramento FWO is responsible for ensuring PG&E is in compliance with its Incidental Take Permit and the MRHCP, and for enforcing the Terms and Conditions of the MRHCP and this Biological Opinion.

Description of the Proposed Action

The proposed Federal discretionary action is the issuance of a section 10(a)(1)(B) incidental take permit (Permit) which addresses 36 species that are reasonably certain to be taken by the activities proposed for coverage in the HCP (see Covered Activities below).

The PG&E Multiple Region O&M HCP is a multi-species, 30-year plan intended to protect and conserve 36 Covered Species (including two DPSs of California tiger salamander) and other biological resources at facilities and easements managed by PG&E in its service area not already encompassed by the Bay Area or San Joaquin Valley HCPs. The HCP is designed to support an application for a Federal Permit under section 10(a)(1)(B) of the Act. The purpose of the proposed HCP is to enable PG&E to continue to conduct current and future O&M and minor construction activities (Covered Activities) in the HCP permit area while avoiding, minimizing, and compensating for possible direct, indirect, and cumulative adverse effects on covered species including threatened and endangered species or designated critical habitat. The intent of the HCP is to minimize incidental take of the Covered Species in the action area and to provide avoidance, minimization, and compensation measures for the effects of Covered Activities on the Covered Species and their habitat. PG&E proposes to cover activities related to the operation and maintenance of its natural gas and electric systems.

Plan Area

The MRHCP plan area encompasses the area where PG&E's routine O&M and minor new construction activities will take place in 34 counties. The Plan Area is divided into regional planning areas called the Central Coast Region, North Coast Region, and Sacramento Valley and Foothills Region, in order to organize the MRHCP for planning and implementation. The Plan Area includes PG&E gas and electric transmission and distribution facilities, ROWs, a buffer around facilities, the lands owned by PG&E or subject to PG&E easements to maintain facilities, access routes associated with PG&E's routine maintenance, and mitigation areas acquired to mitigate impacts resulting from covered activities. The Plan Area also includes areas for minor new construction. The study area and regional planning areas are illustrated on Figure 1.

The Sacramento Valley and Foothills Region consists of the Sacramento Valley counties from Sacramento County in the south to Shasta County in the north, specifically Sacramento, Yolo, Sutter, Colusa, Glenn, Butte, Shasta, Tulare, Yuba, and Tehama Counties. The region also includes the foothill counties that rise into the Cascade and Sierra Nevada mountain ranges, specifically Lassen, Plumas, Sierra, Nevada, Placer, El Dorado, Amador, Calaveras, Tuolumne, Mariposa, Madera, and Fresno Counties. The southern counties were included in this planning area because they abut PG&E's San Joaquin Valley O&M HCP area. In the north, portions of Siskiyou and Modoc Counties that contain gas and electric transmission lines are also included in this region.

The North Coast Region consists of Humboldt, Trinity, Mendocino and Lake Counties. It abuts PG&E's Bay Area O&M HCP area to the south and the Sacramento Valley and Foothills Region to the east.

The Central Coast region consists of Santa Cruz, Monterey, San Benito, San Luis Obispo, Santa Barbara and southern Kern Counties. It abuts PG&E's San Joaquin Valley O&M HCP area to the east.

Integrated Plan Area

The MRHCP also contains an area known as the Integrated Plan Area, wherein mitigation for impacts of MRHCP covered activities can be implemented across approved O&M HCP planning areas with USFWS approval. The Integrated Plan Area consists of the three MRHCP regional planning areas plus the areas covered PG&E's Bay Area and San Joaquin Valley O&M HCPs. Figure 2 depicts the Integrated Plan Area and all PG&E O&M HCP regions. The Integrated Plan Area is designed to ensure mitigation could be acquired outside the MRHCP Plan Area when such mitigation is regionally and ecologically appropriate. The Integrated Plan Area does not extend take authorization to covered activities outside the MRCHP Plan Area, nor does it allow PG&E to mitigate within the MRHCP Plan Area impacts of Bay Area O&M HCP or San Joaquin Valley O&M HCP covered activities areas unless authorized by those plans.

Covered Species

Covered Species are listed on page 2 of this Memorandum.

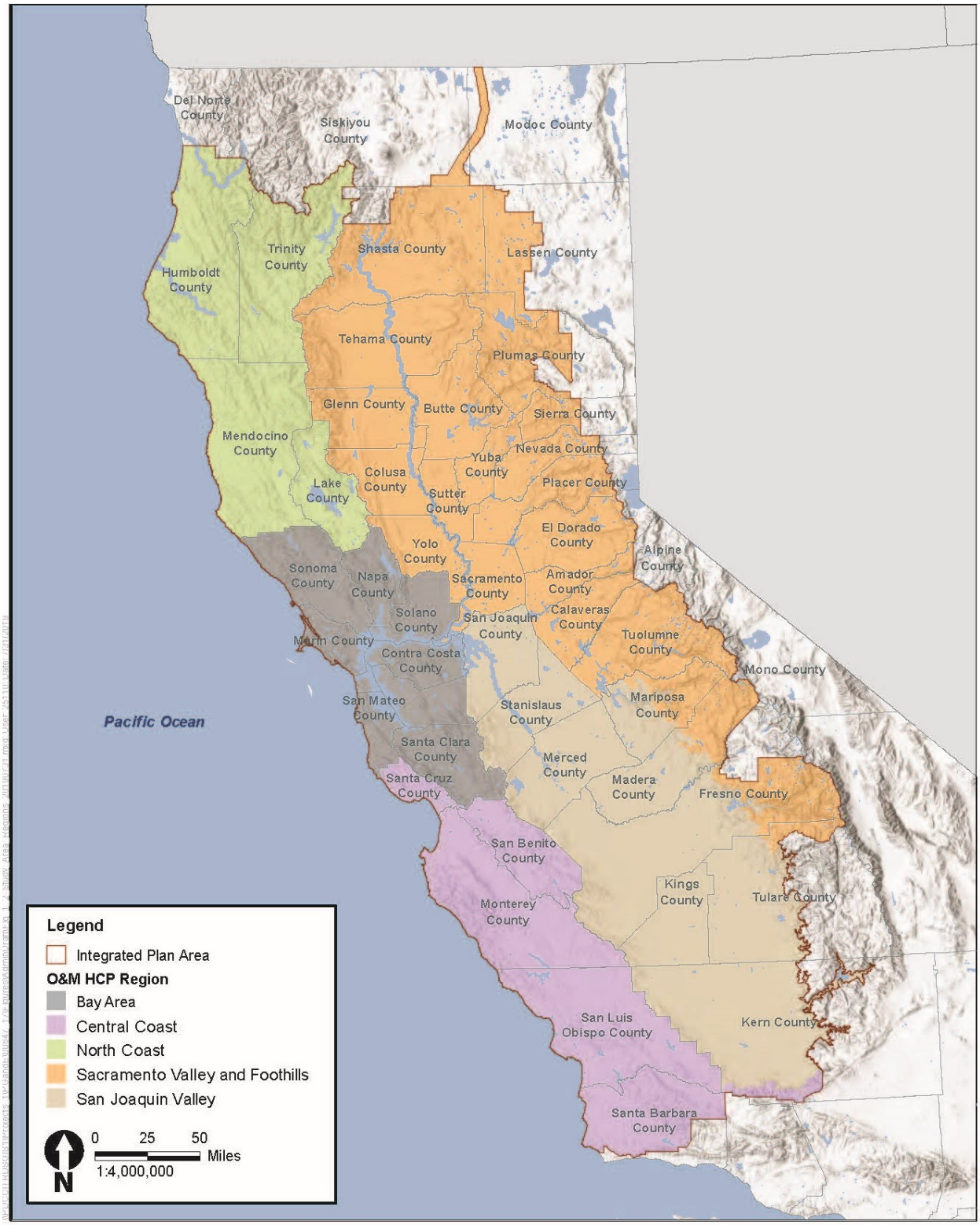
Covered Activities

The MRHCP covers a number of activities that are related to PG&E's natural gas and electric transmission and distribution systems that are reasonably certain to result in take of one or more

Covered Species and that are located in the Plan Area. Covered Activities will occur at or near existing facilities. Covered Activities are described in three major categories: Electric System Covered Activities, Gas System Covered Activities, and Other Covered Activities. Each of these categories contains several subcategories of covered activities. In addition to the operations and maintenance activities PG&E has proposed, the electric and gas system Covered Activities include descriptions of potential minor new construction that may occur during the permit term. Minor new construction activities include installing new or replacement structures to upgrade facilities or to extend service to new customers. Consistent with the requirements of NEPA, the MRHCP will not allow segmentation of proposed construction to obtain coverage under the HCP. Covered Activities include inspection, field testing, and potentially replacing many pipeline segments to ensure reliable and safe delivery of gas to customers. Brief summaries of covered activities are provided below. For a complete description of all Covered Activities, please refer to Chapter 3: *Covered Activities*, in the MRHCP.

Figure 1: MRHCP Plan Area

Figure 2: MRHCP Integrated Plan Area



Natural Gas System

A. Covered Activities - Similar Across All Natural Gas Activities

Items 1-12 below are general descriptions of the methods PG&E uses for access, staging, clearing, grading, erosion control, trenching and excavating, and crossings that are similar across all the individual categories of Covered Activities under the Natural Gas Line of Business.

1. Site Access

   Site access involves the construction of temporary or permanent access roads, and the restoration of temporary roads to pre-construction conditions upon project completion. In the event that no road to a project site exists, or an emergency arises, off-road travel or construction of a new temporary access road may be necessary. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.2.1: *Access*.

2. Staging

   Staging areas are areas where construction equipment and materials are stored. They are frequently used to implement Covered Activities, especially large-scale covered activities, such as pipeline replacements. PG&E restores staging areas to preconstruction conditions at the completion of the activity. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.2.2: *Staging*.

3. Clearing

   After staking the boundaries of work sites, PG&E maintenance personnel remove trees and brush (clear and grub such obstacles as rocks or tree stumps by mechanical means) within construction footprints. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.2.3: *Clearing*.

4. Grading

   Prior to commencing construction at a given site, PG&E may need to grade, level, or contour a project site using tractors and other equipment. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.2.4: *Grading.*

5. Erosion Control

   PG&E employs erosion control techniques to preclude pipeline washout, gully development, and sedimentation of local drainages. Standard erosion control measures may include installation of water bars along temporary or dirt roads, diversion channels and terraces to reduce erosion and runoff, ditch plugs installed in ditches to prevent washout, and other soil stabilization practices such as use of jute mats, wood mulching, straw mulch, and other similar methods. PG&E also uses permanent articulating cement ground mat systems (i.e., erosion control or "Ercon" mats) and riprap infrequently. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.2.5: *Erosion Control.*

6. Trenching and Excavating

   Trenching may involve the use of self-propelled trenching machines or backhoes are used for trench excavation on moderate terrain. Trenches crossing waterways are excavated using a backhoe, dragline, or clamshell. If workers encounter rock or rocky formations, tractor-mounted mechanical rippers are used to expedite excavation. In areas where mechanical rippers are not practical or sufficient, rock trenching equipment may be employed. Backhoes are used to clean the trench after ripping, or, in extremely rare circumstances, blasting is implemented after other alternatives, such as rerouting, are exhausted.

   The width and depth of the trench depends on the diameter of the pipe, soil type, terrain, and minimum depth requirements. Typically, the trench is 12 inches wider than the diameter of the pipe. The trench must be deep enough to achieve adequate soil cover over the pipe. PG&E crews clear the trench of loose rocks and, when necessary, provide imported material or other suitable bedding material as a cushion for the pipe. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.2.6: *Trenching and Excavating.*

7. Crossings

   Boring and open trenching are typical construction methods for crossings. Open-trench waterway crossings are usually avoided unless a waterway is very small or seasonal. The MRHCP describes three types of boring methods: jack and bore, horizontal directional drilling, and microtunneling. PG&E chooses the method based on the crossing type, soil type, terrain, and type of facility being installed. Crossing methods are summarized below. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.2.7: *Crossings.*

- *Jack and bore.* Crews excavate each side of the crossing to accommodate the boring equipment. Bore holes are drilled to accommodate pipes ranging from 2 to 24 inches in diameter. Sleeves and pipes are then pushed through the bore hole.
- *Horizontal directional drilling.* Crews excavate a "mud pit," approximately 6 feet wide by 6 feet long by 3 feet deep. The tunnel is drilled from surface to surface. Workers set up a drilling machine on one side of the crossing. The auger drills at a predetermined angle from the surface elevation toward the crossing; the angle is prescribed to attain the correct depth below the feature being crossed.
- *Microtunneling.* Each side of the crossing is excavated to accommodate the boring equipment. Microtunnel excavation can be a trench as small as 10 feet by 40 feet or as large as 50 feet by 50 feet, depending on the required depth. A jetting head containing multiple high-pressure water jets is attached to the pipe being installed. Water forced through the jets dislodges the soil as the head is pushed, and the pipe is installed behind it.
- *Open-trench waterway crossings.* A trench is opened in the streambed using backhoes, backhoes on barges, clamshells, or draglines, depending on the streamflow characteristics. Flow is maintained at water crossings during construction using bypass piping and temporary cofferdams. The pipeline is placed at least 6 feet below scour

depth. After installation, crews backfill the trench and the streambank, stabilize the soil through compaction, and restore the area to approximate preconstruction conditions.

8. Pipe Placement

   Pipe placement involves transporting pipe segments, welding segments, coating segments, and lowering completed segments into trenches. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.2.8: *Pipe Placement.*

9. Pipeline Marking

   PG&E crews install identifying markers over the centerline of the pipeline. These markers show the general location and direction of the pipeline, identify the owner of the pipeline, and convey emergency information in accordance with applicable regulations. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.2.9: *Pipeline Marking.*

10. Hydrostatic Testing

    Hydrostatic testing is used to test the pressure of a new, existing, or repaired or replaced pipeline. PG&E most commonly uses water as the test medium, but compressed air or compressed nitrogen gas occasionally are used for testing small-diameter pipes. Soil excavation, soil stockpiling, and the use of construction equipment at each end of the pipeline requires an approximate 20- by 50-foot work site. An additional 100- by 100-foot laydown area and a staging area are also required at each end of the pipeline. Hydrostatically tested pipelines may require a 100- by 100-foot staging area to store the baker tank(s). For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.2.10: *Hydrostatic Testing.*

11. Cleanup and Restoration

    PG&E removes construction material and re-contours disturbed areas to their pre-project grade. Depending on the nature of the site and the type of installation that took place, several tasks may be involved in the cleanup and restoration. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.2.11: *Cleanup and Restoration.*

12. Emergency Work

    If possible, PG&E staff evaluates the work site for potential endangered species effects and prescribes avoidance, minimization, mitigation, or restoration, if needed. PG&E staff implements Conservation Measures described in Chapter 5: Conservation Strategy, sections 5.4, 5.5, and 5.6. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.2.12: *Emergency Work.*

B. Covered Activities - Individual to certain Natural Gas Systems

1. G1: Patrols

PG&E patrols and inspects its facilities using either ground or air based patrols. Ground patrols typically involve vehicles driving on existing pipeline access roads. Aerial patrols involve helicopters flying approximately 500 feet off the ground above pipelines. PG&E also conducts gas leak patrols using light trucks or sport utility vehicles. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.3.1: *G1. Patrols*.

2. G2: Inspections

   This covered activity covers inspections of valves, telecommunication sites, anode beds, and pressure limiting stations. It also covers land surveys. Light trucks or fixed-wing aircraft are used to access sites to perform all of these activities. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activi*ties, section 3.2.3.2: *G2. Inspections*.

3. G3: Pipeline Remedial Maintenance and Internal Pipeline Inspections

   This covered activity is subdivided into two subcategories. Summaries are provided below. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.3.3: *G3. Pipeline Remedial Maintenance and Internal Pipeline Inspections*.

   a. G3a: Pipeline Remedial Maintenance

      Remedial maintenance corrects erosion and vandalism problems and involves the evaluation of internal pipeline issues. Maintenance materials used for site-specific solutions to erosion problems may include biodegradable jute netting and, to a lesser extent, the periodic use of concrete, Ercon mats, or concrete pillow systems. Occasionally, repeated vandalism requires fencing to control future vandalism impacts. Fencing these areas requires excavation for fence post installation; this action will need an approximately 50- by 50-foot work site and result in approximately 50 feet by 50 feet of disturbed area for each fenced location.

   b. G3b: Internal Pipeline Inspections (In-Line Inspection)

      PG&E inspects the internal coatings of its pipelines annually. If problems are indicated, the pipeline is inspected internally using a pig that is inserted into the pipe at an external launch and receiver point. No excavation is required. The pig travels throughout the length of the pipeline employing robotically operated cameras and sensors to look directly inside pipes. Once the “pigging” data are analyzed, the inspection crew conducts a calibration test (i.e., excavates a bell hole) at two or three locations along the pipeline to confirm that the pigging results are accurate. The size of the area exposed depends on the length of pipeline where the pig has indicated possible problems.

4. G4: Compressor Station Upgrades and Maintenance

   Compressor stations occupy developed and fenced sites. PG&E conducts inspections daily and performs maintenance and upgrades as needed. Typical maintenance tasks include overhauling compressors and engines, repairing and replacing piping, painting the station, and drilling or cleaning water wells. In addition, operations and air quality

standards may require modifications or upgrades to station equipment. Inspections, maintenance, and upgrades to compressor stations are typically within fenced facility footprints. Access is from existing roads. Crews maintain mow strips outside the perimeter of the facility's fence line to comply with local fire standards.

5. G5: Pipeline Electric Test System (ETS) Installation

   The ETS is a component of the cathodic protection system. Units are installed 1 to 5 miles apart on pipelines to (1) determine protection system effectiveness by measuring electrical conductivity, and (2) help crews locate the pipe prior to excavation. This technology precludes the need to systematically expose the pipe and physically examine it for signs of corrosion. The ETS consists of two wires (leads) that are welded to the pipe; the leads are exposed at the surface inside a 4-foot-tall, 4-inch-diameter plastic tube or valve box. Installation entails exposing a 3- to 5-foot-long section of pipe, attaching the leads with a small weld, and backfilling the excavation. During ETS installation, the pipeline remains in operation. Most sites are accessible from existing access roads. Where an ETS is not accessible from an existing road, workers access it on foot or by using small trucks.

   PG&E performs approximately eight ETS installations per year. At each installation site, soil excavation, soil stockpiling, and the use of construction vehicles disturb an approximate 50- by 50-foot work site.

6. G6: Pipeline Valve Maintenance – Recoating

   As part of two other Covered Activities, Pipeline Coating Replacement and Pipeline Replacement, PG&E may need to recoat a gas pipeline valve. Recoating is done by sandblasting the valve over tarps, collecting the debris, and recoating the valve with a specialized epoxy that protects against corrosion. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.3.6: *G6. Pipeline Valve Maintenance - Recoating*.

7. G7: Pipeline Valve Maintenance – Replacement or Automation

   As part of two other Covered Activities, Pipeline Coating Replacement and Pipeline Replacement, PG&E may replace a gas pipeline valve. Soil excavation, soil stockpiling, and the use of construction vehicles require an approximately 150- by 150-foot work site. A 50- by 50-foot laydown area to store equipment may also be required. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.3.7: *G7. Pipeline Valve Maintenance – Replacement or Automation*.

8. G8: Pipeline Cathodic Protection

   Corrosion of underground steel pipes is a continual maintenance issue for gas system pipelines. Pipe generates or carries corrosion-cell current that, as it moves through the soil, can form pits in the pipe. These pits can weaken sections of the pressurized pipe and cause it to fail. PG&E uses cathodic protection to prevent corrosion. PG&E uses anode beds to control corrosion. Anode beds are constructed using equipment to excavate the bed. Deep anode beds are drilled to a depth of up to 300 feet. After project completion, work sites are returned to pre-project conditions. For a complete description of this

Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.3.8: *G8. Pipeline Cathodic Protection*.

9. G9: Pipeline Lowering

   PG&E may need to lower gas pipelines to increase the depth below surface and thereby improve public safety. Pipeline lowering typically involves trenching and installing a new pipeline parallel to, and to a greater depth than, the existing pipeline. Typically, the old pipe is abandoned in place and either capped or filled with slurry and then capped. PG&E lowers approximately 2 miles of pipeline every 3 years. A 20-foot-wide work corridor is needed for trenching and soil excavation, soil stockpiling, and the use of construction vehicles. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.3.9: *G9. Pipeline Lowering*.

10. G10: Pipeline Coating Replacement

    Pipeline segments are excavated in sections and supported at intervals typically of 40 feet. Workers remove the old coating by jetting, scraping, or sandblasting and typically place plastic sheeting or tarps below the pipe to collect the residue. PG&E performs testing to determine if the material is hazardous and then disposes of it in accordance with regulations. The surface is then prepared for the new wrap by running a self-contained grit- or shot-blasting machine over the pipe. The pipeline continues to operate while a coating machine applies the coating. Recoating requires use of construction vehicles, vegetation removal, trenching, soil excavation, and soil stockpiling. On average, a 20-foot-wide work site is needed for this activity. One mile of pipeline coating replacement typically involves three different access locations. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.3.10: *G10. Pipeline Coating Replacement*.

11. G11: Pipeline Replacement

    During a pipeline replacement, old pipeline is removed from service for the tie-in to the new line. It is then blown down (i.e., gas is evacuated to the atmosphere from the affected section of pipe through a blowdown stack). The existing pipeline is abandoned in place by filling it with slurry before the pipeline is capped. Typically, the crew will cut and cap the pipeline every 1,000 feet, depending on the location. When a pipeline is abandoned in place, PG&E will typically place the new section of pipe as close to the abandoned pipeline as possible and modify any existing easements by expanding the easement width to accommodate the new section of pipeline.

    PG&E performs pipeline replacement approximately 18 times per year. The minimum length of pipe replaced is typically 40 feet (one joint of pipe), although approximately 1 mile could be replaced during each replacement effort. A 50-foot to 100-foot by 50-foot area for new valve equipment is required along each pipeline replacement. Trenching and soil excavation, soil stockpiling, staging, and construction vehicles disturb a 20-foot-wide work site, which includes the 10-foot excavation area. Once the new pipeline is installed, PG&E hydrostatically tests and backfills the pipeline and disposes of the water using either a baker tank or sewer. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.3.11: *G11. Pipeline Replacement*.

12. G12: Pipeline Telecommunication Site Maintenance

    Periodic vehicle or helicopter access is required to check supervisory control and data acquisition (SCADA) telecommunication facilities, replace batteries, conduct minor maintenance, or make adjustments to the facilities or components. In the event of major storm damage, reconstruction of the facility or replacement of a component is required as soon as weather permits. A staging area may be required for major maintenance or storm damage repairs. A 20- by 20-foot work site is needed for soil excavation, soil stockpiling, and the use of construction vehicles. Approximately once per year, PG&E must install new fiber optic cable, which requires an estimated 10- by 1,500-foot work site. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.3.12: *G12. Pipeline Telecommunication Site Maintenance*.

13. G13: Pipeline Right-of-Way Vegetation Management and Access Road Maintenance

    This Covered Activity is subdivided into two sub-categories, which are summarized below. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.3.13: *G13. Pipeline Right-of-Way Vegetation Management and Access Road Maintenance*.

    a. G13a: Pipeline Right-of-Way Vegetation Management

       The gas system vegetation management program is designed to remove weeds, brush, and trees around equipment and facilities for ROW visibility, fire hazard reduction, security, safety, and maintenance access. A ROW width averages 20 feet over the gas pipeline. The ROW width is dependent on legal easement documentation and the type of vegetation. For example, some easements are 10 feet wide, and others can be up to 65 feet wide. Vegetation management usually is accomplished by manually removing large-diameter woody vegetation with a chainsaw, then mechanically removing other vegetation with a brush hog, hydro-axe, or brush rake, usually to establish a maximum clearance height of 1 foot from the ground (depending on vegetation and the return growth rate), and to allow surveys by foot. If access is poor, vegetation is manually lopped into 6- to 24-inch lengths and scattered within the ROW.

    b. G13b: Pipeline Access Road Maintenance

       Access road maintenance work takes place in the ROW. PG&E maintains the road without altering the road profile. Every 2 to 3 years, PG&E performs surface maintenance on an as-needed basis to keep the access road in operational condition.

C. Minor New Construction Covered Gas System Covered Activities

1. G14: Gas Pressure Limiting Station Construction

   Gas pressure limiting stations (PLS) may be installed as an alternative to replacing a section of pipeline. Installing a PLS that lowers the pressure of the gas in the pipeline. A typical PLS encompasses a footprint area of approximately 250 by 100 feet, including aboveground pipe and valve structures and a small control and monitoring building (usually 100 square feet) surrounded by security fencing. The control building houses pressure flow monitoring and SCADA equipment. The local distribution system or solar panel-charged batteries provide the electricity for the SCADA equipment. This process

that involves excavating a pipeline joint. A construction corridor approximately 100 feet long by 100 feet wide and a laydown area approximately 100 by 100 feet may be required. In addition, the footprint of the PLS is 250 by 100 feet, including fencing. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.4.1: *G14. Gas Pressure Limiting Station Construction*.

2. G15: New Customer/Business Pipeline Extension

   This Covered Activity allows the installation of new sections of pipeline, up to 2 miles in length, and connection to existing segments, which involves clearing and grading the ROW, trenching and excavating, pipe placement (including welding, inspection of welds, field-coating or fiber-wrapping, and backfilling), hydrostatic testing, corrosion protection, marking the pipeline, erosion control, and cleanup and restoration. Specialized trenching and boring methods are used at crossings of rivers, streams, backwaters, washes, faults, roads, railroads, utilities, aqueducts, and canals. A new 10-foot-wide ROW over the pipeline alignment is required and could be in natural vegetation, city streets, or agricultural settings. Trenching and soil excavation, soil stockpiling, and the use of construction equipment require an approximately 125-foot by 20-foot work site, which includes the 10-foot excavation area on one side of the alignment. In the event that no access road exists or an emergency arises, it may be necessary to construct a new temporary access road to implement this covered activity. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.2.4.2: *G15. New Customer/Business Pipeline Extension*.

Electric System

A. Covered Activities Similar Across All Electric System Covered Activities

   Items 1-10 below are general descriptions of the methods PG&E uses for access, staging, clearing, grading, erosion control, trenching and excavating, and crossings that are similar across all the individual categories of Covered Activities under the Electric System line of business. Some, or all, of these activities may be employed when performing Electric System Covered Activities.

   1. Access

      PG&E usually uses existing public and private roads to access their ROWs. However, because of the length of electric facilities, and because electric facilities are frequently located in remote areas, PG&E must construct new temporary access roads periodically when access to facilities is not otherwise available. PG&E constructs these roads within a minimum footprint area and ultimately decommissions and restores them to preconstruction conditions at the completion of the activity. In some instances, roads may be left in place to provide site access for annual patrols or inspections. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.2.1: *Access.*

   2. Staging

      Staging areas, areas where construction equipment and materials are stored, are frequently used to implement Covered Activities, especially large-scale covered

activities, such as pipeline replacements. PG&E restores staging areas to preconstruction conditions at the completion of the activity.

3. Clearing

   Clearing for electric facilities begins by staking the construction ROW. Maintenance personnel then clear vegetation, remove obstacles, and grade to the extent necessary to allow safe work practices and access. Stump profiles are left as low as required for safe work practices and access. Stumps may be removed where appropriate. Debris generated during clearing of the ROW is either chipped and left onsite or disposed of appropriately. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.2.3: *Clearing.*

4. Grading

   Prior to commencing construction at a given site, PG&E may need to grade, level, or contour a project site using tractors and other equipment. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.2.4: *Grading.*

5. Erosion Control

   PG&E employs erosion control techniques to preclude pipeline washout, gully development, and sedimentation of local drainages. Standard erosion control measures may include installation of water bars along temporary or dirt roads, diversion channels and terraces to reduce erosion and runoff, ditch plugs installed in ditches to prevent washout, and other soil stabilization practices such as use of jute mats, wood mulching, straw mulch, and other similar methods. PG&E also uses permanent articulating cement ground mat systems (i.e., erosion control or "Ercon" mats) and riprap infrequently. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.2.5: *Erosion Control*.

6. Trenching and Excavating

   Trenching on moderate terrain may involve the use of self-propelled trenching machines or backhoes. Trenches crossing waterways are excavated using a backhoe, dragline, or clamshell. If workers encounter rock or rocky formations, tractor-mounted mechanical rippers are used to expedite excavation. In areas where mechanical rippers are not practical or sufficient, rock trenching equipment may be employed. Backhoes are used to clean the trench after ripping, or, in extremely rare circumstances, blasting is implemented after other alternatives, such as rerouting, are exhausted. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.2.6: *Trenching and Excavating*.

7. Crossings

   Methods for crossings are the same as those used for the Natural Gas System. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activi*ties, section 3.3.2.7: *Crossings*.

8. Cleanup and Restoration

   PG&E removes construction material and re-contours disturbed areas to their pre-project grade. Depending on the nature of the site and the type of installation that took place, several tasks may be involved in the cleanup and restoration. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.2.8: *Cleanup and Restoration*.

9. Vegetation Management

   PG&E's vegetation management involves maintaining required clearances between vegetation and electric lines and equipment, removing hazard trees, and other vegetation clearing activities to ensure system reliability and reduce fire risk. Prescribed clearance distances vary based on line rating, shrub and tree species composition, slope, regional fire risk/threat rating, and tree growth and movement, as well as sag and blow-out distances. PG&E also implements programs to reduce wildfire risk including enhanced vegetation management in CPUC-designated high tier 2 and tier 3 fire-threat areas and creation of fire defense zones in partnership with customers. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.2.9: *Cleanup and Restoration*.

10. Emergency Work

    If possible, PG&E staff evaluates the work site for potential endangered species effects and prescribes avoidance, minimization, mitigation, or restoration, if needed. PG&E staff implements Conservation Measures described in MRHCP Chapter 5: *Conservation Strategy*, sections 5.4, 5.5, and 5.6. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.2.10: *Emergency Work*.

B. Individual Electric System Covered Activities

1. E1: Patrols

   PG&E conducts aerial patrols of electric transmission lines, distribution lines, and associated facilities annually (in terms of calendar years) using helicopters only. PG&E also patrols facilities on the ground using ATVs, small trucks, or SUVs. Patrols are sometimes carried out on foot. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.3.1: *E1. Patrols*.

2. E2: Inspections

   PG&E routinely inspects its facilities, both to verify the integrity of its facilities, and to respond to and diagnose outages. PG&E also performs land surveys. To perform these inspections, PG&E tends to access facilities using vehicles or foot patrols. On occasion, these inspections may require off-road travel. Some inspections may also be carried out by helicopter. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.3.2: *E2. Inspections*.

3. E3: Insulator Washing or Replacement

   PG&E personnel periodically wash ceramic insulators to reduce the risk of electric faults. Distilled water is used to wash the insulators; dry washing with ground corn hulls also is used.

   PG&E replaces insulators when they have been damaged by gunshot, lightning, or heavy corrosion or when they no longer can be washed. Replacement typically takes a four- to six-person crew with a small truck for hauling crewmembers, tools, and materials. If access is limited, a helicopter may be used to land crewmembers and tools on a tower. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.3.3: *E3. Insulator Washing or Replacement*.

4. E4: Substation Maintenance

   Typical minor maintenance tasks at substations include repair and replacement of transformers, switches, fuses, cutouts, meters, and insulators. This covered activity could require use of station property or adjacent property for construction staging, materials storage, permanent facilities, and land management.

   PG&E conducts vegetation management inside and outside of substation facilities to reduce and eliminate fire hazards, enhance security for fenced facilities, enhance aesthetics, and reduce potential for illegal dumping and homeless encampments. Covered activities on PG&E lands to control vegetation external to substations may include the mowing of grass and weeds. Treatments include pruning or removal of vegetation on the immediate perimeter of a fenced facility, usually within 3 to 5 feet of the fence, brush and weed mowing and discing, herbicide treatments, tree thinning or pruning, and trash removal. Workers may use tractors, flail mowers, or string trimmers for mowing and discing operations. Tree service crews use chainsaws to manually prune or remove hazard trees and to cut brush. Herbicide use may occur, but is not a Covered Activity under the MRHCP. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.3.4: *E4. Substation Maintenance*.

5. E5: System Outage Repair

   When a power outage is reported, PG&E patrols the line until personnel determine the cause of the outage. Access is primarily on existing roads, although some overland access with small trucks or SUVs is expected. Depending on the cause of the outage, repair may entail anything from reclosing a switch to replacing a transformer or pole. Soil excavation, soil stockpiling, and the use of construction equipment disturbs an approximately 22-foot by 22-foot work site during each repair. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.3.5: *E5. System Outage Repair*.

6. E6: Tower and Boardwalk Replacement or Repair

   This Covered Activity is subdivided into two subactivities, which are summarized below. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.3.6: *E6. Tower and Boardwalk Replacement and Repair*.

   a. E6a: Tower Replacement or Repair

Tower Extensions

PG&E utilizes two methods to install tower extensions. The most common method involves installing a prefabricated extension at the bottom, waist, or top of the tower. The extension is typically installed using a helicopter or crane, depending on the tower location. If a crane is used, an approximately 25- by 40-foot area is graded adjacent to the tower to serve as a level crane pad. Temporary wood pole supports (shoo-flies) are constructed adjacent to the tower to support the conductors while the crane lifts the tower. The tower extension is installed, the conductors replaced, and the shoo-flies removed.

The second method requires lifting the tower. A tower lifter is driven beneath the tower, and its four arms are clamped to the tower legs. The tower legs are unbolted from the base, the tower is lifted, and leg extensions are installed.

Strengthening Tower Foundations

To strengthen tower foundations, concrete from the existing footings is broken away to expose the steel reinforcements. Replacement concrete footing is poured between reinforcements. Old concrete footings are removed and hauled.

To repair submerged foundations, a cofferdam is installed at low tide to allow access to the foundation footing. The old concrete pier is chipped away to expose the pile, and the concrete is replaced. The cofferdam then is removed by excavating around the outside and hoisting it from the tower.

If boardwalks are present, but PG&E cannot complete the work from an existing boardwalk, construction crews place a rubber mat at the base of each footing as a work site. PG&E may build a temporary section of boardwalk laterally from an existing boardwalk. A helicopter is then used to place the material on the temporary boardwalk, and workers move the material to the work site by hand or wheelbarrow.

If piles are not required for the tower foundation, footing repairs can be done within a work site extending approximately 2 feet from the footing. If piles are required, the work site may need to be extended to 20 feet outside the tower footprint. For a couple of hours, PG&E crews may use rubber mats to temporarily access the area requiring a temporary boardwalk. Workers place the mats in such a way to help protect the vegetation around the temporary boardwalk during its construction.

Strengthening Tower Superstructures

Superstructures typically are strengthened by replacement, modification, or addition of pieces of steel lattice. Other minor repairs that require accessing facilities are replacing fuses, breakers, relays, cutouts, switches, and transformers, and painting.

b. E6b: Access Boardwalk Repair and Replacement

Boardwalks typically extend from levees and provide access across marsh to transmission tower footings. PG&E crews perform boardwalk maintenance and construction activities using hand tools and gas-powered tools such as drills and saws. If possible, crews work from the boardwalk or areas adjacent to the boardwalk. If the

boardwalk is substantially degraded, crews do the work within a 10-foot corridor around the boardwalk being replaced. When a 10-foot by 10-foot work site is required, soil excavation and soil stockpiling disturb vegetation.

7. E7: Facility Installations (Shoo Flies)

   Shoo-fly installations involve adding temporary poles or structures around existing permanent facilities to limit service interruptions until work crews can make permanent repairs. Shoo-flies consist of a number of poles and anchors supporting conductors to bypass facilities needing repairs or upgrades. Shoo-fly supports are removed when the repair or construction work is complete. Shoo-flies are installed approximately 120 times per year. A work site of approximately 25 by 100 feet is frequently required. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.3.7: *E7. Facility Installations (Shoo Flies)*.

8. E8a: Pole Equipment Repair and Replacement

   Replacement and repair of pole equipment typically are performed with the pole in place, using a line truck. Such repairs and replacements take place approximately 570 times per year.

9. E8b: Utility Wood Pole Replacement

   When replacing a PG&E distribution or transmission pole, the new pole is framed (i.e., cross arms, pins, insulators, grounds, bonding, markers, and any equipment are installed) on the ground adjacent to the existing pole prior to setting the pole in the ground. A line truck augers a hole, the new pole is moved into the new hole, the conductors are moved from the old pole to the new pole, the old pole is typically removed, and the old pole site is backfilled with the augured soil. Existing wood poles may be replaced with new wood poles or light-duty steel poles. PG&E replaces poles approximately 570 times per year.

10. E9: Line Reconductoring

    PG&E replaces conductors (wires) once the wires have outlasted their usefulness. Work crews install replacement conductors by temporarily splicing them to the ends of the existing conductors and pulling them through travelers (pulleys) attached to the arms of the towers or pole cross arms. Travelers are installed at each tower or pole using a boom truck. Where a boom truck cannot be used, a winch is used to install the travelers. In some cases, a helicopter is necessary to install the travelers and conductors. Pull sites are generally rectangular and vary in size, from approximately 50 to 350 feet wide for small pull sites and approximately 100 to 1,250 feet long for large pull sites. Vegetation mowing and minor grading may be required to prepare pull sites for use. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.3.10: *E9. Line Recondutoring*.

11. E10: Vegetation Management

    This Covered Activity is subdivided into several subactivities, which are summarized below. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.3.11: *E10. Vegetation Management*.

a. E10a: Routine Maintenance

Routine vegetation includes pruning or removal of trees that will not remain outside of required clearance distances or that may pose a hazard to electric facilities before the next year's patrol.

b. E10b: Pole Clearing

Vegetation clearing for existing poles applies to vegetation that has grown over the course of the year (i.e., grasses, forbs, saplings, and branches). Vegetation clearing for new poles requires the removal of all vegetation within 10 feet of a pole that could propagate a fire. In some cases, because of vegetation regrowth, it is necessary to clear a pole more than once during a given season.

c. E10c: Tree Removal – Small Groups

Trees are removed in groups affecting approximately 0.1 acre (4,350 square feet) at approximately 30 locations each year. Trees are cut off at ground level, with the roots and stump left in place.

d. E10d: Tree Removal – ROW Clearing

ROW clearing typically is accomplished either mechanically or manually. However, because cutting or mowing can stimulate resprouting of incompatible vegetation, PG&E vegetation management staff monitors the ROW for resprouting and reinvasion by incompatible vegetation. When resprouting and reinvasion does occur, staff manages the ROW to achieve the desired outcome. This covered activity is defined by those instances in which vegetation management is necessary as a distinct and separate action.

At approximately 12 locations per year, PG&E removes 1 mile of vegetation in a 25-foot-wide area under the belly of the span and prunes the remaining vegetation in a 75-foot-wide area along all transmission lines from 115 kV to 500 kV. This estimated area is based on an assumption that PG&E removes most trees from under the belly of the span, and, depending on clearance requirements, leaves the trees near towers. In riparian areas, vegetation management is anticipated to be more targeted. Riparian vegetation clearing is not expected to extend beyond 1,000 feet in one continuous area, and 1,000 feet of clearing is anticipated only once every 3 to 5 years. Riparian removals for this activity are illustrated in Figure 3-2 and Figure 3-3 in Chapter 3 of the MRHCP. Low-growing trees that stay below the clearance distance height are compatible and are retained. If the trees are incompatible, then they will be removed; however, the compatible understory vegetation will be retained.

e. E10e: Tower Cage Clearing

PG&E performs vegetation management around poles and towers on its overhead transmission facilities to maintain the visibility necessary to inspect the footings for structural integrity. Vegetation management includes patrol of poles and towers and removal of all trees, tree seedlings, and any material that obstructs the ability to visually inspect the tower and pole footings. The work is scheduled throughout the

year and the work type depends on the plant material to be removed. Vegetation management involves cutting vegetation with string trimmers or chainsaws.

PG&E performs this activity approximately 90 times a year. Approximately 10% of the time (nine times annually), vegetation is pruned or removed within a 1,600-square-foot area.

f. E10f: Fee Strip Maintenance

To comply with city and county ordinances for fuels reduction and beautification, PG&E performs weed abatement work on PG&E-owned land under electric transmission facilities approximately once a year along a 1-mile ROW corridor. Work type and timing varies depending on requirements defined in each local ordinance. Ongoing vegetation management includes removing material by chemical, mechanical, or physical methods, depending on the site conditions, environmental considerations, types of vegetation, and size of the area. Methods may include mowing, discing, and the use of string trimmers.

12. E11: Wood Pole Test and Treat

This Covered Activity is subdivided into two subactivities, which are summarized below. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.3.12: *E11. Wood Pole Test and Treat*.

a. E11a: Inspection and Maintenance

Within a 3-foot radius around the pole, construction crews excavate 20 inches of soil and bore a minimum of three 9/16-inch holes at 45° angles to the axis of the pole. Each successive boring is 120° to the right and 12 inches above the previous bore. The shell thickness and circumference of the pole are used to determine whether the pole is a candidate for replacement or reinforcement.

Inspection and maintenance occurs frequently, roughly 60,000 times per year. Approximately 10% (7,000) of these poles are in non-urban areas. The excavation of soil within the 3-foot radius of the existing pole results in disturbance.

b. E11b: Reinforcement

Approximately 200 poles will need reinforcement annually. Poles are either stubbed, trussed, or wrapped in fiber. Stubbing and trussing entail driving or setting a short steel truss or wood pole into the ground and attaching it to the existing pole to provide the support originally afforded by the pole butt. Fiber-wrapping entails wrapping the pole at or below ground level with a material that has been impregnated with preservatives to retard external deterioration of the pole. Excavation of soil within the 6-foot radius of the existing pole results in disturbance.

C. Minor New Construction

1. E12: New Distribution and Transmission Line Construction or Relocation

To provide additional service to customers in approved developments, 2-mile extensions of distribution and transmission lines on new wood poles or light-duty steel poles are installed approximately twice a year. Each line extension requires approximately 15,10 by 10 feet work sites, a pull site of approximately 50 feet by 50 feet, and a staging area of approximately 75 feet by 75 feet. Finally, access to the new transmission or distribution section may require construction of a new 10- by 1,000-foot unsurfaced access road. Similarly, degraded or eroding access roads may need to be repaired or replaced. This Covered Activity is subdivided into two subactivities, which are summarized below. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.4.1: *E12. New Distribution and Transmission Line Construction or Relocation*.

2. E13: Tower Line Construction

   Approximately twice a year during the permit term PG&E may construct up to 2 miles of new transmission lines as an extension from existing transmission lines. Each line requires a new 200-foot wide ROW, approximately 10 towers, each requiring an approximately 25-foot by 100-foot work site, three pull sites with an average size of 50 feet by 150 feet, and a laydown area of approximately 100 feet by 100 feet. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.4.2: *E13. Tower Line Construction*.

3. E14: Minor Substation Expansion

   Minor substation expansions under the MRHCP will typically be limited to an average of approximately 3 acres per substation. However, in some cases, the expanded substation footprint may require up to 10 acres of permanent vegetation removal. PG&E grades, paves, or surfaces the substation sites and fence the area for safety and security reasons. PG&E typically owns excess land around each substation to accommodate growth, improvements, or modifications. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.4.3: *E14. Minor Substation Expansion*.

4. E15: Underground Line Construction

   Although width varies, typically a minimum access width of 65 feet is required to allow for the trench excavation and construction of the duct bank. The covered activity construction area length varies based on the length of the line. During construction, trench excavation spoil is removed and stored. PG&E constructs underground line about once every 5 years. For a complete description of this Covered Activity, see MRHCP chapter 3: *Covered Activities*, section 3.3.4.4: *E15. Underground Line Construction*. This activity is limited to two miles in length. The following processes are included in this Covered Activity:

   Duct Bank Installation

   As the trench for the underground cable is completed, crew installs the cable conduit, reinforcement bar, ground wire, and concrete conduit encasement duct bank. The typical trench dimensions for installation of a single circuit are approximately 3 feet wide by 5 feet deep; however, trench depths vary, depending on soil stability and the presence of existing substructures. Dewatering, if necessary because of a high groundwater table, is

conducted using a pump to remove water from the trench. Construction crews then pump the water into baker tanks and haul it away for proper disposal.

Once the PVC conduits are installed, thermal-select or controlled backfill is imported, placed, and compacted. A road base backfill or slurry concrete cap then is installed.

Vault Installation

Vaults are constructed of prefabricated steel-reinforced concrete and are typically about 20 feet long, 10 feet wide, and 8 feet deep. The total excavation footprint for a vault is typically about 22 feet long, 12 feet wide, and 10 feet deep.

Cable Pulling, Splicing, and Termination

After installation of the conduit, cables are installed in the duct banks. Each cable segment is pulled into the duct bank, spliced at each of the vaults along the route, and terminated at the bus structures (switchboard) inside the switchyards.

Other Covered Activities

1. Biological Surveys and Handling

   PG&E's personnel or its contractors will perform biological surveys for covered species in hot zones and for large activities. The individuals conducting the surveys will have the qualifications specified in Service survey guidelines or as otherwise approved by the Service. If surveys require physical capture and immediate release of covered species, such as California tiger salamander, California red-legged frog and giant garter snake, an authorized biologist (a person who has the educational background, training, and work experience) will be used. Although these surveys are not expected to require handling of individuals in most instances, incidental take of covered species may result if handling is needed or if individuals are killed by vehicle strikes. Such surveys and take will be covered by the permit.

2. Management of Lands Purchased or Conserved for Mitigation

   The MRHCP will cover management activities (e.g., fencing, surveying, conducting pre-activity biological surveys, conducting habitat enhancements, driving on these lands) and the potential for take, including management activities carried out by any independent land manager with whom PG&E has contracted to perform such activities on PG&E's behalf. Further, restoration actions on conservation lands may also result in impacts that will provide a long-term improvement of species' habitat. One to five acres of disturbance per year is anticipated.

Conservation Strategy

<u>Overview</u>

The conservation strategy for the MRHCP is described in MRHCP chapter 5, *Conservation Strategy*, with sections important to our analysis summarized extensively for reference in the sections below.

The conservation strategy prioritizes avoidance of species habitat when possible. When habitat disturbance is not avoidable, a series of avoidance measures are prescribed for a given Covered Activity to minimize the amount of habitat disturbance, as well as injury and/or mortality, a Covered Species may experience. The Conservation Strategy is guided by the following five principles:

1. The avoidance and minimization of potential environmental impacts associated with covered activities is ensured by screening covered activities and assigning site-specific conservation measures to the activity, based on activity type, schedule, and location.

2. Avoiding impacts on habitat (i.e., implementing AMMs and BMPs) is preferable to mitigating or preserving habitat offsite.

3. Preserving lands for covered species with high-quality habitat or of high conservation value works in synergy with other local and regional conservation efforts.

4. Preserving large, contiguous areas of habitat is preferable to preserving a larger number of small areas.

5. Habitat mitigation lands will be protected and managed in perpetuity.

<u>Environmental Review, Planning, and Screening Process</u>

The foundation of the MRHCP's conservation strategy is PG&E's environmental review, planning, and screening process (summarized here, and described in full in Chapter 5, *Conservation Strategy*, section 5.4, *Environmental Review, Planning, and Screening Process*). This process is a stepwise process that evaluates covered activities before and sometimes after implementation. First, potential projects are screened by PG&E's internal planners and biologists to determine whether or not a project may affect a covered species or disturb their habitat. If it appears that a project will have affects to either a Covered Species or its habitat, various conservation measures (described in MRHCP Chapter 5, *Conservation Strategy*, section 5.5.1 *Avoidance and Minimization of Impacts*, and MRHCP Table 5-1) are assigned to the project. The type of mitigation owed (permanent or temporary) and how the amount will be determined, (pre-determined estimates or on-site inspection) is also determined through the environmental screening process.

Habitat Models for Covered Animal Species

Habitat models, GIS shapes depicting estimated species habitat within the Plan Area, have been developed for all Covered animal Species (Modeled Habitat). Habitat models are used as an alternative to on-the-ground surveys to determine whether or not a species might be present. The habitat models developed for the MRHCP are a coarse representation of habitat likely to be used by covered species in the Plan Area. Models are not static and may be updated during the duration of the MRHCP with concurrence of both the Service and PG&E as described in MRHCP chapter 5, section 5.4.1.1, *Use of Habitat Models*.

Hot Zones

A hot zone is a mapped area within modeled habitat containing an extant population of a Covered wildlife Species with a small and well-defined range, with greater risk that the species may be affected by covered activities. All modeled habitat is a Hot Zone for a

Covered Species that has been assigned a Hot Zone. Additional AMMs are assigned to Covered Activities when they occur in Hot Zones. Hot Zones exist for the following species:

Invertebrate hot zones:

- Longhorn fairy shrimp
- Conservancy fairy shrimp
- Morro shoulderband snail
- Zayante band-winged grasshopper
- Mount Hermon June beetle
- Ohlone tiger beetle

Amphibian hot zone:

- Santa Cruz long-toed salamander

Mammal hot zone:

- Point Arena mountain beaver

Use of Habitat Models for Animal Species Mitigation

Covered Activities larger than or equal to 0.10-acre within Modeled Habitat will require post-construction surveys to determine the amount of temporary habitat disturbance and permanent habitat loss that has occurred. These totals will be used to determine the amount of mitigation that is to be deducted from PG&E's available mitigation. For activities smaller than 0.1-acre, impact estimates from MRHCP Chapter 4, Table 4-1, will be used to determine the amount of temporary habitat disturbance and permanent habitat loss to be used for mitigation purposes. Additionally, PG&E will periodically validate a subset of these activities, as described in Chapter 6, *Plan Implementation and Funding*, to ensure that average on-the-ground impacts are similar to the estimates in MHRPC Table 4-1, and that habitat impacts do not exceed estimates. Activities G1, G2, G6, E1, E2, and E8a are not expected to result in ground disturbance and, therefore, are unlikely to cause loss of covered species habitat.

Exceptions to Use of Modeled Habitat in Determining Mitigation

Valley elderberry longhorn beetle:

PG&E will use its existing valley elderberry longhorn beetle database to account for the number of shrubs pruned and removed each year. Mitigation will be calculated annually in association with the number of shrubs subject to permanent or temporary impacts, rather than impacts on modeled habitat. Using a 2:1 ratio for permanent habitat loss, and a 0.25:1 ratio for temporary impacts, PG&E will multiply the number of shrubs pruned and removed by 0.041 acres, the number used by the Service in the *Framework for Assessing Impacts to the*

Valley Elderberry Longhorn Beetle (Service 2017a), to calculate annual impacts and mitigation.

Foothill yellow-legged frog, mountain yellow-legged frog and Yosemite toad:

PG&E will use the habitat models for these species to inform where site-specific habitat assessments should be conducted. If land cover with suitable aquatic or dispersal habitat will be affected by a covered activity, PG&E will mitigate those impacts. PG&E will conduct site-specific surveys for these species to determine if habitat impacts will result. If, over time, surveys prove ineffective or inefficient (i.e., the cost of surveys exceeds the cost of mitigation), PG&E, with USFWS concurrence, may revert to the use of habitat models to evaluate impacts and determine mitigation.

Map Book Zones and Covered Plants

The conservation strategy for Covered Plants is based on PG&E's Map Book Zone process, described in MRHCP Chapter 5, section 5.4.2, *Screening for Covered Plants*. Map Book zones are defined as areas occupied or potentially occupied by one or more covered plant species and indicate where plant-related AMMs will be applied.

Avoidance, Minimization, and Mitigation of Impacts to Covered Plants in Map Book Zones

The avoidance, minimization, and mitigation strategy for covered plants differs depending on the size of the activity. For activities of less than 0.1-acre within Map Book zones, PG&E will determine whether or not AMMs can be implemented. If the impact is minimized but not avoided, or if it is not feasible to implement an AMM, a post-activity survey may be performed by PG&E (at its discretion) to determine whether plants were permanently impacted by the activity. If a post-activity survey is not performed, PG&E will assume the activity results in a permanent impact and mitigation will be based on the average area of disturbance for the type of small activity that was completed, as depicted on table 4-1 in chapter 4 of the MRHCP.

For activities greater than or equal to 0.1-acre within Map Book zones, additional site-specific review or surveys will be conducted to confirm the location of existing plant populations relative to work sites. Based on the Map Book zone and results of a site evaluation, PG&E will implement AMMs appropriate to the species for which the map book zone exists. If the impact cannot be avoided, PG&E will prepare a restoration plan for USFWS to review and approve. PG&E will adhere to the restoration plan (further described in MRHCP chapter 5, section 5.6.2.5 *Mitigation Summary for Plants*). Subsequent monitoring will determine whether the impact is permanent or temporary. PG&E will provide mitigation for large activities based on the number of plants impacted or based on the amount of habitat impacted and will monitor mitigation sites for success. For some large emergency activities, work may be implemented in a Map Book zone without additional evaluation or AMMs. In these instances, PG&E will conduct post-activity surveys to determine if the species has recovered or will mitigate impacts as if they were permanent.

Restoration plans shall include the following information:

1. An assessment of the impact site;

2. Methods for collecting, storing, or propagating plant material from the impact site;

3. Information on site preparation and reintroduction of collected plant material; measurable success criteria that can be achieved within a 3 year period;

4. Adaptive management measures to ensure the desired success criteria are achieved;

5. Monitoring and reporting methods and schedules;

6. Funding sources and responsible parties;

7. The acreage or number of individual plants expected to benefit from implementing the restoration plan.

Avoidance, Minimization, and Mitigation of Impacts to Covered Plants Outside of Map Book Zones

For large activities implemented outside of Map Book zones, PG&E may discover additional occurrences or suitable habitat for a covered species during environmental review. New CNDDB occurrences of Covered Plants will be added to the Map Book zones and treated as Map Book Zones. If a biologist determines that the species is likely present given the range and specific habitat requirements for the covered plant, the biologist will conduct additional analyses and may initiate a survey. If the survey cannot be conducted during the correct seasonal window, the work will be performed in accordance with AMMs to minimize impacts. If the survey is conducted during the correct seasonal window, the survey will determine either the presence or absence of the species. If the species is present, PG&E will select the appropriate AMMs. If the impact cannot be avoided or if an annual plant species (for example) does not recover, PG&E will prepare a restoration plan for the Service to review and approve. PG&E will implement the restoration plan, and subsequent monitoring, which will help determine whether the restoration is successful and whether the impact is permanent or temporary. Further mitigation, if any, will be based on the results of the monitoring effort.

Plant Salvage and other Minimization

PG&E will salvage plants as follows prior to commencing a Covered Activity:

PG&E will salvage individual plants in advance of impact and replant them within PG&E's ROW. Similarly, if impacts on annual plant species are unavoidable, PG&E will salvage topsoil and replace it within the ROW. PG&E will monitor the success of the replanting of perennial species and recovery of annual species for 3 years, unless the species is shown to have recovered sooner. If during this time the number of individual plants is not equal to or within normal variation of the number of individuals originally removed, then PG&E will pursue other mitigation options to ensure that mitigation is implemented at the appropriate ratio (see *Conservation Strategy*; *Mitigation*; *Mitigation for Covered Plants* section of this Biological Opinion below).

Mitigation options for impacts on perennials may include propagation of replacement stock for planting in suitable habitat within the ROW, where it will not conflict with operation or maintenance of utility facilities.

Additional measures to minimize effects of covered activities on plants include on a site-specific basis (1) relocating aboveground facilities away from occupied habitat (but still

within and subject to existing easements) on a case-by-case basis if feasible and allowable for safe and reliable operations; or (2) removing noxious weeds to expand habitat for annual species. If a conservation easement is not feasible for these lands because private owners are unwilling, PG&E will comply with the success criteria outlined in the restoration or management plan to ensure the population persists. USFWS approval of the plan and success criteria will be required.

Avoidance and Minimization Measures

The MRHCP's avoidance and minimization measures are described in MRHCP Chapter 5, section 5.5.1, *Avoidance and Minimization of Impacts*. The MRHCP has several categories of AMMs: field protocols, Hot Zone Measures, Species Specific Avoidance and Minimization Measures, and Covered Plant Avoidance and Minimization Measures. AMMs are assigned to individual projects through the Environmental Review, Planning, and Screening process. The AMMs are described on MRHCP table 5-1 and summarized below.

Field Protocols

Field protocols are PG&E's general measures designed to avoid or minimize impacts covered species and/or their habitat during performance of covered activities. Field protocols are assigned to projects within Modeled Habitat through PG&E's environmental review, planning, and screening process.

Hot Zone Measures

Hot Zone Measures are similar to Field Protocols, but are implemented within modeled habitat for specific species to provide an additional level of avoidance and minimization of certain species. All modeled habitat for species with Hot Zones is considered to be a Hot Zone. See *Hot Zones* above.

Species-Specific Avoidance and Minimization Measures

Species-specific avoidance measures are additional measures assigned to large (greater than or equal to 0.10-acre) activities, specifically: electrical transmission line reconductoring (Covered Activity E9a in the MRHCP); power pole and tower line construction and electrical substation expansion (Covered Activities E12-E14 in the MRHCP); gas valve replacement (Covered Activity G7 in the MRHCP; and pipeline lowering, pipeline coating replacement, and pipeline replacement (Covered Activities G9-G11 in the MRHCP).

Covered Plant Avoidance and Minimization Measures

Covered Plant Avoidance and Minimization Measures are similar to Field Protocols, but are designed to avoid and/or minimize disturbance to habitat for Covered plant Species, and/or avoid damage or destruction of Covered plant Species. Covered Plant Avoidance and Minimization Measures are part of the Map Book Zone process and are assigned through the Environmental Review, Planning, and Screening process.

Vegetation Management Best Management Practices

In addition to the AMM categories described above, the MRHCP contains a list of Best Management Practices (BMP, MRHCP Table 5-2) intended to be implemented during all

Covered Activities that include Vegetation Management. These measures are assigned through the Environmental Review, Planning, and Screening process, and are additive with the AMMs described in MRHCP Table 5-1.

Additionally, surveys for nesting birds are performed for Vegetation Management Covered Activities. If nests are discovered, specialists prescribe measures to avoid disturbing nests, which may include delaying work until nests are no longer occupied. These measures are in addition to AMMs that avoid or minimize effects on Covered bird Species in Table 5-1.

Prior to commencing, Vegetation Management Covered Activities within 25 feet of riparian zones are subject to extra scrutiny as described in MRHCP chapter 5, section 5.5.1.4, *Vegetation Management Best Management Practices to Reduce Environmental Impacts*. Information about the habitat at the activity location is gathered from a pre-activity survey and compiled into a Riparian Review Form, which is then sent to the Environmental Review, Planning, and Screening team for additional review. AMMs and BMPs are assigned by the team to Vegetation Management Covered Activities based on the information in the report.

Mitigation

Temporary disturbance to and permanent loss of Modeled Habitat for Covered Species will be mitigated with equivalent or higher-value habitat. The approach to mitigation described in chapter 5, section 5.6.1, *Approach to Mitigation*, emphasizes permanent protection of habitat for Covered Species through fee acquisition and/or conservation easement as the highest priority. PG&E also is expected to mitigate by purchasing credits from approved conservation banks, funding restoration or other recovery efforts, and partnering with conservation entities or other approved HCPs to jointly accomplish a mitigation option described above, with the exception of purchasing credits at a bank.

Jump Start Provision

PG&E has secured, or is in the process of securing, lands intended to provide mitigation for the impacts of the taking anticipated to result from Covered Activities. MRHCP Table 5-6 describes these pre-permit-issuance acquisitions.

Stay-Ahead Provision

As described in MRHCP chapter 5, section 5.6.1.2, *Stay Ahead Provision*, PG&E will "stay ahead" of impacts, meaning PG&E will provide mitigation in advance of impacts in a given covered species' habitat in a given region, or will mitigate at a slightly higher ratio if advance mitigation is not provided. In this context, the word "impacts" means habitat disturbance or loss.

If mitigation deficit of any kind exists for any Covered Species for two consecutive calendar cycles PG&E will provide additional mitigation. Temporary impacts will be mitigated at an additional 0.5:1 ratio, and permanent impacts will be mitigated at an additional 1:1 ratio. Additionally, mitigation shall not be in arrears for more than 2 years. Finally, prior to permit expiration, PG&E will be responsible for any outstanding mitigation requirements in the permit.

Mitigation for Permanent Habitat Loss for Covered Animal Species

Permanent impact (habitat loss) is defined in the MRHCP as damage to habitat that does not recover within 1 year of the completion of a Covered Activity. PG&E will mitigate permanent

impacts on modeled habitat for covered species at a 3:1 ratio (3 acres mitigated for every 1 acre permanently impacted), except for VELB, at a 2:1 ratio, and San Joaquin kit fox moderate-value and low-value habitat, which will be mitigated at 1:1 and 0.5:1, respectively. PG&E will provide mitigation for impacts on a specific location only once during the duration of the HCP, even if subsequent impacts occur in the same location. For permanent impacts, it will be assumed that the impacted location will be permanently lost, and so subsequent impacts within the footprint of those impacts will not require further mitigation.

Mitigation for Temporary Habitat Disturbance for Covered Animal Species

Temporary impact (habitat disturbance) is defined as disturbances to habitat for Covered Species that recovers within one year following the completion of a Covered Activity. There is a wide range of ratios for temporary impacts, as described below:

- Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, Zayante broad-banded grasshopper, and Morro shoulder-banded snail: 0.5:1 ratio.
- Valley elderberry longhorn beetle: 0.25:1 ratio.
- California tiger salamander (both Central California and Santa Barbara DPS) breeding habitat: 1:1 ratio.
- California tiger salamander (both Central California and Santa Barbara DPS) upland habitat: 0.5:1 ratio.
- California red-legged frog, foothill yellow-legged frog, and Santa Cruz long-toed salamander breeding habitat: 1:1 ratio.
- California red-legged frog and Santa Cruz long-toed salamander upland habitat: 0.5:1 ratio.
- Foothill yellow-legged frog dispersal habitat: 0.5:1 ratio.
- Sierra Nevada yellow-legged frog, mountain yellow-legged frog, and Yosemite toad: 0.5:1 ratio.
- Giant garter snake aquatic habitat: 1:1 ratio
- Giant Garter Snake upland and rice habitat: 0.1:1 ratio.
- Blunt-nosed leopard lizard suitable and core habitat: 0.5:1 ratio.
- Marbled murrelet and northern spotted owl suitable habitat: 0.5:1 ratio.
- Point Arena mountain beaver suitable habitat: 0.5:1 ratio.
- Giant kangaroo rat suitable habitat: 0.5:1 ratio.
- San Joaquin kit fox high value habitat: 0.5:1 ratio.

- San Joaquin kit fox low- and moderate-value habitat: 0.1:1 ratio.

Mitigation for Covered Plants

Mitigation will be provided for permanent impacts to Covered plant Species. Permanent impacts are defined as the absence of the plants subsequent to, and as a result of, a Covered Activity. PG&E will provide both planting offsets and permanent habitat conservation for permanent impacts to covered plants as follows:

1. For permanent impacts to Covered Plants, PG&E will plant new plants at a 3:1 ratio, meaning that for each plant that is permanently impacted, PG&E will provide plant three new plants.

2. For every acre of permanent habitat loss of a given covered plant, PG&E will mitigate by conserving habitat for that plant at a 1:1 ratio, meaning that for every acre permanently lost, PG&E will secure 1 acre of habitat through a mechanism identified in the section titled *Options for Mitigation* below.

PG&E will not provide mitigation for temporary impacts on plants, including pruning or temporary disturbance to topsoil.

Options for Mitigation

PG&E is expected to utilize all of the following approaches to fulfill its mitigation obligations throughout the permit term.

1. Fee Title

   PG&E may purchase lands in fee from willing sellers. Lands purchased in fee will be protected through a conservation easement or equivalent site protection mechanism approved by USFWS and will include a management plan and associated endowment. Enhancement or restoration activities may occur on these lands to make them more suitable for covered species.

   Approval Process

   The approval process for Fee Title mitigation acquisition is described in MRHCP Chapter 5, section 5.6.4.1, *Approval Process for Fee Title and Easements*. The process is a 6-step process summarized briefly as follows:

   1) PG&E submits information about the site to the Service for early/preliminary approval;

   2) The Service either gives or withholds preliminary approval;

   3) If preliminary approval is granted, PG&E develops and submits to the Service a formal acquisition package which contains a draft conservation easement, management plan, phase I environmental assessment, preliminary title report, site map, and other documentation as described in the MRHCP;

   4) The Service reviews the package for completeness, suggests modifications to documents, and communicates the requested changes to PG&E;

5) PG&E makes changes to the documents or discusses them with the Service, and resubmits the documents to the Service;

6) The Service makes a final approval or rejection decision for the site, and if approved, PG&E completes the acquisition by recording the conservation easement, funding the conservation endowment, and completing other tasks as necessary to finalize the acquisition.

Mitigation Credit Release Procedure

PG&E will receive 25% of its mitigation value (in acres) when the land is secured by a contract to purchase (i.e., optioned), 50% of its mitigation value upon acquisition, and the remaining 25% upon finalizing the management plan, recording the conservation easement and funding the endowment. If the land or easement is not acquired, PG&E will ensure that the 25% of the mitigation value that it had available when the land was intended to be purchased is deducted from PG&E's available mitigation. If covered activities have taken place that required deductions from the available mitigation, and that causes PG&E to owe mitigation for covered activities, the procedures describe in the *Stay-Ahead Provision* section above will apply.

2. Conservation Easements

PG&E may purchase conservation easements from willing sellers. A management plan and associated endowment will also be included. PG&E also owns several parcels of land that have high conservation values and may be suitable for mitigation. Either PG&E or the land conservation organization may also conduct enhancement or restoration activities on these lands to make them more suitable for covered species.

Approval Process

The approval process for conservation easements is the same as the approval process for Fee Title acquisitions described above.

Mitigation Credit Release Procedure

The procedure for releasing mitigation credit for lands secured with conservation easements follows the procedures for Fee Title acquisitions described above.

3. Conservation Partnerships

These types of contributions to regional conservation planning efforts have the advantage of building on or expanding existing species-focused conservation with immediate benefit to covered species.

PG&E may partner with conservation organizations to further regional conservation efforts. This option may take different forms. PG&E may contribute funds towards land acquisition or management carried out by another conservation entity. PG&E may also contribute finances or in-kind services to further conservation performed under other HCPs/NCCPs with which it may overlap.

Financial and In-Kind Contribution to Local Land Managers

PG&E may contribute financial or in-kind services if the Service agrees contributions are likely to have direct benefits to covered species on the public lands where covered species impacts may occur. Such contributions by PG&E would be subject to Service review and approval. This type of mitigation will have a discrete timeline for implementation; will result in covered species habitat restoration or enhancement; and will demonstrate a measurable benefit to the species while satisfying a portion of PG&E's mitigation needs.

Financial and In-Kind Contribution to Restoration Efforts

PG&E may contribute financial or in-kind contributions to restoration efforts that benefit habitat for one or more Covered Species. Once an opportunity, including acreage of benefit, is identified financial or in-kind contributions would need the approval of the Service.

Approval Process

The approval process for conservation partnerships is described in MRHCP Chapter 5, section 5.6.4.2 *Approval Process for Conservation Partnerships*, and is summarized below.

PG&E will develop a proposal for these sorts of contributions indicating the amount to be contributed, the types of activities on which funds will be spent, and the species expected to benefit from the contribution, and other relevant information. The Service will review the proposal within 30 working days of submittal and indicate whether the proposal is: (1) complete and acceptable, (2) acceptable with modifications, or (3) incomplete. If complete, PG&E can finalize the contribution. If the Service requests modifications, PG&E and the Service will discuss modifications until the proposal is acceptable to the Service, at which time the contribution will be finalized.

Mitigation Credit Release Procedure

For land management and restoration and creation efforts, 50% of the conservation values approved by the Service will be released upon PG&E's contribution of funding to the entity. The remaining 50% of the conservation values will be released upon achievement of performance standards for the mitigation land.

For conservation partnership land that is proposed for habitat restoration or creation, PG&E will receive 25% of its mitigation value upon Service approval of design drawings, 50% value upon completion of construction, and the remaining 25% upon fulfillment of success criteria. However, if the project fails to meet success criteria, the compliance credit will be reduced to match the extent to which success criteria have been met. If design drawings are approved, but construction of conservation action is not started within 1 year of the approval of those drawings, PG&E will remove all credited mitigation from its mitigation available for debit. PG&E may request from the Service a single, 1-year time extension to implement the conservation action.

4. Conservation/Mitigation Banks

PG&E may purchase credits from an approved conservation or mitigation bank within the Plan Area or Integrated Plan Area. In addition, on a case-by-case basis subject to Service approval, PG&E may obtain mitigation credits created as part of a California Department of

Fish and Wildlife Regional Conservation Investment Strategy (RCIS). The physical location of any conservation bank must be within the Plan Area or Integrated Plan Area. There is no approval process for this mitigation option outside of that which exists for any other conservation banking transaction. Mitigation credits purchased from banks are available for PG&E to use immediately after being purchased.

5. Habitat Enhancement and Restoration

PG&E may fund specific enhancement and restoration projects to benefit the Morro shoulderband snail, Zayante band-winged grasshopper, Santa Cruz long-toed salamander, and most covered plants. In some instances, other restoration enhancement and restoration efforts for more common species may also serve as mitigation; examples include dredging ponds to make them more suitable for California red-legged frog, creating new aquatic habitat, or contributing to bullfrog eradication efforts. PG&E will work closely with the Service to gain agreement on the number of mitigation credits that will be generated from an enhancement or restoration activity before fulling committing any financial resources. Enhancement or restoration would create credits that PG&E would be able to use in the future to offset future impacts on covered species.

Approval Process

The approval process for habitat restoration and enhancement is described in MRHCP Chapter 5, section 5.6.4.4 Approval Process for Offsite Habitat Enhancement and Restoration, and is summarized below.

PG&E must submit a proposal to the Service for review and approval identifying the species expected to benefit, how the actions will benefit the species, how long the improvements are intended to benefit the species, the schedule and cost associated with the enhancement or restoration action, and success criteria.

Mitigation Credit Release Procedure

Conservation values associated with restoration and enhancement projects will be released incrementally. PG&E will receive 25% of its mitigation value upon Service approval of design drawings, 50% of value upon completion of construction, and the remaining 25% of mitigation value upon fulfillment of success criteria. However, if the project fails to meet success criteria, the compliance credit will be reduced to match the extent to which success criteria have been met. If design drawings are approved but construction is not started within 1 year of the approval of those drawings, PG&E will remove all credited mitigation from its mitigation available for debit. PG&E may request from the Service a single, 1-year time extension to implement the land management, creation, or restoration.

Mitigation Debit Process

PG&E will maintain a ledger of mitigation acreage acquired and used to compensate for impacts from covered activities. This ledger will include information on the acres of species habitat that is available for each species from the total credits available from mitigation parcels. These acres will be tracked as species-acre credits, and will be debited as part of each year's annual accounting of species' impact and mitigation needs. PG&E will retain any surplus mitigation

credits at the end of the permit duration or upon permit termination for use on future PG&E activities.

Mitigation Lands Selection

The complete description for selecting mitigation lands, including preferred site criteria, site location characteristics, and the contents of management plans is found in MRHCP Chapter 5, Section 5.6.6 *Selection, Location, and Management of Habitat Mitigation Lands*. Required contents of management plans are found in MRHCP Chapter 5 Section 5.6.6.3 *Mitigation Management Plans*.

In order for a site to be considered for acquisition to satisfy mitigation requirements in the MRHCP, it must meet one of the following two criteria, with species presence being preferred:

1. Species presence.

2. For species with frequent population fluctuations (e.g., butterflies), that are difficult to detect species (e.g., giant garter snake, or that may only infrequently be present on a given parcel (e.g., San Joaquin kit fox), suitability of the habitat for a Covered Species may be used. Suitability is determined by one of the following:

    a. Biologist provides qualitative assessment of the presence, suitability for presence, or ability of the site to support species, based on vegetation structure, plant community associations, proximity to CNDDB or other known occurrences, or observations of scat or other signs of covered species' presence or use of a site.

    b. Property contributes to protecting important corridors for a Covered Species

Pre-Action Mitigation Acquisitions

PG&E has begun securing lands to meet the mitigation obligations anticipated to occur during implementation of the MRCHP. These pre-action acquisitions are described in MRHCP Chapter 5, section 5.6.8 *Pending Interim Conservation Lands*.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action." For the proposed project, the action area is the Plan Area and the Integrated Plan Area described in the *Description of the Proposed Action* of this Biological Opinion.

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; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-federal activities in the action area on the species. The *Effects of the Action* and *Cumulative Effects* are added to the *Environmental Baseline* and in light of the status of the species, the Service formulates its opinion as to whether the proposed action is likely to jeopardize the continued existence of the listed species.

Analytical Framework for the Adverse Modification Determination

Section 7(a)(2) of the Act requires that federal agencies insure that any action they authorize, fund, or carry out is not likely to destroy or to adversely modify designated critical habitat. A final rule revising the regulatory definition of "destruction or adverse modification" (DAM) was published on August 27, 2019 (84 FR 44976). The final rule became effective on October 28, 2019. The revised definition states:

> "*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 DAM analysis in this biological opinion relies on four components: (1) the *Status of Critical Habitat*, which describes the current rangewide condition of the critical habitat in terms of the key components (i.e., essential habitat features, primary constituent elements, or physical and biological features) that provide for the conservation of the listed species, the factors responsible for that condition, and the intended value of the critical habitat overall for the conservation/recovery of 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 conservation/recovery of the listed species; (3) the *Effects of the Action*, which determines all consequences to designated critical habitat that are caused by the proposed federal action on the key components of critical habitat that provide for the conservation of the listed species, and how those impacts are likely to influence the conservation value of the affected critical habitat; and (4) *Cumulative Effects*, which evaluate the effects of future non-federal activities that are reasonably certain to occur in the action area on the key components of critical habitat that provide for the conservation of the listed species and how those impacts are likely to influence the conservation value of the affected critical habitat. The *Effects of the Action* and *Cumulative Effects* are added to the *Environmental Baseline* and in light of the status of critical habitat, the Service formulates its opinion as to whether the action is likely to destroy or adversely modify designated critical habitat. The Service's opinion evaluates whether the action is likely to impair or preclude the capacity of critical habitat in the action area to serve its intended conservation function to an extent that appreciably diminishes the rangewide value of critical habitat for the conservation of the listed species. The key to making that finding is understanding the value (i.e., the role) of the critical habitat in the action area for the conservation/recovery of the listed species based on the *Environmental Baseline* analysis.

Status of the Species

Beach Layia

For the most recent comprehensive assessment of the species' rangewide status, please refer to the beach layia *(Layia carnosa) 5-year Review: Summary and Evaluation* (Service 2011a). The 5-year review recommended downlisting the species to threatened due to extensive conservation and habitat management. Threats evaluated during that review and discussed in the final document have continued to act on the species since the November 2011 5-year review was finalized, with loss of habitat as a result of increased invasive plant species cover being the most significant effect. The Service has not issued a biological opinion of jeopardy for the species.

Approximately 90% of occupied beach layia habitat is protected, and about half is managed to benefit the layia. However, invasive plants, notably European beachgrass (*Ammophila arenaria*), overstabilize dune systems and can outcompete beach layia. Restoration has alleviated the impacts of invasive species, but recurring maintenance is required to reduce re-infestations.

Blunt-nosed Leopard Lizard

For the most recent comprehensive assessment of the species' rangewide status, please refer to the blunt-nosed leopard lizard (*Gambelia sila*) *5-year Review: Summary and Evaluation* (Service 2010a). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the February 2010 5-year review was finalized, with loss of habitat being the most significant effect. While there have been continued losses of blunt-nosed leopard lizard habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Some conservation has been completed for the blunt-nosed leopard lizard throughout its range. Notably, the Carrizo Plains National Monument protects approximately 200,000 acres, some of which is suitable habitat for the lizard. Habitat loss and fragmentation resulting from agricultural activities and conversion, development, and oil and gas exploration and extraction continue to threaten the species.

California red-legged Frog

<u>Listing Status</u>
The California red-legged frog was listed as a threatened species on May 23, 1996 (Service 1996a). Critical habitat was designated for this species on April 13, 2006 (Service 2006a), with revisions to the critical habitat designation published on March 17, 2010 (Service 2010b). At that time, the Service recognized the taxonomic change from *Rana aurora draytonii* to *Rana draytonii* (Shaffer et al. 2010). The Service's Recovery Plan for the California red-legged frog (*Rana aurora draytonii*) (Recovery Plan) was published for the California red-legged frog on September 12, 2002 (Service 2002a). For a description of the species and a discussion of the habitat, life history and recovery objectives, please see the Recovery Plan (Service 2002a).

<u>Status and Distribution</u>
The historical range of the California red-legged frog extended from central Mendocino County and western Tehama County south in the California Coast Range to northern Baja California, Mexico, and in the Sierra Nevada/Cascade Ranges from Shasta County south to Madera County

(Jennings and Hayes 1994). The species historically occurred from sea level to elevations of about 5,200 feet in 46 counties; however, currently the taxon is extant in 238 streams or drainages within only 22 counties, representing a loss of 70 percent of its former range (Service 2002a). Isolated populations persist in several Sierra Nevada foothill locales and in Riverside County (Barry and Fellers 2013; Backlin et al. 2017; CDFW 2017; Gordon, R. and J. Bennett, pers. comm., 2017). The species is no longer considered extant in California's Central Valley due to significant declines caused by habitat modifications and exotic species (Fisher and Shaffer 1996). Currently, the California red-legged frog is widespread in the San Francisco Bay nine-county area (CDFW 2017). They are still locally abundant within the California coastal counties from Mendocino County to Los Angeles County and presumed extirpated in Orange and San Diego counties (CDFW 2017; Yang, D. and J. Martin, pers. comm., 2017; Gordon, R. and J. Bennett, pers. comm., 2017). Baja California represents the southernmost edge of the species' current range (Peralta-García et al. 2016).

Barry and Fellers (2013) conducted a comprehensive study to determine the current range of the California red-legged frog in the Sierra Nevada, concluding that it differs little from its historical range; however, the current Sierra Nevada populations appear to be small and tend to fluctuate. Since 1991, eleven California red-legged frog populations have been discovered or confirmed, including eight probable breeding populations (Barry and Fellers 2013; Mabe, J., pers. comm., 2017). Microsatellite and mitochondrial DNA analysis by Richmond et al. (2014) confirmed the Sierra Nevada populations of the California red-legged frog are genetically distinct from each other, as well as from other populations throughout the range of this species. The research concluded that the Sierra Nevada populations are persisting at low levels of genetic diversity and no contemporary gene flow across populations exist. On a larger geographic scale, range contraction has left a substantial gap between Sierra Nevada and Coast Range populations, similar to the gap separating the Southern California and Baja California populations (Richmond et al. 2014).

Threats

Habitat loss and fragmentation, urban encroachment and introduced non-native species are the primary threats to California red-legged frog throughout its range. Aquatic habitat has been lost to development, agriculture and repair of levees and irrigation structures that created perennial habitat. Suitable aquatic habitat has been fragmented by development, infrastructure and agriculture such that breeding populations have become isolated. Urbanization of California red-legged frog habitat has affected the species. These declines are attributed to channelization of riparian areas, enclosure of the channels by urban development and introduction of predatory fishes and bullfrogs (*Lithobates catesbeianus*). California red-legged frogs have disappeared from systems that support bullfrogs, red swamp crayfish (*Procambarus clarkia*), signal crayfish (*Pacifastacus leniusculus*), goldfish (*Carassius auratus*), common carp (*Cyprinus carpio*) and mosquito fish (*Gambusia affinis*) (Jennings and Hayes 1990, Twedt 1993, Fisher and Schaffer 1996). Disease may pose a significant threat. Chytridiomycosis and ranaviruses are a potential threat because these diseases have been found to adversely affect other amphibians (Davidson et al. 2003, Lips et al. 2006).

California Tiger Salamander (Central California Distinct Population Segment)

For the most recent comprehensive assessment of the species' rangewide status, please refer to the recovery plan for the central California distinct population segment of the California tiger salamander (*Ambystoma californiense*) (Service 2017b). No change in the species' listing status was recommended in this recovery plan. Threats evaluated Threats evaluated during that review

and discussed in the final document have continued to act on the species since the June 2017 recovery plan was finalized, with loss of habitat being the most significant effect. While there have been continued losses of California tiger salamander habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

The central California DPS is threatened by habitat loss and fragmentation as a result of agricultural activities and conversion, and development. Competition and predation by invasive species also threatens the central California DPS, particularly in aquatic breeding habitat. Hybridization with barred tiger salamanders (*Ambystoma tigrinum*) is an increasing threat to the species. Some suitable breeding and upland habitats have been conserved for the California tiger salamander as a result of section 7 consultations, habitat conservation plans, and mitigation banks.

California Tiger Salamander (Santa Barbara DPS)

For the most recent comprehensive assessment of the species' rangewide status, please refer to the recovery plan for the Santa Barbara County distinct population segment of the California tiger salamander (*Ambystoma californiense*)(Service 2016a). No change in the species' listing status was recommended in this recovery plan. Threats evaluated during that review and discussed in the final document have continued to act on the species since the December 2016 recovery plan was finalized, with loss of habitat being the most significant effect. While there have been continued losses of California tiger salamander habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

While some areas have been protected for the Santa Barbara DPS of California tiger salamander, they are still threatened by habitat loss and fragmentation. The Santa Barbara DPS occurs in metapopulations; that is, there are groups of populations that have some genetic exchange of individuals. The continued loss and fragmentation of suitable breeding and upland habitats can isolate populations within the metapopulation, reducing the viability of the metapopulation. Habitat degradation from changes to hydrology, invasive species, and runoff from development and agriculture may further impact the species.

Conservancy Fairy Shrimp

For the most recent comprehensive assessment of the species' rangewide status, please refer to the conservancy fairy shrimp (*Branchinecta conservatio*) *5-year Review: Summary and Evaluation* (Service 2012a). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the June 2012 5-year review was finalized, with loss of habitat being the most significant effect. While there have been continued losses of conservancy fairy shrimp habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Many of the known populations are protected, but they are widely dispersed throughout California and are isolated from each other. Occupied habitat may be loss to development or agriculture. The loss of unoccupied habitat adjacent to populations reduces the opportunity for colonization of new areas. The isolated and fragmented nature of the conservancy fairy shrimp's distribution makes them vulnerable to stochastic events, drought, and climate change.

Foothill yellow-legged Frog

Listing Status

The foothill yellow-legged frog is not currently listed under the Act, nor does it have designated critical habitat. Foothill yellow-legged frog was petitioned for listing in 2012, and the Service determined that the petition provided substantial scientific or commercial information that indicated the petitioned action may be warranted (Service 2015). The species is currently under review.

Habitat and Life History

Foothill yellow-legged frog inhabits streams and rivers with sunny, sandy, and rocky banks, deep pool, and shallow riffles in a variety of habitats, including woodlands, conifer forests, valley-foothill riparian, coastal scrub, chaparral, and wet meadows (California Department of Fish and Game (CDFG) 2000, Stebbins and McGinnis 2012). Adults bask on exposed rock surfaces near streams and, when disturbed, seek refuge beneath submerged rocks and sediments (CDFG 2000, Stebbins and McGinnis 2012). Adults feed on a wide range of insects and are a known to eat snails (Stebbins and McGinnis 2012). Tadpoles graze on algae and diatoms attached to rocky stream bottoms (CDFG 2000). Tadpoles require at least three to four months in aquatic habitat to complete metamorphosis (CDFG 2000). Along intermittent streams large aggregations of adults have been observed at locations of quiet persistent water (i.e., pools) during the dry season (Stebbins and McGinnis 2012). The behavior and resources needs of overwintering frogs is poorly understood (Hayes et al. 2016). Fall and winter habitat includes small perennial tributary streams and adjacent riparian habitat but more research is needed on overwintering sites (Hayes et al. 2016, Olson and Davis 2009).

Foothill yellow-legged frogs are a highly aquatic amphibian, spending most or all of their life in or near streams (CDFG 2000). Adult foothill yellow-legged frogs have high site fidelity and typically occupy small home ranges. Normal home ranges are probably less than 33 feet (10 m), with occasional long distance movements of 165 feet (50 m)(CDFG 2000). Seasonal movements or migrations from breeding areas have reported to range between 450-7,043 m, recently metamorphosed frogs show a strong tendency to migrate upstream, perhaps as an evolutionary mechanism to repatriate individuals washed downstream during the larval stage, and frogs have been found 50-80 m from water (Ashton et al. 1997, CDFG 2000, Olson and Davis 2009).

Foothill yellow-legged frogs in California generally breed between March and early June, usually waiting until high spring flows have subsided (Ashton et al. 1997, CDFG 2000). Females typically deposit eggs in clusters of 200 to 300, which are attached to gravel and cobble in moving water near stream margins, though they have also been observed attaching eggs to aquatic vegetation and woody debris (Ashton et al. 1997, CDFG 2000). Eggs can hatch in five to 30 days depending on water temperature (Ashton et al. 1997). Metamorphosis generally occurs approximately 12–16 weeks after oviposition and is also generally temperature dependent (Ashton et al. 1997). Maturity is typically reached when the frog is 40 mm (snout-urostyle length) and breeding typically occurs in the second post-metamorphic year (Ashton et al. 1997).

Status and Distribution

The known elevation range of the species extends from near sea level to approximately 6,700 feet above sea level (Stebbins 2003). The current range excludes coastal areas south of northern San Luis Obispo County and foothill areas south of Fresno County, where the species is apparently extirpated (Jennings and Hayes 1994). The foothill yellow-legged frog is still common along the north coast of California (Fellers, as cited Stebbins and Cohen, 1995). Fellers

(1994, as cited in ICF International, 2012) reported healthy, reproducing populations throughout suitable habitat in the Diablo Range in Alameda, western Stanislaus, Santa Clara, San Benito, and western Fresno Counties.

Historically, foothill yellow-legged frogs occurred in most Pacific drainages from the Santiam River in Oregon to the San Gabriel River in Los Angeles County, and in the interior foothills and mountains from the Oregon border into southern California (Jennings and Hayes 1994). An isolated population was reported in Sierra San Pedro Martir, Baja Mexico (Feller 2005).

The species is still moderately abundant in coast drainages north of Monterey Bay, but numerous historic populations appear to have been lost on the western slopes of the Sierra Nevada, especially in the southern part of its range (Stebbins and McGinnis 2012). Many of these extirpations are associated with the damming and regulation of stream flow that leads to habitat loss and unnatural flow regimes (Ashton et al. 1997; Stebbins and McGinnis 2012). Periodic water releases (pulse flows) from upstream Sierra reservoirs during the breeding period can scour eggs from their attachments sites and washout and kill tadpoles (Kupferberg et al. 2008, Stebbins and McGinnis 2012). Furthermore, decreased flows can force adult frogs to move into permanent pools, where they may be more susceptible to predation (Ashton et al. 1997).

Threats

Habitat loss and degradation, introduction of exotic predators, and toxic chemicals (including pesticides) pose continued and increasing threats to the long-term viability of amphibians throughout California (Jennings and Hayes 1994). In addition, poorly timed water releases from upstream reservoirs can scour egg masses of this species from their oviposition substrates (Jennings and Hayes 1994, Kupferberg 2009), and decreased flows can force adult frogs to move into permanent pools. Threats include stream scouring, invasive aquatic animals, riverine and riparian effects from logging practices, and stabilization of historically fluctuating stream flows. Davidson *et al*. (2002) found evidence that airborne agrochemicals play a significant role in the decline of this species; habitat destruction, climate change, and UV-B radiation also appear to be contributing factors. Lind (2005) further linked changes in land use and use of air-borne toxins to the absence of foothill yellow-legged frogs in areas where they had been previously documented. Kupferberg (1997) found that bullfrog larvae perturbed aquatic community structure and exerted detrimental effects on foothill yellow-legged frog populations in northern California but had only a slight effect on Pacific tree frog (*Pseudacris regilla*).

The introduction of nonnative predatory game fish species, nonnative crayfish, and American bullfrogs have also lead to a decline in populations in California (Ashton et al. 1997, Kupferberg et al. 2008, Stebbins and McGinnis 2012, Hayes et al. 2016). Interspecific matings between male foothill yellow-legged frog and female bullfrogs have been observed; these interactions with nonnative bullfrogs might reduce the reproductive output of *R. boylii* (Lind *et al*. 1996). Furthermore, centrachid fishes readily eat frog eggs (Werschkul and Christensen 1977) and where introduced into foothill streams, may also contribute to the elimination of foothill yellow-legged frogs (Morey 2005).

Giant Garter Snake

For the most recent comprehensive assessment of the species' rangewide status, please refer to the recovery plan for the giant garter snake (*Thamnophis gigas*)(Service 2017c).2017c). No change in the species' listing status was recommended in this recovery plan. Threats evaluated during that review and discussed in the final document have continued to act on the species since

the September 2017 recovery plan was finalized, with loss of habitat being the most significant effect. While there have been continued losses of giant garter snake habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Giant garter snake continues to be threatened by habitat loss, particularly the loss of rice as former rice fields are converted to other crop types or developed. Development and crop conversion fragments suitable habitat patches, limiting movements throughout their range. Changes in agriculture may also affect water deliveries; giant garter snakes utilize irrigation canals to disperse throughout the landscape, and intact habitat may become inaccessible if water deliveries cease or decrease. Suitable habitat for giant garter snakes has been conserved as a result of section 7 consultations, habitat conservation plans, and mitigation banks.

Giant Kangaroo Rat

For the most recent comprehensive assessment of the species' rangewide status, please refer to the giant kangaroo rat (*Dipodomys ingens) 5-year Review: Summary and Evaluation* (Service 2010c). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the February 2010 5-year review was finalized, with loss of habitat being the most significant effect. While there have been continued losses of giant kangaroo rat habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Although large areas have been conserved for giant kangaroo rat, notably the Carrizo Plains National Monument, less than 5% of the kangaroo rats' historic range is occupied. Development, agriculture, solar development, and oil and gas exploration continue to result in the loss, fragmentation and degradation of giant kangaroo rat habitat. Giant kangaroo rat is also vulnerable to stochastic weather events and climate change. Too much rain can flood their burrow systems and inhibit above ground movements due to increased vegetation growth, while insufficient rain can reduce food availability.

Ione Manzanita

For the most recent comprehensive assessment of the species' rangewide status, please refer to the Ione manzanita (*Arctostaphylos myrtifolia*) *5-year Review: Summary and Evaluation* (Service 2010d). The 5-year review recommended uplisting the species to endangered as a result of the increased threat of disease and development. Threats evaluated during that review and discussed in the final document have continued to act on the species since the July 2010 5-year review was finalized, with the expansion of novel diseases being the most significant impact. While there have been continued losses of Ione manzanita habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Disease was identified as a threat to Ione manzanita when it was listed (Service 1999a), but it was unknown what the pathogen was or the extent of disease in the population. Recent studies determined that at least three different diseases are affecting Ione manzanita (Swiecki and Bernhardt 2003, Swiecki et al. 2005). First, a branch canker disease caused by a species of *Fusicoccum* that had previously been identified that can cause significant dieback, and two newly identified pathogens, *Phytophthora cinnamomi* and *P. cambivora*. *Phytophthora* spp. were

found to cause contiguous patches of mortality in stands due to root and crown rot (Swiecki and Bernhardt 2003, Swiecki et al. 2005). Other threats include habitat loss due to development, mining, and fire, and herbicide use.

Kern Mallow

For the most recent comprehensive assessment of the species' rangewide status, please refer to the Kern mallow (*Eremalche kernensis* spp. *parryi*) *5-year Review: Summary and Evaluation* (Service 2013a). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the August 2013 5-year review was finalized, with habitat degradation being the most significant effect. While there have been continued losses of Kern mallow habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

There has been significant discussion on the taxonomy of Kern mallow, discussed in the 5-year review. Additional populations of the species have been discovered since the species was listed, primarily on federal land. Because about 60% of the known populations are on federal land, habitat loss and fragmentation are not as severe a threat compared to when the species was listed. Habitat degradation resulting from inappropriate grazing regimes, competition, recreation, nitrogen deposition, and loss of pollinator species are threats throughout the species' distribution. Habitat loss from oil and gas extraction is also a threat to the species.

Layne's Butterweed

Layne's butterweed, also known as Layne's ragwort, was listed in 1996 (Service 1996b) as threatened under the name *Senecio layneae*. In 2019, the Service recognized the taxonomic change to *Packera layneae* (Service 2019a), and the species is also known by the common name Layne's ragwort. For the most recent comprehensive assessment of the species' rangewide status, please refer to the Layne's butterweed *5-year Review: Summary and Evaluation* (Service 2019a). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the May 2019 5-year review was finalized, with loss of habitat being the most significant effect. While there have been losses of Layne's ragwort habitat throughout the range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

New populations of Layne's butterweed have been discovered since the species was listed, but it is restricted to serpentine and Gabbro soils in the central Sierra Nevada foothills. Approximately 80% of its current distribution is protected. However, habitat degradation from fire suppression and vegetation succession threaten the species throughout its range. Other threats identified at the time of listing have largely been ameliorated.

Longhorn Fairy Shrimp

For the most recent comprehensive assessment of the species' rangewide status, please refer to the longhorn fairy shrimp (*Branchinecta longiantenna*) *5-year Review: Summary and Evaluation* (Service 2012b). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the June 2012 5-year review was finalized, with loss of habitat being the

most significant effect. While there have been continued losses of longhorn fairy shrimp habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Approximately 50% of the longhorn fairy shrimp known distribution has been protected, but the species remains at risk of habitat loss and degradation. Habitat loss may be the result of development and agricultural conversions throughout the species' range. Incorrect grazing regimes, altered hydrology, and invasive species degrade existing habitat throughout its range. Longhorn fairy shrimp are also threatened by stochastic events, both natural and anthropogenic, due to the patchy distribution of small, isolated populations.

Marbled Murrelet

For the most recent comprehensive assessment of the species' rangewide status, please refer to the marbled murrelet (*Brachyramphus marmoratus*) *5-year Review: Summary and Evaluation* (Service 2019b). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the May 2019 5-year review was finalized, with habitat loss and degradation being the most significant effect. While there have been continued losses of marbled murrelet habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Many threats to marbled murrelets have been identified, including habitat destruction and modification from timber harvest and human development; high levels of predation resulting from forest "edge effects," as well as elevated predator densities in the vicinity of area of high human use; inadequate existing regulatory mechanisms (such as land management plans); and threats in the marine ecosystem including oil spills and entanglement in fishing nets. Additional threats include elevated levels of polychlorinated biphenyls in prey species, changes in prey abundance and availability, changes in prey quality, algal blooms that produce biotoxins leading to domoic acid and paralytic shellfish poisoning that have caused marbled murrelet mortality, and climate change in the Pacific Northwest. Other marine threats include energy development projects (wave, tidal, and on-shore wind energy projects) that cause mortality, and disturbance in the marine environment (from exposure to lethal and sub-lethal levels of high underwater sound pressure).

Monterey Gilia

For the most recent comprehensive assessment of the species' rangewide status, please refer to the Monterey gilia (*Gilia tenuiflora* ssp. *arenaria*) *5-year Review: Summary and Evaluation* (Service 2008a). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the March 2008 5-year review was finalized, with habitat loss and degradation being the most significant effect. While there have been continued losses of Monterey gilia habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

The primary threats to Monterey gilia are habitat destruction due to development and an increase in cover by invasive species. The interior sites are generally more at risk than coastal populations. The coastal populations of Monterey gilia on State Park lands are relatively more protected than interior sites at this time, although invasive species control is required at virtually

all sites and repeated out-plantings have been necessary to maintain numbers and expand populations. Because invasive species are a concern throughout the Monterey Bay region, it is likely that they pose a threat to Monterey gilia on private parcels in this area as well; however, little information is available regarding the status of occurrences on private lands along the coast. The status of Monterey gilia since the time of listing has likely improved at some sites by virtue of current or planned management for conservation. Along the coast, acquisition of one private parcel by Big Sur Land Trust and management activities within the State Park units have been a benefit to the long-term conservation of the taxon.

Monterey Spineflower

For the most recent comprehensive assessment of the species' rangewide status, please refer to the Monterey spineflower (*Chorizanthe pungens* var. *pungens*) *5-year Review: Summary and Evaluation* (Service 2009a). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the January 2009 5-year review was finalized, with loss of habitat being the most significant effect. While there have been continued losses of Monterey spineflower habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

The primary threats to Monterey spineflower populations include habitat loss from development, and habitat degradation as a result of recreation and invasive species. While several populations have been protected and managed to benefit the spineflower, inland populations are not adequately protected or managed. Restoration activities, especially removing invasive species, have benefitted Monterey spineflower.

Morro Shoulderband Snail

For the most recent comprehensive assessment of the species' rangewide status, please refer to the Morro shoulderband snail (*Helminthoglypta walkeriana*) *Species Status Assessment Report* (Service 2019c). The most recent 5-year review was completed in 2006, and found no change in the species' listing status was recommended (Service 2006b). Threats evaluated during both reviews have continued to act on the species since the September 2006 5-year review and the February 2019 status review were finalized, with continued loss and fragmentation of habitat being the most significant effect. While there have been continued losses of Morro shoulderband snail habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

At the time of its listing, the Service thought threats to the Morro shoulderband snail included habitat loss and degradation, competition from nonnative snail species, off-highway vehicle activity, and pesticides (Service 2019c). Since 1994, several of these threats have been ameliorated; however, habitat loss and, in particular, changes in community structure and composition continue to constitute threats to the species. Dehydration is a major threat to terrestrial mollusks. Partial or complete removal of sheltering vegetation that creates a mesic microclimate for Morro shoulderband snail makes individuals more vulnerable to dehydration and desiccation. As with other species of *Helminthoglypta*, the Morro shoulderband snail is subject to predation from small mammals and snakes (van der Laan 1980, Huntzinger et al. 2008). While no formal studies provide evidence that disturbance during aestivation adversely affects Morro shoulderband snails, it appears that individuals likely survive careful capture and relocation into nearby suitable habitat (SWCA 2014). Even so, some individuals may suffer

physiological stress, injury, or mortality death from damage to the epiphragm and exposure to desiccating conditions that could occur during relocation.

Mount Hermon June Beetle

For the most recent comprehensive assessment of the species' rangewide status, please refer to the Zayante band-winged grasshopper (*Trimerotropis infantilis*) and Mount Hermon June beetle (*Polyphylla barbata*) *5-year Review: Status and Evaluation* (Service 2009b). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the August 2009 5-year review was finalized, with loss and fragmentation of habitat being the most significant effect. While there have been continued losses of Mount Hermon June beetle habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Threats to the beetle include habitat loss and fragmentation from sand mining and urbanization, and habitat degradation due to invasive plants and succession. Mount Hermon June beetles require open habitats with patches of bare soil for burrowing. Sand mining has removed large areas of suitable habitat, and fragmented remaining habitat. Fire suppression has led to vegetation succession, which has contributed to the loss of habitat. Some conservation of habitat has been completed, but habitat restoration has only been marginally successful.

Mountain yellow-legged Frog (Northern DPS)

Listing Status

The northern DPS of the mountain yellow-legged frog (*Rana muscosa*) was listed as endangered species on April 29, 2014, under the Endangered Species Act of 1973 (Service 2014). Critical habitat was designated for the species on August 26, 2016 (Service 2016b). For a complete description, and discussion of habitat and life history, please see the proposed listing rule (Service 2013b). Based on mitochondrial DNA, morphological information, and acoustic studies, Vredenburg et al. (2007) concluded that mountain yellow-legged frog in the Sierra Nevada consists of two species: *R. muscosa* and *R. sierrae* (Sierra Nevada yellow-legged frog).

Status and Distribution

In the Sierra Nevada, mountain yellow-legged frog ranges from the Monarch Divide south to Dunlap and Taylor meadows in the Sequoia National Forest (Vredenburg et al. 2007, CDFW 2011). The southern DPS of the mountain yellow-legged frog occurs in the Transverse and Peninsular Ranges in southern California, and is also listed as endangered (Service 2002b). The current distribution of the species is primarily restricted to high elevation publicly managed lands within National Forests and National Parks.

Once thought to be abundant throughout aquatic habitat in the high Sierra Nevada (Grinnell and Storer 1924), mountain yellow-legged frog has declined since the 1970s (Bradford 1991). Historical specimen and sightings data found mountain yellow-legged frogs distributed from Antelope Lake, Plumas County, south to Taylor and French Joe Meadow, Tulare County, as well as disjunct populations up to the extreme north reaches of Feather River within the southern end of Lassen National Park (Zweifel 1955, Vrendenburg et al. 2005). Beginning in the 1980s, researchers reported the frogs had disappeared from a significant portion of their range (e.g. Jennings and Hayes 1986). Davidson et al. (2002) reviewed 255 previously documented locations throughout historical mountain yellow-legged frog range, based on Jennings and Hayes

(1994), and they concluded that 83 percent of these sites no longer supported extant populations. Vredenburg et al. (2007) further compared recent surveys from 1995 to 2004 with museum records of specimens collected between 1899 and 1994 and found that 95 percent of the sites with historic records of the mountain yellow-legged frog were extirpated. Most recently from 2002-2009, watersheds containing over 2900 meadows, lakes, ponds or stream reaches were surveyed: breeding was found in 4% of watersheds that had frog records from 1990-2001, and only 2% of watersheds that had frog records prior to 1990 (Brown et al. 2014).

Overall, recent surveys estimate 65-95% disappearance from their historical range (Knapp and Matthews 2000, Vredenburg et al. 2007, CDFW 2014 a, b). Furthermore, extant populations are much smaller than historical populations (57% of watersheds surveyed had <10 adults/subadults and <10 tadpoles (Foote et al. 2013, Brown et al. 2014). Populations in the northern DPS of mountain yellow-legged frog in the Sierra Nevada are particularly vulnerable to stochastic environmental events and loss of genetic variation due to their small size and isolation from other populations (Service 2014).

Threats

The mountain yellow-legged frog is imperiled by a variety of factors, particularly invasive predators and disease (Bradford 1989, Bradford et al. 1998, Knapp and Matthews 2000, Fellers et al. 2001). Because the frog has a short active season, must overwinter in aquatic habitats for much of the year, and requires perennial water for reproduction (Zweifel 1955, Bradford 1983, Matthews and Pope 1999, Knapp and Matthews 2000, Brown et al. 2014), it is especially vulnerable to such threats. The introduction of trout to historically fish-free lakes in the Sierra Nevada reduced the distribution and abundance of the northern DPS of the mountain yellow-legged frog (Bradford 1989, Knapp and Matthews 2000, Knapp 2005). Prior to the mid-19th century, almost all lakes and associated streams in the Sierra Nevada above 6000 feet were fishless, but as a result of 150 years of fish stocking throughout the region, all watersheds now contain as many as five non-native trout species (Moyle et al. 1996, USFS 2013). Besides direct predation, trout can also further fragment small populations by disrupting dispersal and recolonization routes (Bradford et al. 1993). In addition, introduced bullfrogs co-occur with mountain yellow-legged frogs at lower elevation sites (generally below 6,000 ft.), and may also increase predation and competition, though their exact contribution to the decline remains unknown (Casper and Hendricks 2005).

Diseases also pose a significant threat – especially chytrid fungus, documented as a primary factor in widespread declines in mountain yellow-legged frogs across the Sierra Nevada over the past several decades (Rachowicz et al. 2006, Vredenburg et al. 2010). Human activities can also facilitate the spread of disease by further introduction of non-native carriers and even acting as carriers themselves.

Finally, though mountain yellow-legged frogs might not be losing much habitat per se by human development, additional activities such as water development, mining, and roads are increasingly fragmenting these populations. As the majority of remaining mountain yellow-legged frog populations are small and isolated, they are vulnerable to stochastic events, increased inbreeding, and loss of genetic diversity (Bradford et al. 1993, Knapp et al. 2007, Brown et al. 2011). Furthermore, climate change will reduce snow pack and increase evapotranspiration that may result in desiccation of some breeding ponds which in turn would reduce breeding success (Lacan et al. 2008) and affect survivorship (Blaustein et al. 2010; Walls et al. 2013). Given the few populations remaining in the Sierra Nevada, losses of even a couple populations of the mountain yellow-legged frog may be significant.

Northern Spotted Owl

For the most recent comprehensive assessment of the species' rangewide status, please refer to the northern spotted owl (*Strix occidentalis caurina*) *5-year Review: Summary and Evaluation* (Service 2011b). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the 2011 5-year review was finalized, with loss of habitat being the most significant effect. While there have been continued losses of northern spotted owl habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Habitat loss from timber harvest and wildfire, and competition from barred owls (*Strix varia*) are the most significant threats to northern spotted owl. Habitat loss as a result of timber harvest is the primary threat to the species on private land. Within fire-adapted forests, northern spotted owls have adapted to withstand fires of variable sizes and severities. However, fire is often considered a threat because of its potential to rapidly alter habitat (Bond et al. 2009), and is the primary cause of habitat loss on federal lands (Courtney et al. 2004). While fire can lead to habitat loss, a lack of fire causes vegetation growth or succession that is unsuitable for the owl's prey (Hanson et al. 2009). Climate change is expected to make unpredictable changes to habitat, due to warmer temperatures increasing the probability of both severe fires and extended fire seasons (Skinner 2007). Barred owls reduce northern spotted owl site occupancy, reproduction, and survival (Dark et al. 1998; Gutiérrez et al. 2004; Courtney et al. 2004; Olson et al. 2005; Anthony et al. 2006). Barred owl compete with northern spotted owl for prey (Hamer et al. 2001, 2007; Gutiérrez et al. 2007; Livezey and Fleming 2007) and habitat (Hamer et al. 1989; Dunbar et al. 1991; Herter and Hicks 2000; Pearson and Livezey 2003; Singleton et al. 2010).

Ohlone Tiger Beetle

For the most recent comprehensive assessment of the species' rangewide status, please refer to the Ohlone tiger beetle (*Cicindela ohlone*) *5-year Review: Summary and Evaluation* (Service 2019d). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the October 2019 5-year review was finalized, with habitat fragmentation and degradation being the most significant effect. While there have been continued losses of Ohlone tiger beetle habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Most of the areas where Ohlone tiger beetles are known are threatened by habitat fragmentation, degradation, and destruction due to residential development and recreational activities. Disturbance of the substrate, and removal or elimination of vegetation by urban development, kills or injures individuals and precludes others from feeding, sheltering, or reproducing. Additionally, Ohlone tiger beetle habitat is threatened due to invasive vegetation (e.g., French broom (*Genista monspessulana*), velvet grass (*Holcus lanatus*), and eucalyptus trees (*Eucalyptus* sp.)) and vulnerability to local extirpations from random natural events. Without management efforts to reduce and control vegetation encroachment by invasive species, it is expected that the Ohlone tiger beetle will likely decline and may become extirpated in all of the locations where the species is known presently.

Pine Hill Ceanothus

For the most recent comprehensive assessment of the species' rangewide status, please refer to the Pine Hill ceanothus (*Ceanothus roderickii*) *5-year Review: Summary and Evaluation* (Service 2019a). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the May 2019 5-year review was finalized, with habitat degradation being the most significant effect. While there have been losses of Pine Hill ceanothus habitat throughout the range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

A significant amount of Pine Hill ceanothus habitat has been conserved since listing. The primary threat to the ceanothus at the time of listing was habitat loss and fragmentation due to development. Habitat loss and fragmentation has largely been reduced throughout its range, but still occurs in isolated parcels. The main threat to Pine Hill ceanothus is vegetation succession as a result of altered fire regime. While Pine Hill ceanothus does not seem to require fire for seed germination, it does require open habitat patches that become unavailable as chaparral develops.

Pine Hill Flannelbush

For the most recent comprehensive assessment of the species' rangewide status, please refer to the Pine Hill flannelbush (*Fremontodendron californicum* spp. *decumbens*) *5-year Review: Summary and Evaluation* (Service 2019a). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the May 2019 5-year review was finalized, with loss of habitat being the most significant effect. While there have been losses of Pine Hill flannelbush habitat throughout the range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

A significant amount of Pine Hill flannelbush habitat has been conserved since listing. The primary threat to the flannelbush at the time of listing was habitat loss and fragmentation due to development. Habitat loss and fragmentation has largely been reduced throughout its range, but still occurs in isolated parcels. The main threat to Pine Hill flannelbush is vegetation succession as a result of altered fire regime, and seed herbivory by insects and rodents.

Point Arena Mountain Beaver

For the most recent comprehensive assessment of the species' rangewide status, please refer to the Point Arena mountain beaver (*Aplodontia rufa nigra*) *5-year Review: Summary and Evaluation* (Service 2019e). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the August 2019 5-year review was finalized, with loss and fragmentation of habitat being the most significant effect. While there have been continued loss and fragmentation of Point Arena mountain beaver habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Habitat loss and fragmentation from agricultural conversion and residential development, and to a lesser extent, from recreational development (e.g., trails, campgrounds) and road and utilities construction is the primary threat to Point Arena mountain beaver (Service 1998a). Agricultural

conversion of suitable habitat still occurs, but at a much smaller scale than the historical large scale conversion prior to federal listing. Much of the remaining suitable coastal scrub habitat within the subspecies range occurs on protected public lands or on private lands that are largely inaccessible (e.g., protected riparian corridors) or unbuildable (e.g., steep coastal bluffs). In contrast to future agricultural conversion, residential development is expected to increase with human population growth, especially if climate change causes more humans to migrate to the relatively cool coastal areas. Currently, regulatory constraints on residential development in coastal areas avoid or minimize habitat loss and fragmentation, but regulations may be relaxed in the future under political pressure to accommodate climate change refugees.

Other threats include collapse of occupied burrow systems by humans or livestock, predation by feral and non-feral domestic pets, vehicle strikes, exposure to rodenticides used on residential, municipal, and agricultural lands, wildfires, and climate change. Mountain beavers have limited ability to thermoregulate at high ambient temperatures (Johnson 1971, Kinney 1971), and may be confined to moist environments due to their inability to concentrate urine (Nungesser and Pfeiffer 1965). Thus, the mountain beaver's unique physiology may make them especially vulnerable climate change. Timber harvest operations may disturb, or even directly injure or kill individual mountain beavers during felling or yarding. Transportation and utility infrastructure construction may result in direct injury or mortality. Potential sources of disturbance to mountain beavers include, but are not limited to, noise and visual disturbance associated with human presence and activity, mechanically-induced noise or ground vibration, and nighttime lighting. While *Aplodontia* are generally more active at night, they can be active at any time (Ingles 1959). Scheduling potentially disturbing activities outside of the breeding season may minimize disruption of breeding and rearing activity.

Robust Spineflower

For the most recent comprehensive assessment of the species' rangewide status, please refer to the robust spineflower (*Chorizanthe robusta* var. *robusta*) *5-year Review: Summary and Evaluation* (Service 2010e). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the February 2010 5-year review was finalized, with loss of habitat being the most significant effect. While there have been continued loss of robust spineflower habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Robust spineflower is threatened by habitat loss and fragmentation, which reduces population size and increases isolation. Suitable and occupied habitat have been degraded by invasive species, recreation, vegetation management, and the loss of pollinators. Dune communities have also been altered in composition by the introduction of invasive species, especially ice plant and European beachgrass, in an attempt to stabilize shifting sands. In the last decade, significant efforts have been made to restore native dune communities, including the elimination of these invasive species.

San Benito Evening-Primrose

For the most recent comprehensive assessment of the species' rangewide status, please refer to the San Benito evening-primrose (*Camissonia benitensis*) *5-year Review: Summary and Evaluation* (Service 2009c). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have

continued to act on the species since the August 2009 5-year review was finalized, with loss of habitat being the most significant effect. While there have been continued loss of San Benito evening-primrose habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

There are fewer than 427 acres of suitable habitat for the San Benito evening-primrose known throughout its range. In any given year, only a very small fraction of this suitable habitat is occupied. When suitable habitat is available and environmental conditions are conducive for germination, certain San Benito evening-primrose sites can be productive; however, other sites may not manifest any germination that year (Bureau of Land Management 2004). The primary threat to the evening-primrose is, therefore, the loss of habitat and the extensive seedbank present in occupied habitat. Other threats include small population sizes, habitat degradation, and recreation.

San Joaquin Kit Fox

For the most recent comprehensive assessment of the species' rangewide status, please refer to the San Joaquin kit fox (*Vulpes macrotis mutica*) *5-year Review: Summary and Evaluation* (Service 2010f). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the February 2010 5-year review was finalized, with loss of habitat being the most significant effect. While there have been continued losses of San Joaquin kit fox habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

San Joaquin kit fox still faces a variety of threats including habitat loss, fragmentation and degradation; competition and predation from coyotes and invasive red foxes; pesticides and rodenticides; and disease. Development, agriculture activities, solar development, and oil and gas exploration and extraction remove and fragment remaining suitable habitat for the kit fox, while competition and pesticide use reduces habitat quality. Sacroptic mange is a growing threat to San Joaquin kit fox recovery in the southern portion of their range. While some suitable habitat has been conserved for the kit fox, it is fragmented across the landscape.

Santa Cruz long-toed Salamander

For the most recent comprehensive assessment of the species' rangewide status, please refer to the Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*) *5-year Review: Summary and Evaluation* (Service 2019f). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the October 2019 5-year review was finalized, with loss of habitat being the most significant effect. While there have been continued losses of Santa Cruz long-toed salamander habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

The Santa Cruz long-toed salamander occupies a small area in Santa Cruz and Monterey Counties. Threats to the species include loss of breeding habitat due to increases in salinity and competition and predation by rough-skinned newt (*Taricha granulosa*), mosquito abatement activities, and loss and degradation of non-breeding habitat. Restoration and enhancement of breeding ponds have been successful at increasing salamander reproduction and survival.

Sierra Nevada yellow-legged Frog

Listing Status

The Sierra Nevada yellow-legged frog (*Rana sierrae*) was listed as an endangered species on April 29, 2014, under the Endangered Species Act of 1973 (Service 2014). Critical habitat was designated for the species on August 26, 2016 (Service 2016b). For a complete description and a discussion of the habitat and life history of the Sierra Nevada yellow-legged frog, please see the proposed listing rule (Service 2013b). Based on mitochondrial DNA, morphological information, and acoustic studies, Vredenburg et al. (2007) concluded that mountain yellow-legged frog in the Sierra Nevada consists of two species: *R. muscosa* and *R. sierrae*.

Status and Distribution

The Sierra Nevada yellow-legged frog is endemic to the northern and central Sierra Nevada, ranging from north of the Feather River including the Plumas and southern edge of the Lassen National Forests, south to the Monarch Divide on the west side of the Sierra Nevada crest in the Sierra National Forest, and near Independence Creek on the east side of the Sierra Nevada crest in the Inyo National Forest. The current distribution of the species is primarily restricted to high elevation publicly managed lands within National Forests and National Parks.

Once thought to be abundant throughout aquatic habitat in the high Sierra Nevada (Grinnell and Storer 1924), the Sierra Nevada yellow-legged frog has declined since the 1970s (Bradford 1991). Beginning in the 1980s, researchers reported the frogs had disappeared from a significant portion of their range (Hayes and Jennings 1986). Davidson et al. (2002) reviewed 255 previously documented locations throughout the historical ranges of Sierra Nevada yellow-legged frog, based on Jennings and Hayes (1994), and they concluded that 83 percent of these sites no longer supported extant populations. Vredenburg et al. (2007) further compared recent surveys from 1995 to 2004 with museum records of specimens collected between 1899 and 1994 and found that 93 percent of locations with historic records of Sierra Nevada yellow-legged frog sites were extirpated. Most recently from 2002-2009, watersheds containing over 2,900 meadows, lakes, ponds or stream reaches were surveyed for the species: breeding was found in four percent of watersheds that had frog records from 1990-2001, and only two percent of watersheds that had frog records prior to 1990 (Brown et al. 2014).

Overall, recent surveys estimate 65-95 percent disappearance from their historical range (Knapp and Matthews 2000a, Vredenburg et al. 2007, CDFW 2014 a, b). Furthermore, extant populations are much smaller than historical populations (57 percent of watersheds surveyed had <10 adults/subadults and <10 tadpoles (Foote et al. 2013, Brown et al. 2014). Populations in the northern range of the Sierra Nevada yellow-legged frog are particularly vulnerable to stochastic environmental events and loss of genetic variation due to their small size and isolation from other populations (Service 2014).

Threats

The Sierra Nevada yellow-legged frog is imperiled by a variety of factors, particularly invasive predators and disease (Bradford 1989, Bradford et al. 1998, Knapp and Matthews 2000, Fellers et al. 2001). Because the species has a short active season, they must overwinter in aquatic habitats for much of the year, and they require perennial water for reproduction (Zweifel 1955, Bradford 1983, Matthews and Pope 1999, Knapp and Matthews 2000, Brown et al. 2014), it is especially vulnerable to such threats. The introduction of trout to historically fish-free lakes in the Sierra Nevada reduced the distribution and abundance of the Sierra Nevada yellow-legged

frog (Bradford 1989, Knapp and Matthews 2000, Knapp 2005). Prior to the mid-19th century, almost all lakes and associated streams in the Sierra Nevada above 6,000 feet were fishless, but as a result of 150 years of fish stocking throughout the region, all watersheds now contain as many as five non-native trout species (Moyle et al. 1996, USFS 2013). Besides direct predation, trout can also further fragment small populations by disrupting dispersal and recolonization routes (Bradford et al. 1993). In addition, introduced bullfrogs co-occur with native ranid species at lower elevation sites (generally below 6,000 feet), and may also increase predation and competition, though their exact contribution to the decline remains unknown (Casper and Hendricks 2005).

Diseases also pose a significant threat – especially chytrid fungus, documented as a primary factor in widespread declines in Sierra Nevada yellow-legged frogs across the Sierra Nevada over the past several decades (Rachowicz et al. 2006, Vredenburg et al. 2010). Human activities can also facilitate the spread of disease by further introduction of non-native carriers and even acting as carriers themselves.

Finally, though Sierra Nevada yellow-legged frogs might not be losing much habitat per se by human development, additional activities such as water development, mining, and roads are increasingly fragmenting these populations. As the majority of remaining frog populations are small and isolated, they are vulnerable to stochastic events, increased inbreeding, and loss of genetic diversity (Bradford et al. 1993, Knapp et al. 2007, Brown et al. 2011). Furthermore, climate change will reduce snow pack and increase evapotranspiration that may result in desiccation of some breeding ponds which in turn would reduce breeding success (Lacan et al. 2008) and affect survivorship (Blaustein et al. 2010; Walls et al. 2013).

Although the previously mentioned threats continue to affect the Sierra Nevada yellow-legged frog, evidence from Yosemite National Park shows that recovery is achievable when certain stressors are eliminated. Over a 20-year time period, frog abundance increased in Yosemite National Park likely due to the cessation of fish stocking (Knapp et al. 2016). Other factors may have also played a role in the observed recovery because frog populations in the study area appear to have a perceived resistance to chytrid fungus, and may serve as important source populations to sustain the species (Knapp et al. 2016). Knapp et al. (2016) caution that recovery in Yosemite National Park is hardly complete and will require continued management actions, including fish removals and frog translocations in order to maintain and reestablish populations.

Smith's Blue Butterfly

For the most recent comprehensive assessment of the species' rangewide status, please refer to the Smith's blue butterfly (*Euphilotes enoptes smithi*) *5-year Review: Summary and Evaluation* (Service 2006c). The 5-year review recommended downlisting the butterfly due to the discovery of additional populations after listing. Threats evaluated during that review and discussed in the final document have continued to act on the species since the September 2006 5-year review was finalized, with habitat fragmentation being the most significant threat in the northern portion of the butterfly's range and habitat loss and degradation from invasive species being the most significant threat in the southern portion of its range. While there have been continued threats to Smith's blue butterfly habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Despite the downlisting, the threats to the butterfly are the same. The downlisting occurred due to the discovery of more populations of this species. The decline of the Smith's blue butterfly is

attributed to degradation and loss of habitat as a result of urban development, recreational activities in dune habitats, sand mining, military activities, fire suppression in chaparral habitat, and encroachment of exotic plant species. Wildfire suppression increases the risk of large-scale, high-intensity wildfires and reduces the frequency of smaller fires. Smaller fires would be expected to create disturbances that favor establishment of seacliff buckwheat plants; while large, high-intensity fires would likely damage soils and destroy seed banks to the detriment of native plant communities. Aggressive, disturbance-oriented invasive plant species such as kikuyu grass (*Pennisetum clandestinum*), pampas grass (*Cortaderia jubata*), Cape ivy (*Delairea odorata*), and French broom are found on sites otherwise suitable for seacliff buckwheat and Smith's blue butterfly. In sand dunes along Monterey Bay, invasive ice plant has covered hundreds of acres of formerly suitable habitat for the Smith's blue butterfly. The low vagility of adults, coupled with fragmentation of suitable habitat, reduce the probabilities of colonization events and migratory exchange between populations.

Stebbin's Morning-Glory

For the most recent comprehensive assessment of the species' rangewide status, please refer to the Stebbin's morning-glory (*Calystegia stebbinsii*) *5-year Review: Summary and Evaluation* (Service 2019a). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the May 2019 5-year review was finalized, with loss of habitat being the most significant effect. While there have been losses of Stebbin's morning-glory habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

A significant amount of Stebbin's morning-glory habitat has been conserved since listing. The primary threat to the morning-glory at the time of listing was habitat loss and fragmentation due to development. Habitat loss and fragmentation has largely been reduced throughout its range, but still occurs in isolated parcels. The main threat to Stebbin's morning-glory is vegetation succession as a result of altered fire regime. Stebbin's morning-glory requires open areas and heat scarification for seed germination. While the morning-glory has responded well to controlled burns in some conserved lands (Service 2019a), controlled burns are not possible in areas that are adjacent to suburban development.

Valley Elderberry Longhorn Beetle

For the most recent comprehensive assessment of the range-wide status of the valley elderberry longhorn beetle (*Desmocerus californicus dimorhpus*), please refer to the revised recovery plan for valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)(Service 2019g). Threats discussed in the revised recovery plan continue to act on the beetle, with loss of habitat being the most significant effect. While there have been continued losses of valley elderberry longhorn beetle habitat throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Valley elderberry longhorn beetle continue to be threatened by habitat loss, but especially habitat fragmentation. The beetle exists in isolated populations throughout the Central Valley in remnant riparian habitat, and is inherently dispersal limited. Habitat fragmentation isolates populations and limits the opportunity for genetic rescue of small populations, as well as limits the opportunity for colonization of suitable habitat. An emerging threat to valley elderberry longhorn

beetle is the spread of the invasive Argentine ant (*Linepithema humile*), which may depredate larval beetles. It is not yet known whether this is a significant threat to recovery of the beetle.

Vernal Pool Fairy Shrimp

For the most recent comprehensive assessment of the species' rangewide status, please refer to the vernal pool fairy shrimp (*Branchinecta lynchi*) *5-year Review: Summary and Evaluation* (Service 2007a). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the September 2007 5-year review was finalized, with loss of habitat being the most significant effect. While there have been continued losses of vernal pool fairy shrimp habitat throughout the range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

There has been successful conservation for vernal pool fairy shrimp throughout its range, but it is still threatened by habitat loss, degradation and fragmentation. Development and agriculture result in the loss and fragmentation of habitat, and may impact the hydrology and other essential habitat features of adjacent, intact vernal pool wetlands. Invasive plants and incorrect grazing regimes may reduce the function and value of vernal pool wetlands. Climate change, especially extensive drought, will affect the hydroperiod and function of vernal pool wetlands.

Vernal Pool Tadpole Shrimp

For the most recent comprehensive assessment of the species' rangewide status, please refer to the vernal pool tadpole shrimp (*Lepidurus packardi*) *5-year Review: Summary and Evaluation* (Service 2007b). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the September 2007 5-year review was finalized, with loss of habitat being the most significant effect. While there have been continued losses of vernal pool tadpole shrimp habitat throughout the range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

There has been successful conservation for vernal pool tadpole shrimp throughout its range, but it is still threatened by habitat loss, degradation and fragmentation. Development and agriculture result in the loss and fragmentation of habitat, and may impact the hydrology and other essential habitat features of adjacent, intact vernal pool wetlands. Invasive plants and incorrect grazing regimes may reduce the function and value of vernal pool wetlands. Climate change, especially extensive drought, will affect the hydroperiod and function of vernal pool wetlands.

Yadon's Piperia

Piperia yadonii is known by two common names: Yadon's piperia and Yadon's rein orchid. The Service listed the species as endangered in 1998 using the common name Yadon's piperia (Service 1998b). For the most recent comprehensive assessment of the species' rangewide status, please refer to the Yadon's piperia *5-year Review: Summary and Evaluation* (Service 2009d). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the September 2009 5-year review was finalized, with loss and fragmentation of habitat being the most significant effect. While there have been continued losses of Yadon's piperia habitat

throughout its range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Since the time of listing, the threat of development and habitat fragmentation has been reduced somewhat; in particular, some of the densest populations of Yadon's piperia on Monterey peninsula have been set aside in designated open space areas by Pebble Beach Company and will likely not be developed in the future. In addition, plans are being developed to acquire populations of Yadon's piperia in the near future for conservation and they will receive an additional level of protection through implementation of management plans. Extensive surveys have expanded the species' known range, discovered additional populations, and reported higher numbers of individuals; however, a number of factors have been shown to reduce the reproductive potential of the species. Recent research has shown high rates of herbivory have significantly affected the populations of Yadon's piperia over time by reducing the ability of individual plants to survive and reproduce (Doak and Graff 2001). Research has also elucidated the importance of pollinators to achieving viable seed set, which is also crucial for long-term persistence (Doak and Graff 2001). Therefore, although the range is greater and the number of populations and individuals now known is higher than at the time of listing, threats including herbivory, disease, and low rates of seed set may be decreasing the long-term persistence of the species.

Yosemite Toad

Listing Status

The Yosemite toad was listed as a threatened species on April 29, 2014, under the Endangered Species Act of 1973 (Service 2014). Critical habitat was designated for this species on August 26, 2016 (Service 2016b). For a complete description and a discussion of the habitat and life history of the Yosemite toad, please see the proposed listing rule (Service 2013b).

Status and Distribution

The Yosemite toad is endemic to the high elevation Sierra Nevada in California, ranging from the Blue Lakes region north of Ebbetts Pass in Alpine County to just south of Kaiser Pass in the Evolution Lake/Darwin Canyon area in Fresno County (Jennings and Hayes 1994, Lannoo 2005, Liang et al. 2010, Liang and Stohlgren 2011, Stebbins and McGinnis 2012, Dodd 2013, Green et al. 2014). Most of the Yosemite toad's range occurs on lands managed by the Forest Service (72 percent, USFS 2014) or National Parks.

The species historically inhabited elevations ranging from 4,790 to 11,910 feet (Stephens 2001, Stebbins 2003), and was most abundant above 8,000 feet and below permanent snow and ice. Occupancy studies indicate a decline of greater than 50 percent of former sites range-wide (Stebbins and Cohen 1995, Drost and Fellers 1996). Current populations are thought to be very small (< 20 adult males) (Brown et al. 2011). The only long-term, site-specific population study of the Yosemite toad at Tioga Pass Meadow from 1971-1991 found a dramatic decline from 258 males entering breeding pools, down to 28 in the early 1980s, with only one found in 1991 (Kagarise Sherman et al. 1993). Within its current range on National Forest lands, breeding is currently found in only 22 percent of watersheds (Brown et al. 2012).

Threats

The Yosemite toad is imperiled by a variety of factors, especially loss and degradation of habitat, livestock grazing, chytrid fungus, and global climate change (Lannoo 2005, Davidson and Fellers 2005, Martin 2008, Brown et al. 2011, Green et al. 2014). Because Yosemite toads rely

on shallow, ephemeral water, they may be particularly sensitive to even minor impacts on their habitat. Drying of meadow systems is a significant impact, primarily as a result of widespread historic livestock overgrazing (Ratliff 1985, Menke et al. 1996, Lind et al. 2011, Weixelman et al. 2011, McIlroy et al. 2013). Timber harvest, road construction, and an altered fire regime has introduced additional disturbance pressures to meadows, including tree encroachment. Livestock and recreation activities both degrade meadow habitats and can directly impact individual toads through trampling, collapse of rodent burrows, and harassment (Karlstrom 1962). There is evidence that roads and trails reduce Yosemite toad connectivity (Maier 2018). Also, recent monitoring efforts on the Sierra National Forest documented vehicle related mortality along commonly used roadways (Barnes 2017a, 2017b, and 2018).

Diseases, especially chytrid fungus, also play an important role in Yosemite toad population dynamics. Although individuals appear less prone to epidemic outbreaks than mountain yellow-legged frogs (Green and Kagarise Sherman 2001, USFS et al. 2009), pathogen prevalence appeared to coincide with recent declines (Fellers et al. 2007, Service 2013). From 2006-2011, Dodge and Vredenburg (2012 in Service 2013) found infection intensities between 17 and 26 percent, and that juvenile toads were more likely to be infected. In an experimental study, 100 percent of juvenile toads exposed to chytrid fungus became infected and died within 25 days (Lindauer 2018).

As the majority of remaining populations are likely small and isolated, they are vulnerable to stochastic environmental events and loss of genetic diversity (Service 2014b). Additionally, the Yosemite toad's high fidelity to breeding and non-breeding sites can increase the vulnerability of small populations when individuals return to habitats that are no longer suitable.

Zayante band-winged Grasshopper

For the most recent comprehensive assessment of the species' rangewide status, please refer to the Zayante band-winged grasshopper (*Trimerotropis infantilis*) and Mount Hermon June beetle (*Polyphylla barbata*) *5-year Review: Summary and Evaluation* (Service 2009b). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the August 2009 5-year review was finalized, with loss and fragmentation of habitat being the most significant effect. While there have been continued losses of Zayante band-winged grasshopper habitat throughout the range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Threats to the grasshopper include habitat loss and fragmentation from sand mining and urbanization, and habitat degradation due to invasive plants and succession. Zayante band-winged grasshopper require open habitats with patches of bare soil for burrowing. Sand mining has removed large areas of suitable habitat, and fragmented remaining habitat. Fire suppression has led to vegetation succession, which has contributed to the loss of habitat. Some conservation of habitat has been completed, but habitat restoration has only been marginally successful.

Status of Critical Habitat

California red-legged Frog

Critical habitat for California red-legged frog was designated in 2006, and revised in 2010 (Service 2010b). A total of 1,636,609 acres in 48 units were designated. Four primary constituent

elements are described in the revision to designated critical habitat, and include the necessary physical and biological features of aquatic breeding habitat, aquatic non-breeding habitat, upland habitat, and dispersal habitat for the frog (Service 2010b). To date, no project has proposed a level of effects for which the Service has issued a biological opinion of adverse modification for California red-legged frog critical habitat.

California Tiger Salamander (Central California DPS)

Critical habitat for the Central California DPS of the California tiger salamander was designated in 2005 (Service 2005). A total of 199,109 acres were designated in 31 units across four regions: East Bay, Central Coast, San Joaquin Valley, and Central Valley. Three primary constituent elements are described in the final rule (Service 2005a), and include breeding habitat, upland habitat, and dispersal habitat. To date, no project has proposed a level of effects for which the Service has issued a biological opinion of adverse modification for central California DPS of California tiger salamander critical habitat.

California Tiger Salamander (Santa Barbara DPS)

Critical habitat for the Santa Barbara DPS of the California tiger salamander was designated in 2004 (Service 2004). A total of 11,180 acres were designated in 6 units. Three primary constituent elements are described in the final rule (Service 2004), and include the necessary physical and biological features of breeding habitat, upland habitat, and dispersal habitat. To date, no project has proposed a level of effects for which the Service has issued a biological opinion of adverse modification for Santa Barbara DPS of California tiger salamander critical habitat.

Conservancy Fairy Shrimp

Critical habitat for conservancy fairy shrimp was designated in 2006 (Service 2006d). A total of 161,786 acres were designated in 8 units. Four primary constituent elements are described in the final rule (Service 2006d), and include the topographical characteristics to support the hydrology of vernal pool wetlands within grasslands, vernal pool wetlands with underlying restrictive soil layers that pond water for at least 19 days, sources of food, and shelter within the vernal pool wetlands. To date, no project has proposed a level of effects for which the Service has issued a biological opinion of adverse modification for conservancy fairy shrimp critical habitat.

Longhorn Fairy Shrimp

Critical habitat for longhorn fairy shrimp was designated in 2006 (Service 2006d). A total of 13,557 acres were designated in 3 units. Four primary constituent elements are described in the final rule (Service 2006d), and include the topographical characteristics to support the hydrology of vernal pool wetlands within grasslands, vernal pool wetlands with underlying restrictive soil layers that pond water for at least 23 days, sources of food, and shelter within the vernal pool wetlands. To date, no project has proposed a level of effects for which the Service has issued a biological opinion of adverse modification for longhorn fairy shrimp critical habitat.

Marbled Murrelet

Critical habitat for marbled murrelet was designated in 1996, revised in 2012, and upheld in 2016 (Service 2016c). A total of 3,698,100 acres were designated in 33 units in Washington, Oregon and California. Two primary constituent elements are described in the final rule (Service

2016b), and include individual trees with potential nesting platforms, and forested areas within 0.5 mile (0.8 kilometer) of individual trees with potential nesting platforms with a canopy height of at least one-half the site-potential tree height. To date, no project has proposed a level of effects for which the Service has issued a biological opinion of adverse modification for marbled murrelet critical habitat.

Monterey Spineflower

Critical habitat for Monterey spineflower was designated in 2008 (Service 2008b). A total of 11,055 acres were designated in 9 units in Santa Cruz and Monterey Counties, California. The primary constituent element for Monterey spineflower critical habitat is a vegetation structure arranged in a mosaic with openings between the dominant vegetation that changes in spatial position that allows sunlight to reach the surface of the following sandy soils: coastal beaches, dune land, Baywood sand, Ben Lomond sandy loam, Elder sandy loam, Oceano loamy sand, Arnold loamy sand, Santa Ynez fine sandy loam, Arnold-Santa Ynez complex, Metz complex, and Metz loamy sand (Service 2008b). To date, no project has proposed a level of effects for which the Service has issued a biological opinion of adverse modification for Monterey spineflower critical habitat.

Morro Shoulderband Snail

Critical habitat for Morro shoulderband snail was designated in 2001 (Service 2001a). A total of 2,566 acres were designated in 3 units. Three primary constituent elements are described in the final rule (Service 2001a), and include sand or sandy soils needed for reproduction, a slope not greater than 10 percent to facilitate movement of individuals, and the presence of native coastal dune scrub vegetation. To date, no project has proposed a level of effects for which the Service has issued a biological opinion of adverse modification for Morro shoulderband snail critical habitat.

Mountain yellow-legged Frog (Northern DPS)

Critical habitat for northern DPS of the mountain yellow-legged frog was designated in 2016 (Service 2016b). A total of 221,498 acres were designated in 2 units. Three primary constituent elements are described in the final rule (Service 2016b), and include aquatic habitat for breeding and rearing, aquatic non-breeding habitat (including overwintering habitat), and upland habitat. To date, no project has proposed a level of effects for which the Service has issued a biological opinion of adverse modification for mountain yellow-legged frog critical habitat.

Northern Spotted Owl

Critical habitat for northern spotted owl was designated 1992, 2008 and 2012 (Service 2012c). A total of 9,577,969 acres were designated in 11 units in Washington, Oregon and California. Three primary constituent elements are described in the final rule (Service 2012c), and include forest types that support the northern spotted owl across its geographical range, habitat that provides for nesting and roosting, and foraging habitat. To date, no project has proposed a level of effects for which the Service has issued a biological opinion of adverse modification for northern spotted owl critical habitat.

Robust Spineflower

Critical habitat for robust spineflower was designated 2002 (Service 2002c). A total of 469 acres were designated in 6 units. Three primary constituent elements are described in the final rule (Service 2002c), and include sandy soils associated with active coastal dunes and inland sites with sandy soils, plant communities that support associated species, and plant communities that contain little or no cover by invasive species. To date, no project has proposed a level of effects for which the Service has issued a biological opinion of adverse modification for robust spineflower critical habitat.

Sierra Nevada yellow-legged Frog

Critical habitat for Sierra Nevada yellow-legged frog was designated in 2016 (Service 2016b). A total of 1,082,147 acres were designated in 3 units. Three primary constituent elements are described in the final rule (Service 2016b), and include aquatic habitat for breeding and rearing, aquatic non-breeding habitat (including overwintering habitat), and upland habitat. To date, no project has proposed a level of effects for which the Service has issued a biological opinion of adverse modification for Sierra Nevada yellow-legged frog critical habitat.

Valley Elderberry Longhorn Beetle

Critical habitat for valley elderberry longhorn beetle was designated in 1980 (Service 1980). A total of 515 acres were designated in 2 units. To date, no project has proposed a level of effects for which the Service has issued a biological opinion of adverse modification for valley elderberry longhorn beetle critical habitat.

Vernal Pool Fairy Shrimp

Critical habitat for vernal pool fairy shrimp was designated in 2006 (Service 2006d). A total of 597,821 acres were designated in 35 units in California and Oregon. Four primary constituent elements are described in the final rule (Service 2006d), and include the topographical characteristics to support the hydrology of vernal pool wetlands within grasslands, vernal pool wetlands with underlying restrictive soil layers that pond water for at least 18 days, sources of food, and shelter within the vernal pool wetlands. To date, no project has proposed a level of effects for which the Service has issued a biological opinion of adverse modification for vernal pool fairy shrimp critical habitat.

Vernal Pool Tadpole Shrimp

Critical habitat for vernal pool tadpole shrimp was designated in 2006 (Service 2006d). A total of 228,785 acres were designated in 18 units. Four primary constituent elements are described in the final rule (Service 2006d), and include the topographical characteristics to support the hydrology of vernal pool wetlands within grasslands, vernal pool wetlands with underlying restrictive soil layers that pond water for at least 41 days, sources of food, and shelter within the vernal pool wetlands. To date, no project has proposed a level of effects for which the Service has issued a biological opinion of adverse modification for vernal pool tadpole shrimp critical habitat.

Yadon's Piperia

Critical habitat for Yadon's piperia was designated in 2007 (Service 2007c). A total of 2,117 acres were designated in 8 units. Two primary constituent elements are described in the final rule (Service 2007c), and include a vegetation structure providing filtered sunlight on sandy soils; and presence of nocturnal, short-tongued moths in the families *Pyralidae*, *Geometridae*, *Noctuidae*, and *Pterophoridae*. To date, no project has proposed a level of effects for which the Service has issued a biological opinion of adverse modification for Yadon's piperia critical habitat.

Yosemite Toad

Critical habitat for Yosemite toad was designated in 2016 (Service 2016b). A total of 750,926 acres were designated in 16 units. Two primary constituent elements are described in the final rule (Service 2016b), and include aquatic habitat for breeding, and upland habitat. To date, no project has proposed a level of effects for which the Service has issued a biological opinion of adverse modification for Yosemite toad critical habitat.

Zayante band-winged Grasshopper

Critical habitat for Zayante band-winged grasshopper was designated in 2001 (Service 2001b). A total of 10,560 acres were designated in one unit. Three primary constituent elements are described in the final rule (Service 2001b), and include the presence of Zayante soils; the occurrence of Zayante sand hills habitat and the associated plant species; and certain microhabitat conditions, including areas that receive sunlight, widely scattered cover, bare or sparsely vegetated ground, and loose sand. To date, no project has proposed a level of effects for which the Service has issued a biological opinion of adverse modification for Zayante band-winged grasshopper critical habitat.

Environmental Baseline

Environmental baseline refers to 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 consequences 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.

General Description of the Environmental Baseline

Due to the size of the action area, the environmental baseline is described in general terms in the MRHCP, with the extent of modeled habitat for each Covered Species within the action area provided in Table 2 below, and table 2-7 in Chapter 2 of the MRHCP. Habitat conditions for Covered Species within the action area range from relatively undisturbed areas, to areas in active agriculture, to areas that have experienced considerable resource harvesting and extraction from logging or mining, to areas that have experienced extensive urbanization. PG&E's facilities, other than those that might be built as a result of Minor New Construction, pre-exist this analysis and are the baseline condition throughout the action area. Ongoing operations and maintenance

activities that will become Covered Activities under the Service's permit are currently occurring on the landscape in roughly the same scope and frequency as they will be after permit issuance. Thus, for purposes of establishing the environmental baseline, operations and maintenance activities as described above, excluding minor new construction activities, constitute the existing conditions with regard to PG&E facilities and right-of-ways within the action area. Discussions of climate, topography, geology and soils, and hydrology, for each of the MRHCP's three sub-regions, may be found in MRHCP Chapter 2, section 2.1 *Geographic Overview*, and are not summarized or reproduced here.

Central Coast Region

The Central Coast Region has a wide variety of habitats and vegetation, including coastal prairie scrub, mixed hardwoods, and valley oaks on the rolling hills and mountains that descend to the ocean. This region includes Santa Cruz County and stretches south through San Benito, Monterey, and San Luis Obispo Counties, and into northern Santa Barbara County. The region also includes a portion of southern Kern County along a gas transmission corridor. Like much of coastal California, the climate is characterized as Mediterranean. In general, the Central Coast Region has foggy summers, mild falls, and chilly, rainy winters. Farther inland, hot, dry summers and warm autumns are followed by mild, wet winters. Snowfall is rare.

North Coast Region

The North Coast Region encompasses coastal redwood forests, inland mountain valleys, and the North Coast Ranges in Humboldt, Mendocino, Lake, and Trinity Counties. The coastal climate is cool, moist, and often foggy, with rainy winters at lower elevations and snow in the high mountains. Inland the climate is drier with low rainfall in winter and hot, dry summers. Much of the North Coast Region is forested.

Sacramento Valley and Foothills Region

The Sacramento Valley and Foothills Region covers territory from Shasta County in the north to Tulare County in the south. A corridor also extends north through southeastern Siskiyou County and western Modoc County to the Oregon border. The Sacramento Valley portion of the region is mostly flat, and is situated between the northern Coast Ranges to the west, the Klamath Mountains to the north and the southern Cascade and Sierra Nevada Mountains to the east. The region also includes a northeastern piece of the Sacramento-San Joaquin River Delta. Climate in the Sacramento Valley is characterized by hot, dry summers with the high temperatures above 100° Fahrenheit (F) and cool, sometimes foggy winters. Precipitation falls as rain primarily from late fall through early spring.

In the more mountainous portions of the region, the climate varies with elevation. High elevations have cold snowy winters and cool summers; foothill areas have rainy winters and mild to hot summers. With the exception of occasional thunderstorms, summers are dry throughout the mountain and foothill portions of the region. Temperatures decrease with increasing latitude and elevation, declining by approximately 3.3°F for each 1,000 feet. At Blue Canyon, a weather station is located in the northern Sierra between Auburn and Truckee at about 4,700 feet elevation, It reports relative humidity to be highest in January at 60% and lowest in July at 30%. Extremely low relative humidity is common throughout the Sacramento Valley and Foothills Region during the summer.

Designated Critical Habitat

For each Covered Species with designated critical habitat, the amount of designated critical habitat within the action area is described in the *Environmental Baseline for Individual Covered Species* section of this Biological Opinion below. The MRCHP describes the percentage of the plan area that overlaps with each unit of designated critical habitat. Table 1 (MRHCP Table 4-11) contains this information and is included below for reference.

Covered Plant Species Habitats within the Plan Area

Since this project includes ongoing maintenance, the applicant has knowledge of where covered plants exist on the landscape relative to existing facilities. Discussion of known plant occurrences and plant habitat is within the individual plant descriptions in the *Environmental Baseline for Individual Covered Species* section below.

Covered Animal Species Habitats within the Plan Area

Table 2 presents the estimated extent of each wildlife species' habitat present in the Plan Area for each respective region.

Table 1: Potentially Impacted Critical Habitat Units

Covered Species	Critical Habitat Units with Possible Impacts (Percent of Plan Area in Critical Habitat Unit)
Invertebrates	
Conservancy fairy shrimp	1A (0.18%), 1E (0.23%)
Longhorn fairy shrimp	LONFS 3 (0.82%)
Vernal pool fairy shrimp	11 (3.84%), 12A (4.48%), 12B (1.14%), 13 (1.51%), 14A (0.53%), 28 (0.87%), 29A (2.36%), 29B (0.05%), 29C (3.83%), 29E (1.35%), 29F (1.97%), 29G (2.55%), 29H (2.67%), 30 (0.82%), 31 (1.06%), 5 (1.82%), 6 (3.06%), 7A (0.18%), 7E (0.23%), 7F (1.10%), 8 (3.95%), 9 (6.58%)
Vernal pool tadpole shrimp	1 (1.82%), 10 (0.83%), 2A (1.99%), 2B (2.47%), 3A (0.18%), 3E (0.23%), 3F (1.10%), 4A (6.58%), 4B (14.31%), 4C (0.14%), 4D (4.14%), 4E (2.62%), 4F (7.32%), 6 (10.17%), 7 (3.84%), 8 (1.51%), 9B (0.53%)
Morro shoulderband snail	1 (0.94%), 2 (2.19%), 3 (3.93%)
Valley elderberry longhorn beetle	Sacramento Zone (1.32%), American River Parkway Zone (0.01%)
Zayante band-winged grasshopper	1 (0.94%), 2 (2.19%), 3 (3.93%)
Amphibians and Reptiles	
California red-legged frog	Cal-1 (11.02%), Eld-1 (4.88%), Men-1 (1.30%), Mnt-1 (5.72%), Mnt-2 (1.88%), Mnt-3 (0.94%), Nev-1 (2.27%), Pla-1 (0.78%), Scz-1 (1.93%), Scz-2 (5.83%), Slo-1 (0.74%), Slo-2 (1.56%), Slo-3 (3.27%), Slo-4 (0.21%), Snb-1 (2.45%), Snb-2 (4.02%), Snb-3 (0.82%), Stb-2 (1.45%), Stb-4 (0.02%), Stb-5 (0.42%), Stb-6 (0.12%), Stb-7 (0.01%), Stc-2 (0.01%), Yub-1 (1.69%)
California tiger salamander (Central California DPS)	Cc (0.65%), Cv (0.59%), Eb (1.06%)
California tiger salamander (Santa Barbara County DPS)	Ela (2.04%), Esm (2.04%), Srs (5.07%, Wsmo (3.19%)
Sierra Nevada yellow-legged frog	Cc (0.65%), Cv (0.59%), Eb (1.06%)
Yosemite toad	1 (0.19%), 2 (0.16%)
Birds	
Marbled murrelet	CA-01-c (0.04%), CA-02-b (0.07%), CA-02-c (3.98%), CA-04-a (0.39%), CA-04-b (1.96%), CA-05-a (0.04%), CA-05-b (0.06%) CA-06-a (0.42%), CA-06-b (0.08%), CA-07-a (0.73%), CA-07-b (1.29%), CA-11-b (0.06%), CA-14-b (0.24%), CA-14-c (0.20%), CA-15 (1.40%)

Covered Species	Critical Habitat Units with Possible Impacts (Percent of Plan Area in Critical Habitat Unit)
Northern spotted owl	RC (0.26%), KW (0.03%), ICC (0.19%)
Plants	
Monterey spineflower	Fo (1.08%), Fb (13.58%), Man (8.77%), Mar (0.23%), Ml (0.45%), Pru (8.85%), So (3.34%)
Robust spineflower	1 (0.00%), 2 (0.00%), Sunset (0.0007%), Pogonip (0.0013%), Branciforte (0.0001%), Aptos (0.0005%), Freedom (0.0001%), Buena Vista (0.0011%)
Yadon's rein orchid	Br (0.15%), Map (0.88%), Mop (1.62%), Plr (0.54%), Vc (24.73%)

Table 2: Estimated Extent of Covered Wildlife Species Habitat in the Plan area of Each Region

Covered Species	Plan Area within Sacramento Valley and Foothills Region	Plan Area within North Coast Region	Plan Area within Central Coast Region
Invertebrates			
Conservancy fairy shrimp	2,260	0	0
Longhorn fairy shrimp	468	0	438
Vernal pool fairy shrimp	11,233	0	2,076
Vernal pool tadpole shrimp	11,233	0	2,076
Morro shoulderband snail	0	0	293
Mount Hermon June beetle	0	0	577
Ohlone tiger beetle	0	0	720
Valley elderberry longhorn beetle	2,997	0	0
Smith's blue butterfly	0	0	2,890
Zayante band-winged grasshopper	0	0	577
Amphibians			
California red-legged frog	16,275	1,092	10,804
California tiger salamander (Central California DPS)	14,105	0	32,192
California tiger salamander (Santa Barbara DPS)	0	0	3,340
Foothill yellow-legged frog	2,547	1,607	1,275
Mountain yellow-legged frog (northern and southern DPS)	16	0	0
Santa Cruz long-toed salamander	0	0	1,248
Sierra Nevada yellow-legged frog	194	0	0
Yosemite toad	0	0	0
Reptiles			
Blunt-nosed leopard lizard	0	0	6,228
Giant garter snake	17,520	0	0
Birds			
Marbled murrelet	0	1,881	607
Northern spotted owl	1,392	20,644	0
Mammals			
Giant kangaroo rat	0	0	5,565
Point Arena mountain beaver	0	177	0
San Joaquin kit fox	0	0	48,373

Environmental Baseline for Individual Covered Species

Beach Layia

a. North Coast Region

Habitat for beach layia totals about 2,333 acres in the North Coast Region.

Blunt-Nosed Leopard Lizard

a. Central Coast Region

The blunt-nosed leopard lizard occurs in the eastern portions of San Benito, San Luis Obispo, and Santa Barbara Counties in the Central Coast Region. Modeled habitat for the blunt-nosed leopard lizard within the Central Coast Region consists of approximately 2,209 acres of suitable habitat and 4,019 acres of core habitat (total of 6,228 acres).

Within this species' range livestock grazing has resulted in removal of herbaceous vegetation and shrub cover and destruction of rodent burrows used by lizards for shelter. Agricultural actions, petroleum and mineral extraction, pesticide applications, off-road vehicle use, and construction of transportation, communication, and irrigation infrastructures collectively have caused the reduction, fragmentation of populations, and decline of blunt-nosed leopard lizards endemic to California (Service 2007d).

California Red-Legged Frog

In the early to mid-1990s, a 70% reduction in the geographic range of this subspecies occurred. This decline primarily resulted from habitat loss and the alteration and introduction of exotic predators (Service 2002a). Populations in the Central Coast, Sacramento Valley and Foothills regions have greatly declined, possibly due to nonnative predators (bullfrogs and fish), habitat loss from development and agriculture, and pesticide pollution.

a. Central Coast Region

The California red-legged frog is found in all counties in the Central Coast Region. There are approximately 10,804 acres of modeled habitat within the Plan Area of Central Coast Region, which is composed of an estimated 2,076 acres aquatic/breeding habitat and 8,728 acres of upland habitat.

Critical Habitat

There are 11,854 acres of critical habitat within the Central Coast Region. All modeled habitat for this species in the Central Coast Region is within designated critical habitat for this species. The action area overlaps with the following units of designated critical habitat for the species: Mnt-1,-2, and -3; Scz-1 and -2; Slo-1, -2, -3, and -4; Snb-1, -2, and -3; Stb-2, -4, -5, -6, and -7; and Stc-2.

b. North Coast Region

Approximately 1,092 acres of habitat are modeled in Mendocino and Lake Counties in the the North Coast Region, which includes 148 acres of potential aquatic/breeding habitat and 945 acres of potential upland habitat.

Critical Habitat

There are 283 acres of critical habitat within the North Coast Region, overlapping the Men-1 unit of designated critical habitat.

c. Sacramento Valley and Foothills Region

Much of the California red-legged frog's upland habitat has been developed in the San Francisco Bay Area and in the Sierra Nevada foothills. As of 2018, 11 CNDDB occurrences are, "Presumed Extant," in the Sierra Nevada and associated foothills, with the greatest density of occurrences in El Dorado County (CDFW 2018). In Tuolumne County, the four occurrences in the Sierra Nevadas are, "Potentially Extirpated," (CDFW 2018). This species is distributed throughout all counties of the Sacramento Valley and Foothills Region, and there are approximately 16,275 acres of modeled habitat in the Plan Area within this region. This habitat is composed of 3,274 acres of potential aquatic/breeding habitat and 13,001 acres of potential upland habitat.

Critical Habitat

There are 876 acres of designated critical habitat for the California red-legged frog within the Sacramento Valley and Foothills Region, representing approximately 5.4% of modeled habitat within this region. The action area overlaps the following units of designated critical habitat: Cal-1, Eld-1, Nev 1, Pla-1, and Yub-1.

California Tiger Salamander - Central California and Santa Barbara DPSs

CTS populations have experienced dramatic declines throughout the historical range of the species, particularly in the Central Valley. CTS populations have declined as a result of two primary factors: widespread habitat loss and habitat fragmentation. These factors have both been caused by conversion of valley and foothill grassland and oak woodland habitats to agricultural and urban development (Stebbins and McGinnis 2012). Hybridization with nonnative tiger salamanders has also occurred on a large scale.

a. Central Coast Region

There are two distinct population segments for CTS in the Central Coast Region; the Central California DPS occurs in Santa Cruz, San Benito, Monterey, and San Luis Obispo Counties, and the Santa Barbara County DPS occurs only in Santa Barbara County.

In the Plan Area within the Central Coast Region, there are approximately 32,192 acres of modeled habitat consisting of 147 acres of aquatic/breeding habitat and 32,046 acres of upland habitat for the Central California DPS. For the Santa Barbara County DPS, there are 3,340 acres of modeled habitat in the Plan Area within the region. The modeled

habitat consists of 6 acres of aquatic/breeding habitat and 3,334 acres of upland habitat located in the west-central portion of Santa Barbara County.

Critical Habitat

There are 813 acres of critical habitat for the Central California DPS within the Central Coast Region, representing approximately 2.5% of modeled habitat in the region's Plan Area, all within the Central Coast unit of designated critical habitat.

There are 237 acres of critical habitat for the Santa Barbara DPS within the Central Coast Region, overlapping portions of the Eastern Los Alamos, Eastern Santa Maria, Santa Rita Valley, and Western Santa Maria/Orcutt units of designated critical habitat.

b. Sacramento Valley and Foothills Region

Only the Central California DPS of the species occurs in the Sacramento Valley and Foothills Region. It occurs in Butte, Sutter, Yolo, Sacramento, Amador, Calaveras, and Tuolumne counties. There are approximately 14,015 acres of modeled habitat in the Plan Area within this region. This habitat includes approximately 1,024 acres of potential aquatic/breeding habitat and 12,990 acres of the potential upland habitat.

Critical Habitat

Designated critical habitat for the Central California DPS encompasses 569 acres within the Sacramento Valley and Foothills Region. The Central Coast, Central Valley, and East Bay units are within this region of the action area.

Conservancy Fairy Shrimp

Conversion of vernal pool habitat to agricultural lands and urban development has occurred within the action area (Service 2005b). Remaining habitat for this species is limited and disjunct. Potentially suitable habitat can be found in the following land-cover types: annual and perennial grasslands; blue oak, coastal oak and valley oak woodlands; and vernal pool complexes.

a. Sacramento Valley and Foothills Region

This species occurs in Sutter, Tehama, Butte, Glenn, Colusa, Yuba, Placer, Yolo, and Sacramento Counties. Approximately 2,260 acres of habitat are modeled within the Sacramento Valley and Foothills Region.

Critical Habitat

There are 6 acres of designated critical habitat for the Conservancy fairy shrimp within the Sacramento Valley and Foothills Region, representing approximately 0.26% of modeled habitat in the region. Designated critical habitat units 1A and 1E are overlapped by the action area.

Foothill Yellow-Legged Frog

Historically, foothill yellow-legged frogs occurred in most Pacific drainages from the Santiam River in Oregon to the San Gabriel River in Los Angeles County and in the interior foothills and mountains from the Oregon border into southern California (Jennings and Hayes 1994). Within the action area, the species currently occupies the same general range with an extirpated occurrence in each of the following counties: Butte, Yuba and Napa (CDFW 2018). Potential extirpation has been reported for single occurrences in Merced, Sonoma, and Sutter Counties and for two occurrences in Mariposa County.

The species is still moderately abundant in coast drainages north of Monterey Bay and numerous historic populations appear to have been lost on the western slopes of the Sierra Nevada, especially in the southern part of its range (Stebbins and McGinnis 2012). Many of these population losses are associated with the damming and regulation of stream flow that leads to habitat loss and unnatural flow regimes (Ashton et al. 1997; Stebbins and McGinnis 2012). Periodic water releases (pulse flows) from upstream Sierra reservoirs during the breeding period can scour eggs from their attachments sites and washout and kill tadpoles (Kupferberg et al. 2008; Stebbins and McGinnis 2012). Also, decreased flows can force adult frogs to move into permanent pools, where they may be more susceptible to predation (Ashton et al. 1997). The introduction of nonnative predatory game fish species, nonnative crayfish, and American bullfrogs have also lead to a decline in populations in California (Ashton et al. 1997; Kupferberg et al. 2008; Stebbins and McGinnis 2012, Hayes et al. 2016).

a. Central Coast Region

The foothill yellow-legged frog occurs in the coastal mountain ranges of Santa Cruz, San Benito, Monterey, San Luis Obispo, and Santa Barbara Counties in the Central Coast Region. Modeled habitat within the Central Coast Region encompasses approximately 1,275 total acres, consisting of 74 acres of potential breeding habitat and 1,201 acres of potential dispersal habitat.

b. North Coast Region

The foothill yellow-legged frog occurs throughout the North Coast Region. Modeled habitat for this species within the North Coast Region encompasses 147 acres of breeding habitat and 1,460 acres of upland/dispersal habitat.

c. Sacramento Valley and Foothills Region

With the potential exception of Sutter County, the foothill yellow-legged frog occurs in each county of the Sacramento Valley and Foothills Region. There are approximately 2,547 acres of modeled habitat, composed of 197 acres of breeding habitat and 2,351 acres of upland.

Giant Gartersnake

a. Sacramento Valley and Foothills Region

The giant gartersnake is distributed throughout portions of Sacramento, Sutter, Butte, Colusa, and Glenn Counties; along the western border of the Yolo Bypass in Yolo County, west to the vicinity of Woodland in Yolo County; and along the eastern fringes of the Sacramento-San Joaquin River Delta from the Laguna Creek/Elk Grove region of central Sacramento County southward. The Sacramento Valley and Foothills Region is estimated to encompass approximately 17,520 acres of modeled habitat consisting of 2,416 acres of potential wetland and marsh habitat, 6,758 acres of upland habitat, and 8,345 acres of other aquatic (rice) habitat. Some of the 13 populations of giant garter snake may not be viable because they are small, highly fragmented, and restricted to small patches of habitat of limited quality (Service 1999b).

Surveys on the Natomas Basin found that the mean size of male and female giant garter snakes has decreased over time, and they are smaller than other populations to the north. This decrease in size could be due to changes in sampling methodology, or could be due to high mortality rates and decreased fitness in the Natomas Basin because of nematode infestations or vehicle collisions (Service 2012d).

Habitat has been lost due to agricultural development and flood control activities (Service 1999b). Upstream watershed modifications, water storage and diversion projects, and urban and agricultural development have removed and fragmented wetland habitat for giant garter snakes on the valley floor (Service 1999b). Invasive species have been introduced into the species' habitat, and individuals within the action area are subject to predation by feral cats, crayfish, and bullfrogs. Studies on other snake species have found that bullfrogs feed on snakes up to 31.5 inches (80 cm) in length (Service 1999b). Northern watersnakes (*Nerodia sipedon*) have been introduced into this species habitat and may compete with giant gartersnakes for resources (Service 2012d).

Giant Kangaroo Rat

a. Central Coast Region

The giant kangaroo rat occurs in San Benito and San Luis Obispo Counties. There are approximately 5,565 acres of modeled habitat for the giant kangaroo rat within the Central Coast Region. Conversion of natural habitat to agricultural lands has resulted in dramatic habitat loss for this species, though the amount of suitable lands that are currently being converted to agricultural use has slowed because the remaining suitable habitats are too rugged for agricultural uses (Service 2010c). Development of large-scale renewable solar energy projects, construction of large transmission lines, oil and gas developments in the southern portion of the species range and Kettleman Hills, increased off-road vehicle use throughout the species range, and urban and residential development in western Kern County, have all contributed to habitat loss and fragmentation for this species.

Ione Manzanita

a. Sacramento Valley and Foothills Region

Based on population sizes reported for three occurrences, plant density in Ione manzanita populations ranges from three to 41 plants per acre. Habitat for Ione manzanita totals about 6,582 acres of potential and occupied habitat. Ten occurrences mapped as specific

polygons total 4,522 acres, and five non-specific occurrences have an estimated 2,060 acres of potential habitat. For EO2, one small polygon is bisected by a distribution line and one large expansive polygon is bisected in only one location on its boundary by a distribution line. EO2 contains good quality habitat but portions are threatened by mining activities and a network of roads also crosses the majority of the polygons. Occurrence EO4 contains good quality, intact habitat and is only intersected by a distribution line at the northern end of the occurrence polygon. Occurrence EO5 is crossed by a network of gas and electric lines and is heavily disturbed by off-highway vehicle use and clay mining (CDFW 2018). Of the numerous polygons that compose EO6, only one is bisected by a distribution line; however, roads intersect some of the other polygons. Occurrence EO18 is a non-specific occurrence that has not been documented since 1967; therefore, this population is unlikely to be present. Extensive die off from *Phytophthora* sp. has occurred within EO5 (CDFW 2018).

Kern Mallow

a. Central Coast Region

Habitat for Kern mallow totals about 5,660 acres of occupied and potential habitat within the Central Coast Region. Reported population sizes for other occurrences outside the study area range from a single plant to 17,500 plants (averaging 117 plants per acre).

The occurrences of Kern mallow in the Plan Area are located in areas where there is little development. Most of the habitat is intact and crossed by only one electric facility; however EO 181 is crossed by two transmission lines that parallel and overlap the occurrence, intersecting most of the length of the occurrence. EOs 161 and 168 are the only two occurrences of Kern mallow in the Plan Area that are rated as containing poor habitat quality, because both occurrences are intersected by roads; vehicles and human disturbance threaten these occurrences (CDFW 2018). EO35 is rated as containing fair habitat quality, although two of its three polygons are intersected by State Route 166. Half of the Kern mallow occurrences in the Plan Area are non-specific, described only vaguely in terms of location; therefore, these populations may or may not be present where covered activities are conducted.

Layne's Ragwort

a. Sacramento Valley and Foothills Region

Habitat for Layne's ragwort totals about 1,172 acres of occupied and potential habitat. Much of the habitat within the range of Layne's ragwort is fragmented by rural development; PG&E's electric distribution lines cross 20 occurrences in these areas. Four Layne's ragwort occurrences have non-specific locations and, thus, may or may not be present where they have been mapped in CNDDB. Most occurrences of this species are degraded and disturbed by moderate to heavy development. EOs 12 and 50 are the only occurrences with habitat quality ranked as poor. EO12 has not been observed since the 1980s and no plants were observed in 2011. EO50 is located on public land leased as a recreational park. EO1 is the only occurrence with habitat quality ranked as excellent, likely because of a lack of threats and robust population, although some of the occurrence polygons appear to have been impacted by rural residential development. EO33 is the

only occurrence considered possibly extirpated because most or all of the habitat has been removed by roadwork.

Longhorn Fairy Shrimp

Potential suitable habitat can be found in the following land-cover types: annual and perennial grasslands; blue oak, coastal oak and valley oak woodlands; and vernal pool complexes.

a. Central Coast Region

Approximately 437 acres of longhorn fairy shrimp habitat are modeled within the Central Coast Region, all of which are in San Luis Obispo County.

Critical Habitat

There are 79 acres of longhorn fairy shrimp critical habitat in the Plan Area within the Central Coast Region, representing approximately 18% of modeled habitat in the region. All designated critical habitat in the region is within unit 3.

b. Sacramento Valley and Foothills Region

The longhorn fairy shrimp occurs in Alameda, Contra Costa, Kern, San Joaquin, and San Luis Obispo Counties within the Sacramento Valley and Foothills region. Approximately 468 acres of habitat are modeled within this region.

Marbled Murrelet

Declines in quality of murrelet prey have resulted in declines of the species within the action area (Service 2009e). Road construction within the action area has likely reduced habitat quality for this species, as individuals have been shown to be likely to nest far from roads (Golightly et al 2009). Logging activity is common within habitat for this species, and noise associated with logging (and other activities as well) is thought to attract corvids, which prey on nests and have been implicated as a major source of nest failure for this species (Hébert and Golightly 2006). Central Coast Region

The Central Coast Region contains 607 acres of modeled habitat for the marbled murrelet in northwest Santa Cruz County and along the central coast in Monterey County. The Monterey coast represents the extreme southern limit of the taxon's known breeding range (Ralph et al. 1995). Reported sightings of marbled murrelets along the central California coast have been concentrated within a 6-mile (10-kilometer) radius of Point Año Nuevo in Santa Cruz County (Ainley et al. 1995).

Critical Habitat

There are 166 acres of designated critical habitat within the Central Coast Region, representing approximately 28.4% of modeled habitat in the region's Plan Area.

a. North Coast Region

The marbled murrelet occurs in Humboldt and Mendocino Counties in the North Coast Region. There are 1,735 acres of modeled habitat for the marbled murrelet within this region. Marbled murrelets are widely distributed in coastal waters of western North America, usually within 3 miles (5 kilometers) of shore (Nelson 1997). The densest populations are centered on Prince William Sound, with subpopulations becoming smaller and disjunct southward (Ralph et al. 1995). The breeding distribution of marbled murrelet is determined by the distribution of accessible old-growth conifer forest. Accordingly, gaps in the species' breeding distribution in Washington, Oregon, and California may be the result of timber harvest practices (Ralph et al. 1995).

Critical Habitat

There are 953 acres of designated critical habitat for the marbled murrelet within the North Coast Region, representing approximately 55% of modeled habitat in the region.

Monterey Gilia

a. Central Coast Region

Habitat for Monterey gilia totals about 3,628 acres of occupied and potential habitat within the Central Coast Region. Half of the Monterey gilia occurrences have non-specific locations. EOs 14, 15, and 18 were recorded from fieldwork conducted in 1992 and have not been documented in more than 20 years in CNDDB (CDFW 2018). EO14 is composed of five polygons, three of which are intersected by gas and transmission lines. EO15 is composed of one polygon, which is bisected by a transmission line. EO18 is composed of six polygons, two of which are intersected by transmission lines. EO2 contains two polygons, the eastern of which is intersected by a transmission line; the transmission line parallels a road through the polygon, which would reduce impacts on high-quality habitat and individual plants from covered activities. EO2O and EO31 both contain numerous polygons that are intersected by a network of gas and electric lines. These occurrences are highly fragmented by urban development and contain heavily disturbed habitat (CDFW 2018).

Monterey Spineflower

a. Central Coast Region

Habitat for Monterey spineflower totals about 14,172 acres in the Central Coast Region. Population sizes reported for about half of the Monterey spineflower occurrences vary from about 100 plants to more than 100,000 plants (Table 4-29), with population densities ranging from 2 to 6,667 plants per acre. MRHCP Table 4-29 lists occurrences of this species within the Plan Area. Suitable habitat at EOs 6, 28, and 54 is highly fragmented by farmland conversion and more than half of the habitat within each occurrence polygon has been lost. For example, of the 108 acres that compose the single occurrence polygon at EO28, only 46 acres of suitable habitat remain, approximately 13 acres of which are located at the transmission line crossing and 33 of which are located at the eastern end of the occurrence, approximately 0.7 mile east of the transmission line. The other populations listed in Table 4-29 contain suitable habitat throughout most of

their mapped occurrence polygons. EOs 2, 6, 8, 46, 48, and 58 are crossed by gas facilities; covered activities associated with gas facilities required digging and grading to install those facilities.

Critical Habitat

Designated critical habitat for Monterey spineflower totals approximately 11,055 acres in the Central Coast Region. The Plan Area overlaps portions of the Fort Ord, Freedom Boulevard, Manresa, Marina, Moss Landing, Prunedale, and Soledad units of designated critical habitat for this species.

Morro Shoulderband Snail

Destruction and fragmentation of habitat due to urban development, degradation of habitat due to invasive nonnative plants and off-highway vehicle activity has occurred within the action area. Non-native snails share habitat with this species and compete for food and other resources (Service 1998c).

a. Central Coast Region

The Morro shoulderband snail occurs only in western San Luis Obispo County, in the area bordering Morro Bay. There are 294 acres of modeled MSBS habitat (82 acres natural habitat and 212 acres urban habitat) in the Plan Area within the Central Coast Region.

Critical Habitat

There are 41 acres of designated critical habitat for the Morro shoulderband snail within the Central Coast Region. All modeled habitat for this species is within critical habitat for this species. The action area overlaps designated critical habitat units 1, 2, and 3.

Mount Hermon June Beetle

a. Central Coast Region

The current population of Mount Hermon June beetle is still restricted to the Zayante sandhills ecosystem in Santa Cruz County and primarily distributed over an area approximately less than 10 square miles (Service 2009b). Approximately 577 acres of habitat are modeled within the Central Coast Region. Habitat for the Mount Hermon June beetle has been lost and fragmented due to sand mining, urban development, recreation, and agriculture. Fire suppression activities degraded habitat by allowing vegetation to build up, eliminating the sparsely vegetated, open areas most associated with the species (Service 2009b).

Mountain Yellow-Legged frog

a. Sacramento Valley and Foothills Region

Mountain yellow-legged frog is strongly associated with perennial mountain streams. Approximately 16 acres of modeled habitat are present in the Plan Area of this region of

the action area, all in the southern reaches of the Sacramento Valley and Foothills Region, near the Fresno County-Tulare County border.

Northern Spotted Owl

Barred owls compete with the northern spotted owl for prey and may kill northern spotted owls within the action area (Service 2008c, Service 2011c) Habitat loss from timber harvesting and wildfire throughout its range has led to population declines (Service 2011c).

a. North Coast Region

In the North Coast Region the northern spotted owl occurs in Humboldt, Trinity, Shasta, and Lake Counties. There are approximately 20,644 acres of modeled habitat for the species in the Plan Area within the region.

Critical Habitat

There are 2,405 acres of NSO critical habitat in the Plan Area within the North Coast Region, representing approximately 11.7% of modeled habitat in the region's Plan Area. The Plan Area in this region overlaps the Redwood Coast, portions of the Klamath West, and portions of Interior California Coast units of designated critical habitat.

b. Sacramento Valley and Foothills Region

The northern spotted owl inhabits cool, old-growth forests throughout California, from sea level to 7,600 feet in elevation. It occurs in Siskiyou, Modoc, Shasta, Tehama, Glenn, and Colusa Counties within the Sacramento Valley and Foothills Region. There are approximately 1,392 acres of modeled northern spotted owl habitat within the Plan Area of this region of the action area.

Critical Habitat

There are 161 acres of designated critical habitat for the northern spotted owl in the Plan Area within the Sacramento Valley and Foothills Region, representing approximately 11.6% of modeled habitat in the Plan Area within the region. The Plan Area in this region overlaps with the Interior California Coast unit of designated critical habitat

Ohlone Tiger Beetle

a. Central Coast Region

The Ohlone tiger beetle is endemic to Santa Cruz County, where it is found only in coastal terraces supporting remnant patches of native grassland habitat. There are approximately 720 acres of modeled habitat present in the Plan Area within the Central Coast Region. The Ohlone tiger beetle has been reported for a total of 16 occurrences from 11 different properties (Service 2019d). Occurrences are split into the following separate geographical areas:

West of the city of Soquel, the Ohlone tiger beetle was last documented in 2004 on a grassy terrace along Winkle Avenue in a private parcel. However, the species was not

observed during multiple visits in 2009. The CNDDB describes the occurrence as, "Presumed Extant."

Within the City of Scotts Valley, the species is known to occur on one parcel owned by the city (Service 2019d). The parcel is managed by the Land Trust of Santa Cruz County for the Ohlone tiger beetle and Scotts Valley spineflower.

North of the City of Santa Cruz, the Ohlone tiger beetle is known from a parcel owned by the city. While the parcel is maintained as an open space preserve, there isn't any management conducted specifically for the benefit of the Ohlone tiger beetle. No Ohlone tiger beetles have been noted at this location since 2004 (Arnold, pers. comm. 2009).

West of the City of Santa Cruz, the Ohlone tiger beetle was known from seven occurrences on five parcels at the time of the species listing (Service 2001c). The properties are contiguous, but the populations may be isolated due to unsuitable habitat in between occurrences. The properties are owned by the University of California, Santa Cruz, City of Santa Cruz, and private ownership. One occurrence was lost to development for a vineyard. Three occurrences have lacked observation of Ohlone tiger beetles in the last surveys and are potentially extirpated (Arnold, in litt. 2006, Arnold, pers. comm. 2009). Northwest of the City of Santa Cruz, the Ohlone tiger beetles were known to occur on property owned the California Department of Parks and Recreation (one occurrence) and the University of California, Santa Cruz (five occurrences).

Active Ohlone tiger beetles were documented at the California Department of Parks and Recreation property and in one University of California, Santa Cruz Property (Cooper pers. obs. 2009; Arnold, pers. comm. 2009). One property owned by the University contained active Ohlone tiger beetle larval burrows and Ohlone tiger beetles have not been documented at the remaining occurrences at the University. Active Ohlone tiger beetle larval burrows were detected at the California Department of Parks and Recreation property and in one University of California, Santa Cruz property (Cooper pers. obs. 2009). However, active adults were observed at a different occurrence without larval burrows. Each of the occurrences of Ohlone tiger beetle is limited in extent to 5 acres or less, and is geographically separated from other Ohlone tiger beetle areas (Hayes, pers. comm. 1995; Sculley, pers. obs. 1999 and 2000, Service 2009). However, potential habitat for the species (i.e., open space on Watsonville loam or similar soils, but with vegetation too dense to support beetles) may link some of the areas currently occupied by Ohlone tiger beetle (Jones & Stokes 2005).

Although the potential exists for this range-limited beetle to occur in other locations in the county supporting similar habitat, the beetle has not yet been found in other similar areas. The Ohlone tiger beetle appears to be presently restricted to coastal terrace habitats, at low to mid-elevations (lower than 1,200 feet [366 meters]), located between the crest of the Santa Cruz Mountains and the Pacific Ocean (Jones & Stokes 2005).

Point Arena Mountain Beaver

a. North Coast Region

Point Arena mountain beavers reside entirely in western Mendocino County in the North Coast Region. The Plan Area within the region contains approximately 177 acres of modeled habitat for the Point Arena mountain beaver.

The total number of individual Point Arena mountain beavers throughout their range is unknown. It is also unclear exactly how many separate Point Arena mountain beaver subpopulations currently exist, but estimations suggest there are 26 separate subpopulations (Service 1998b). The amount of occupied and suitable unoccupied Point Arena mountain beaver habitat throughout the range is unknown. Development, agriculture, recreation, water diversion, and invasive species, have all contributed to habitat loss, fragmentation, and degradation for this species (Service 2019e). Land conversion to livestock grazing limits this species from expanding its range within the action area (Service 1998b).

Pine Hill Ceanothus

a. Sacramento Valley and Foothills Region

Habitat for Pine Hill ceanothus totals about 1,293 acres of occupied and potential habitat. Habitat quality ranges from fair to excellent (CDFW 2018). All of the Pine Hill ceanothus occurrences are overlapped or surrounded by residential developments, with varying degree levels of fragmentation based on the intensity of development. The habitat at EO1 is surrounded by high-density residential development and it is likely that the species has been extirpated in some of the occurrence polygons. EOs 10 and 14 are located in rural residential areas where suitable habitat remains interspersed throughout the development. EO23 is heavily developed and little suitable habitat remains; the polygon at this occurrence is intersected by multiple distribution lines. EOs 4 and 5 contain the most intact suitable habitat; four polygons are intersected by distribution lines at EO4 and only one polygon at EO5 is intersected by a distribution line.

Pine Hill Flannelbush

a. Sacramento Valley and Foothills Region

Habitat for Pine Hill flannelbush totals about 243 acres of occupied and potential habitat. Population sizes reported for Pine Hill flannelbush are small, generally consisting of fewer than 100 plants per occurrence. Habitat quality ranges from poor to excellent (CDFW 2018). At EO1, seven of the 18 occurrence polygons are intersected by an electric facility, but only three of these polygons are bisected by the facility. EO1 is ranked as having excellent habitat quality. EOs 4 and 15 are intersected by electric facilities and are ranked as having fair habitat quality because of human disturbance and lack of management, respectively. EO6 contains one polygon that is intersected by a distribution line on its eastern boundary; this occurrence has not been documented in CNDDB since 1986. EO13 contains two polygons of which only one is intersected by a distribution line on its northern boundary. This occurrence is ranked as having poor quality habitat because of heavy disturbance and invasion by nonnative plants.

Robust Spineflower

a. Central Coast Region

Habitat for robust spineflower in the Central Coast Region totals about 210 acres of occupied and potential habitat. Reported population sizes for other occurrences range from 600 to a million plants. EO10 contains two polygons, both of which are intersected by a transmission line at the extreme southern end of each polygon. EO16 consists of one polygon, which has been highly fragmented by Aptos High School. This EO contains two robust spineflower colonies (CDFW 2018), the larger of which may be intersected by parallel gas and transmission lines. EO30 contains one polygon, which is intersected by one distribution line. The habitat at this EO is intact and the distribution line follows an existing road, which is expected to reduce impacts from covered activities on high-quality habitat and plants. EO31 contains one polygon, which is intersected by multiple transmission lines. This EO is non-specific and the exact location of the population is unknown; plants were seen in 2002 and 2003 but were not observed in 2009. Suitable habitat appears to be present.

Critical Habitat

Designated critical habitat for robust spineflower encompasses 469 acres, all of which is within Santa Cruz County in the Central Coast Region.

San Benito Evening-Primrose

a. Central Coast Region

Habitat for San Benito evening-primrose totals about 197 acres of occupied and potential habitat in the Central Coast Region. Population sizes reported for these occurrences ranged from fewer than 10 to 18,700 (CDFW 2018). Habitat quality ranges from fair to good (CDFW 2018). At EO1 and EO15 the polygon is intersected by a distribution line. EO12 is composed of two polygons, and the larger, eastern polygon is intersected by a distribution line. Both polygons are highly disturbed and the eastern polygon contains a building, concrete parking area, and graveled access road. EO13 and EO16 both contain two polygons, all of which are intersected by distribution lines. EO35 is not bisected by any facilities but vehicle access occurs there.

San Joaquin Kit Fox

a. Central Coast Region

The San Joaquin kit fox is known to occur in San Benito, Monterey, San Luis Obispo and Santa Barbara Counties within the Plan Area of this region. Within the Plan Area of the Central Coast Region, modeled habitat for SJKF consists of approximately 3,038 acres of high-value suitable habitat; 39,670 acres of low-value suitable habitat; and 5,665 acres of moderate-value suitable habitat.

Habitat loss and fragmentation as a result of agricultural, industrial, and urban development, in addition to continued predation and competition from coyotes and other predators, has occurred within the action area. Rabies is present in the population and leads to mortality of the species (Service 1998d). Noise in the environment from highway traffic, wind generators, and other human-related activities is known to interfere with foxes' ability to communicate, detect prey, and avoid predators.

Santa Cruz Long-Toed Salamander

a. Central Coast Region

Santa Cruz long-toed salamanders inhabit both aquatic and upland habitats in Santa Cruz and Monterey Counties. There are approximately 1,248 acres of modeled habitat for Santa Cruz long-toed salamander in the Plan Area within the Central Coast Region. The modeled habitat consists of 74 acres of breeding habitat and 1,201 acres of upland habitat. A majority of the Santa Cruz long-toed salamander's habitat has been lost to agriculture and urban sprawl. (CDFW 2018)

Santa Cruz long-toed salamander is found in southern Santa Cruz County and northern Monterey County and was documented in 24 breeding sites (Service 2019f). Of the sites that have been identified, 17 are located in southern Santa Cruz County and 7 in northern Monterey County. Of the 24 sites, breeding was documented at 19 of the known locations. (Service 2009a). According to CNDDB, the species is described from 22 occurrences, all of which are listed as extant, with seven occurrences in Monterey County and 15 occurrences in Santa Cruz County (CDFW 2018).

The population of the Santa Cruz long-toed salamander is relatively unknown. According to CNDDB, three occurrences have a trend described as, "Decreasing," with threats attributed to overgrazing, upland trenching, and agricultural encroachment (CDFW 2018). As described in the draft recovery plan (Service 1999c), the Santa Cruz long-toed salamander populations were grouped into three clusters (metapopulations). However, recent genetic evidence (Savage pers. comm 2009) suggests there is little to no interaction within the clusters of the Santa Cruz metapopulations. Consequently, the 5-year review (Service 2019f) describes four metapopulations in Santa Cruz County and two in Monterey County.

Sierra Nevada Yellow-Legged Frog

a. Sacramento Valley and Foothills Region

Highly suitable habitat is located in all of the small creeks in the Sacramento Valley and foothills Region, from the north starting below Lake Almanor to the south in Kings Canyon. There are approximately 194 acres of modeled habitat in the Plan Area within the region.

Historically, Sierra Nevada yellow-legged frogs were abundant but during the past century the species has declined throughout its range (CDFW 2011). The California Department of Fish and Wildlife surveyed historic populations between 1995 and 2010 and found that 69% of these populations had been extirpated (CDFW 2011).

The decline of the Sierra Nevada yellow-legged frog population and continuing threats are mostly attributable to predation by introduced trout (CDFW 2011; Stebbins and McGinnis 2012). Prior to the mid-1800s, fish were absent from nearly all high elevation habitats in California but since then fish stocking of high elevation lakes and streams has resulted in nearly all these habitats being occupied by trout (CDFW 2011; Stebbins and McGinnis 2012).

Introduction of chytrid fungus (Batrachochytrium dendrobatidis) into the species habitat has led to declines (CDFW 2011; Stebbins and McGinnis 2012). The chytrid fungus is waterborne and affects amphibians by keratinizing tissues, which disrupts critical skin functions such as osmoregulation and in tadpoles produces mouthpart deformities that can affect feeding (CDFW 2011). However, recent evidence suggests some resilience to chytrid fungus in Sierra Nevada yellow-legged frog populations had developed in those with a history of exposure (Knapp et al 2016). Research by Knapp et al. 2016 also demonstrated an increase in Sierra Nevada yellow-legged frog populations, which was, in part, attributed to the cessation of fish-stocking in Sierra Nevada lakes and the development of resilience to chytrid fungus.

Critical Habitat

Critical habitat designated for SYLF includes 1,146 acres in the Plan Area within the Sacramento Valley and Foothills Region. All modeled habitat for this species in the region is within critical habitat for this species.

Smith's Blue Butterfly

While sand dunes are described as Smith's blue butterfly suitable habitat, Smith's blue butterfly is geographically restricted and the previous outlined land cover types are more expansive and contain a mosaic of sand dunes. Information regarding suitable habitat for Smith's blue butterfly came from both the recovery plan and 5-year status review from Service (1984 and 2006c). Sand dunes habitat is too narrowly distributed to be captured in the mapping datasets used in the habitat modeling and instead, surrogate land cover types that could contain dune inclusions were used in the model.

Habitat degradation and loss due to human activities, such as residential and commercial development, recreation, sand mining, military activities, and possibly livestock grazing (Service 1984) have affected the species' habitat within the action area. Habitat fragmentation due to development, ground-disturbing activities, and invasive, nonnative plants within the action area is known to cause adults to travel further to other buckwheat strands. (Service 2006c).

a. Central Coast Region

Smith's blue butterfly is restricted to Monterey and San Luis Obispo Counties. There are approximately 2,890 acres of modeled habitat in the Plan Area within the Central Coast Region.

Stebbins' Morning-Glory

a. Sacramento Valley and Foothills Region

Habitat for Stebbins' morning-glory totals about 720 acres of occupied and potential habitat in the Plan Area. Reported population sizes for Stebbins' morning-glory are highly variable. Habitat quality is fair to excellent (CDFW 2018). EOs 1 and 2 both contain numerous polygons, of which five polygons and three polygons, respectively, are intersected by electric facilities. The habitat at both occurrences is disturbed by development and recreation. EO6 is located in suitable habitat between residential developments to the north and south; electric distribution lines intersect four polygons

within this occurrence. EO18 contains four polygons, two of which are bisected by a gas distribution line and two of which are bisected by an electric distribution line. EO22 contains nine occurrence polygons, five of which are intersected by distribution lines. The population at EO26 is attributed to an area with residential development and has not been recorded in CNDDB since 1997, when 15 plants were observed (CDFW 2018).

Valley Elderberry Longhorn Beetle

a. Sacramento Valley and Foothills Region

The valley elderberry longhorn beetle is found only in association with its host plant, elderberry. This species has a patchy distribution at elevations below 500 feet in Tehama, Butte, Glenn, Colusa, Sutter, Yuba. Nevada, Placer, Yolo, Sacramento, El Dorado, Amador, Calaveras, Tuolumne, and Mariposa Counties. Approximately 108,640 acres of habitat, all of which are below 500 feet, are modeled in the Plan Area within the Sacramento Valley and Foothills Region. More than 90% of streamside woodlands that were habitat for elderberry shrubs have been destroyed by stream and river channelization, removal of riparian vegetation, riprapping of shoreline, loss and alteration of habitat by agricultural conversion, and the use of insecticides and herbicides. Urban expansion has also impacted the beetle.

PG&E has been implementing VELB avoidance, minimization, and mitigation since 2003. These efforts have included training staff in shrub identification, avoiding and minimizing impacts, tracking impacts on shrubs, and mitigating impacts on shrubs. Internally, this information is codified in PG&E's VELB Standard and a VELB Procedure. A large percentage (up to 60%) of the shrubs that PG&E prunes is located in agriculture, urban, or other degraded habitat conditions and approximately one-third (up to 35%) is located in riparian areas.

Critical Habitat

There is approximately 0.35-acre of designated critical habitat for this species in the Plan Area of this region, overlapping portions of the Sacramento and American River Parkway zones of designated critical habitat for this species.

Vernal pool fairy shrimp

Conversion of vernal pool habitat to agricultural lands and urban development has occurred within the action area (Service 2005b). Remaining habitat for this species is limited and disjunct. Potentially suitable habitat can be found in the following land-cover types: annual and perennial grasslands; blue oak, coastal oak and valley oak woodlands; and vernal pool complexes. Potentially suitable habitat can be found in the following land-cover types: annual and perennial grasslands; blue oak, coastal oak and valley oak woodlands; and vernal pool complexes.

a. Central Coast Region

There are approximately 2,076 acres of modeled habitat for this species in the Plan Area within the Central Coast Region.

Critical Habitat

There are 2,818 acres of VPFS critical habitat in the Plan Area within the Central Coast Region. All modeled habitat for this species in the region is within critical habitat for this species.

b. Sacramento Valley and Foothills Region

There are approximately 11,233 acres of modeled habitat for the vernal pool fairy shrimp in the Plan Area within the Sacramento Valley and Foothills Region.

Critical Habitat

There are 2,245 acres of designated critical habitat for the vernal pool fairy shrimp in the Plan Area within the Sacramento Valley and Foothills Region, representing approximately 20% of modeled habitat in the region.

Vernal Pool Tadpole Shrimp

Conversion of vernal pool habitat to agricultural lands and urban development has occurred within the action area (Service 2005b). Remaining habitat for this species is limited and disjunct. Potentially suitable habitat can be found in the following land-cover types: annual and perennial grasslands; blue oak, coastal oak and valley oak woodlands; and vernal pool complexes. Potentially suitable habitat can be found in the following land-cover types: annual and perennial grasslands; blue oak, coastal oak and valley oak woodlands; and vernal pool complexes.

a. Central Coast Region

There are approximately 2,076 acres of modeled habitat for this species in the Plan Area within the Central Coast Region.

b. Sacramento Valley and Foothills Region

There are approximately 11,233 acres of modeled habitat for the vernal pool tadpole shrimp in the Plan Area within the Sacramento Valley and Foothills Region.

Critical Habitat

There are 2,822 acres of designated critical habitat for the vernal pool tadpole shrimp in the Plan Area within the Sacramento Valley and Foothills Region, representing approximately 25% of modeled habitat in the region. The Plan Area overlaps designated critical habitat units 1, 2A, 2B, 3A, 3E, 3F, 4A, 4B, 4C, 4D, 4E, 4F, 6, 7, 8, 9B, and 10.

Yosemite Toad

a. Sacramento Valley and Foothills Region

The Yosemite toad is endemic to shallow, quiet streams in higher elevations of the Sierra Nevada Mountains. The species is limited to Tuolumne, Mariposa, Madera, and Fresno Counties in the southern reaches of the Sacramento Valley and Foothills Region, where

there is less than 1 acre of modeled habitat for this species near the PG&E ROW, just east of State Route 41 in Mariposa County.

Yosemite toad populations declined or disappeared from more than 50 percent of the sites where it has been previously recorded (Jennings and Hayes 1994). Brown et al (2015) indicates that Yosemite toad is still well distributed relative to post-1990 records but abundances are low. Some proposed explanations for declines are cattle grazing, drought, ultraviolet radiation, and predation from introduced trout (Jennings and Hayes 1994; Service 2010; Stebbins and McGinnis 2012); however, the degree to which each of these factors affects the environment for this species is unclear. Recent studies suggest that cattle grazing on U.S. Forest Service lands does not negatively affect Yosemite toad habitat (Roche et al 2012) and that ultraviolet radiation (UV-B) does not appear to affect the hatching success of Yosemite toad eggs (Vredenburg et al 2010). Yosemite toad appears to be persisting in areas where chytrid fungus is common (Fellers et al 2011). However, the Yosemite Toad Environmental Assessment ranked chytrid fungus's threat as "high," in the short term and, "unclear," over long term (Brown et al 2015); the species has demonstrated declines in abundance, despite some persistence. Other possible contributions to declines include effects from roads and timber harvests, vegetation and fire management activities, recreation, and dams and water diversions (Karlstrom 1962; Maier 2018; Barnes 2017a, 2017b, and 2018). The *Yosemite Toad Environmental Assessment* suggests altered meadow hydrology and long-lived adult upland nonbreeding habitat may be responsible for declines (Brown et al 2015). Climate change and recreational activities have altered habitat for this species (Brown et al 2015).

Critical Habitat

There are 208 acres of designated critical habitat in the Plan Area within the Sacramento Valley and Foothills Region, overlapping portions of designated critical habitat units 1 and 2.

Yadon's Rein Orchid

a. Central Coast Region

Habitat for Yadon's rein orchid in the Central Coast Region totals about 2,125 acres in the Plan Area. Population sizes reported for impacted occurrences range from none to 129,000 plants. Habitat quality ranges from good to excellent (CDFW 2018). Urban encroachment into Monterey pine forest across the range of Yadon's rein orchid has fragmented and disturbed all occurrences within the Plan Area. EO12 is the only occurrence ranked as containing excellent habitat (CDFW 2018), although the occurrence is non-specific and fragmented by urban and agricultural development. EO12 contains three polygons, one of which is fully bisected by a transmission line. The other two polygons are intersected by transmission lines near the boundary of the polygons. Similarly, EOs 9 and 11 are intersected by a facility only near the boundary of the occurrences. EO9 is considered to be possibly extirpated because the habitat is not typical for the species and plants were not observed in surveys during 2013, nor in four additional surveys during following years. EO10 encompasses a residential neighborhood and is intersected by the associated network of transmission lines.

Critical Habitat

Designated critical habitat for Yadon's rein orchid encompasses approximately 2,117 acres in the Central Coast Region.

Zayante Band-Winged Grasshopper

a. Central Coast Region

The Zayante band-winged grasshopper is known to occur only in the Zayante sandhills of Santa Cruz County. There are approximately 577 acres of modeled habitat for this species in the Plan Area within the Central Coast Region.

Critical Habitat

There are 1,082 acres of designated critical habitat for the Zayante band-winged grasshopper in the Plan Area within the Central Coast Region. All modeled habitat for this species in the region's Plan Area is within critical habitat for this species. The Plan Area overlaps designated critical habitat units 1, 2, and 3.

Effects of the Action

MRHCP Impact Analysis and Methods

The methodology used to determine the amounts of habitat loss and disturbance on Covered Species is describe in MRHCP Chapter 4, section 4.1, *Impact Definition and Analytical Methods*, and subsections to that section. While not referenced in the individual effects analyses in the Effects of the Action for this Biological Opinion, these sections form the basis of our determinations of the effects of the action on individual Covered Species.

Definitions of Permanent Habitat and Temporary Habitat Loss

Permanent Habitat Loss

Permanent habitat loss results from any of the following activities or conditions:

- New facilities located in a new right-of-way (ROW) (i.e., minor new construction).
- Conversion of the existing land cover for a covered species to a developed land cover or to a habitat that would no longer be usable by a covered species.
- Any activity that causes an impact lasting more than 12 months.
- ROW expansion or management that results in land cover conversion.
- A long-term, substantial increase in the frequency and magnitude of covered activity impacts such that the habitat is no longer available to a Covered Species.

Permanent impacts on plants are defined as absence of the plant for more than 1 year after it is impacted.

Temporary Habitat Loss

Temporary habitat loss is attributed to covered activities that occur over a period of days, weeks, or months, but no longer than 12 months. Although these activities may have an impact on habitat values for covered species, impacts on habitat are temporary in nature and allow habitat functions and values to return within a year. Temporary impacts on habitat are expected to result in take, both direct and indirect, of individuals of the covered species.

Temporary impacts on plants are defined as pruning or temporarily removing topsoil and seedbank—activities that usually allow the plants to recover.

Temporary and Permanent Effects with Respect to Valley Elderberry Longhorn Beetle

Permanent Loss of Valley Elderberry Longhorn Beetle Habitat:

Any covered activity that results in removal of an entire elderberry shrub with at least one stem greater than 1-inch diameter at ground level will be counted as a loss of one shrub.

Temporary Disturbance of Valley Elderberry Longhorn Beetle Habitat:

Any covered activity that results in pruning of one or more elderberry shrub stems greater than 1-inch diameter at ground level, where pruning is at 6-feet or below in height, when the plant is left in place.

Any covered activity that results in pruning of elderberry shrub stems, regardless of stem diameter, beyond 6 feet above ground level during the months of March through May.

General Effects of Covered Activities Common to All Species

Possible effects on covered wildlife species include crushing, killing, injuring, entombment, or capturing (inadvertent or otherwise) during an activity (e.g., in an excavator bucket or in fencing), regardless of the life stage or habitat type (aquatic versus terrestrial). These effects are anticipated as well for plants, which could be damaged or destroyed by personnel, vehicles, or equipment. Indirect effects for covered species include introduction of invasive plant species, increased sedimentation of aquatic habitat near worksites, or introduction of pollutants caused by a covered activity near species habitat or off-site, possibly leading to eventual degradation of habitat, or introduction of pathogens into species' habitat.

Some of the effects on Covered Species described above, and in individual species accounts in the *Effects of the Action by Species* section below, will be avoided or minimized by implementation of the *Conservation Strategy*. The Environmental Review, Planning, and Screening Process described in the *Conservation Strategy* is expected to result in avoidance of this species, or minimization of the effects of Covered Activities on the species, by planning Covered Activities so that they avoid entering Covered Species' habitat whenever possible. This is expected to reduce the number of individuals of all Covered Species that may be crushed or buried by vehicles.

General Effects Associated with Mitigation Common to All Species

Habitat acquisition and other mitigation efforts would benefit Covered Species; however, during implementation of the conservation strategy, some adverse effects could result. For example,

standard maintenance and monitoring of mitigation lands (e.g., fencing, surveying, conducting biological surveys, and conducting habitat enhancements) could result in some minor adverse effects that flush or disturb species; individuals of several species could be inadvertently injured or killed. These potential effects are generally described below.

a. Covered Wildlife

During the maintenance of vernal pools, wetlands and other aquatic habitats, riparian habitats, forests, and grasslands, individual covered wildlife species could be harmed. The magnitude of these potential effects would depend on the size and type of activity, its proximity to individuals or a population, the life stage of the species, and duration of the effects on habitat characteristics. Management plans for mitigation efforts would maximize beneficial effects and minimize adverse effects through the incorporation of AMMs for Covered Species.

b. Covered Plants

In the course of implementing conservation measures for covered plants, direct and indirect effects could result. The magnitude of potential effects would depend on the size and type of activity, proximity of individuals or a population to the Covered Activity, the life stage of the species, and the short- and long-term effects on habitat characteristics. However, specific management plans for plant mitigation efforts would maximize beneficial effects and minimize adverse effects.

General Effects on Critical Habitat for All Covered Species with Designated Critical Habitat

For all discussions of critical habitat for Covered Species that have critical habitat designated, we anticipate that no units of designated critical habitat listed in Table 1 in the Environmental Baseline will to be removed. Temporary and permanent losses of critical habitat described in the *Effects of the Action by Spe*cies section below will be distributed throughout both time and space within the plan area. We anticipate most individual temporary and permanent losses of critical habitat to be less than 0.10-acre in size. This anticipated level of loss and disturbance to the units of designated critical habitat that will be affected by Covered Activities is not expected to impair the ability of any of those units to continue to function as habitat for the species in their respective regions. Furthermore, the *Conservation Strategy* encourages the applicant to secure mitigation land within designated critical habitat, so we anticipate that protection of some of the currently unprotected portions of critical habitat are likely to result from the action in all regions where designated critical habitat for Covered Species occurs.

<u>Habitat Loss Expected by MRHCP Region</u>

Tables 3, 4, and 5 depict the amount of permanent and temporary habitat loss for covered animal species on an annual and 30-year basis for the Central Coast Region, North Coast Region, and Sacramento Valley and Foothills Regions, respectively. For purposes of analyzing the Effects of the Action, we regard the annual totals for each species to be estimates. Annual habitat loss may be lesser or greater than shown on these tables. We regard the 30-year totals to be maximum amounts of permanent and temporary habitat loss, and our conclusions assume that 100% of the 30-year totals will occur over the 30-year permit term.

Table 6 depicts the amount of permanent habitat loss, as well as the anticipated amount of individual plants lost for covered plant species. Annual habitat loss and individual plant loss has been estimated for covered plant species and is depicted in Table 6 below. Although the MRHCP caps losses at whichever limit is reached first, we regard the 30-year totals to be maximum amounts of permanent habitat loss and loss of individuals, and our conclusions assume that 100% of the 30-year totals will occur over the 30-year permit term. The Conservation for covered plants is expected to result in permanent protection of habitat for all covered plant species. Plants that are killed or removed will be replaced at a 3:1 ratio, which is expected to ensure that, at a minimum, the action will not result in a net loss of individual plants, and at a maximum, may result in an increase of individual plant species. We therefore expect the MRHCP to result in a net benefit for covered plant species.

For all of the 30-year totals described in Tables 3, 4, 5, and 6, we note that the maximum acreages of permanent and temporary loss (and maximum number of individuals described for covered plant species) will be distributed throughout the Plan Areas of their respective regions in both time and space, and we anticipate individual areas of permanent and temporary habitat loss to be usually very small and have a negligible effect on the species as a whole, although any single Covered Activity may result in effects described in the Effects of the Action by Species section below.

Table 3: Summary of Estimated Habitat Loss for Covered Wildlife Species in the Central Coast Region (acres)

	Permanent Loss		Temporary Loss	
Species and Habitat	Annual Total	30-Year Total	Annual Total	30-Year Total
Aquatic Invertebrates				
Longhorn fairy shrimp habitat	0.06	1.67	0.34	10.25
Vernal pool fairy shrimp habitat	0.40	11.90	1.78	53.32
Vernal pool tadpole shrimp habitat	0.40	11.90	1.78	53.32
Terrestrial Invertebrates				
Morro shoulderband snail habitat	0.10	3.00	0.20	6.00
Mount Hermon June beetle habitat	0.25	7.50	0.75	22.50
Ohlone tiger beetle habitat	0.25	7.50	0.75	22.50
Smith's blue butterfly habitat	0.51	15.25	2.42	72.69
Zayante band-winged grasshopper habitat	0.12	3.59	0.51	15.15
Amphibians				
California red-legged frog breeding habitat	0.50	15.00	3.00	90.00
California red-legged frog upland habitat	2.00	60.00	10.00	300.00
California tiger salamander (Central California DPS) breeding habitat	0.03	0.85	0.13	3.78
California tiger salamander (Central California DPS) upland habitat	6.02	180.59	27.31	819.40
California tiger salamander (Santa Barbara DPS) breeding habitat	0.001	0.02	0.005	0.14
California tiger salamander (Santa Barbara DPS) upland habitat	0.39	11.77	2.57	77.01

Species and Habitat	Permanent Loss		Temporary Loss	
	Annual Total	30-Year Total	Annual Total	30-Year Total
Foothill yellow-legged frog breeding habitat	0.01	0.30	0.06	1.76
Foothill yellow-legged frog dispersal habitat	0.17	5.15	0.96	28.82
Santa Cruz long-toed salamander breeding habitat	0.10	3.00	0.10	3.00
Santa Cruz long-toed salamander upland habitat	0.50	15.00	1.5	45.00
Reptiles				
Blunt-nosed leopard lizard suitable habitat	0.45	13.28	1.92	57.56
Blunt-nosed leopard lizard core habitat	0.58	17.52	3.22	96.75
Birds				
Marbled murrelet habitat	0.50	15.00	0.75	22.5
Mammals				
Giant kangaroo rat habitat	1.00	30.00	5.00	150.00
San Joaquin kit fox high-value suitable habitat	0.50	15.00	3.00	90.00
San Joaquin kit fox low-value suitable habitat	7.13	213.86	33.43	1,002.99
San Joaquin kit fox moderate-value suitable habitat	0.97	29.06	4.72	141.49

Table 4: Summary of Estimated Habitat Loss for Covered Wildlife Species in the North Coast Region (acres)

Species and Habitat	Permanent Impacts		Temporary Impacts	
	Annual Total	30-Year Total	Annual Total	30-Year Total
Amphibians				
California red-legged frog breeding habitat	0.10	3.00	0.20	6.00
California red-legged frog upland habitat	0.25	7.50	1.00	30.00
Foothill yellow-legged frog breeding habitat	0.02	0.60	0.12	3.35
Foothill yellow-legged frog dispersal habitat	0.21	6.30	1.17	35.07
Birds				
Marbled murrelet habitat	1.00	30.00	2.00	60.00
Northern spotted owl habitat	5.00	150.00	20.00	600.00
Mammals				
Point Arena mountain beaver habitat	0.10	3.00	0.25	7.50

Table 5: Summary of Estimated Habitat Loss for Covered Wildlife Species in the Sacramento Valley and Foothills Region (acres)

Species and Habitat	Permanent Impacts		Temporary Impacts	
	Annual Total	30-year Total	Annual Total	30-year Total
Invertebrates				
Conservancy fairy shrimp habitat	0.25	7.50	1.93	57.92

Species and Habitat	Permanent Impacts		Temporary Impacts	
	Annual Total	30-year Total	Annual Total	30-year Total
Longhorn fairy shrimp habitat	0.06	1.65	0.36	10.81
Vernal pool fairy shrimp habitat	1.00	30.00	9.51	285.17
Vernal pool tadpole shrimp habitat	1.00	30.00	9.51	285.17
Valley elderberry longhorn beetle habitat	2.63	78.93	9.39	281.67
Amphibians				
California red-legged frog breeding habitat	1.00	30.00	3.0	90.0
California red-legged frog upland habitat	2.00	60.00	10.35	310.52
California tiger salamander (Central California DPS) breeding habitat	0.17	5.06	0.85	25.36
California tiger salamander (Central California DPS) upland habitat	2.27	68.22	10.88	326.31
Foothill yellow-legged frog breeding habitat	0.02	0.75	0.15	4.59
Foothill yellow-legged frog dispersal habitat	0.29	8.78	1.80	54.87
Mountain yellow-legged frog habitat	0.02	0.60	0.10	3.00
Sierra Nevada yellow-legged frog habitat	0.02	0.68	0.15	4.48
Yosemite toad habitat	0.02	0.5	0.07	2.00
Reptiles				
Giant garter snake aquatic habitat—wetland and marsh	0.43	12.75	3.00	90.00
Giant garter snake upland habitat	1.27	38.01	10.00	300.00
Giant garter snake aquatic habitat—rice	1.68	50.48	10.00	300.00
Birds				
Northern spotted owl habitat	0.50	15.00	2.00	60.00

Table 6: 30-Year Permanent Habitat Loss for Covered Plants and Loss of Individual Plants

Common Name	Status under the Endangered Species Act	Amount of Impact on Occupied Habitat (acres) and Plants over 30 years (Total will be capped at whichever number is reached first.)
Ione manzanita	Threatened	12.25 acres; 64 plants
Pine Hill ceanothus	Endangered	3.67 acres; 33 plants
Pine Hill flannelbush	Endangered	1.19 acres; 2 plants
Stebbins' morning-glory	Endangered	2.31 acres; 787 plants
Layne's ragwort	Threatened	2.86 acres; 103 plants
Beach layia	Endangered	0.32 acres; 143 plants
San Benito evening-primrose	Threatened	0.37 acres; 1,888 plants
Monterey spineflower	Threatened	46.6 acres; 4,376 plants
Robust spineflower	Endangered	1.3 acres; 3,765 plants
Kern mallow	Endangered	10.5 acres; 1,226 plants
Monterey gilia	Endangered	6.6 acres; 6,266 plants
Yadon's rein orchid	Endangered	2.1 acres; 64 plants

Effects of the Action by Species

Beach Layia

a. North Coast Region

Covered activities may disrupt the seedbank as a result of excavation if seeds are removed from the soil or desiccate from exposure at the ground surface during the dry season. Seedbank disruption could result in reduced regrowth of beach layia once the soil is replaced. Seeds could also be buried by grading or lost where new facilities are constructed. However, given that beach layia would only be affected by covered activities associated with electric facilities, most effects would be above ground (e.g., as a result of access, staging equipment, work on overhead wires) and restricted to localized areas where existing electric poles are replaced or new electric poles are installed. Individuals may be crushed by off-road vehicle travel, which could reduce reproductive success. The only known occurrence of this species within the Plan Area is CNDDB occurrence 15; however, the MRHCP anticipates the discovery of currently unknown populations of this species, so it is possible that other populations may be affected by the action.

AMMs described in the Conservation Strategy are expected to avoid or minimize these effects when Covered Activities are carried out. AMM Plant-02 requires heavy equipment to remain on roads within map book zones, which is expected to prevent individuals from being crushed. Plant-03 requires stockpiling the top 4 inches of soil before commencing ground-disturbing activities in Map Book Zones, and returning it once work has been completed, which is expected to minimize impacts to the seed bank for this species and allow it to persist in its habitat after ground-disturbing Covered Activities have taken place. Plant-04 requires flagging and marking avoidance areas, reducing the amount of plants that will be damaged or crushed from Covered Activities, as well as reducing disturbance or removal of its habitat. Plant-05 requires PG&E to collect seeds if plants cannot be avoided, reducing negative effects on the species' reproductive success. Plant-06 requires plants to have set seed before Covered Activities have taken place, if plants cannot be avoided, thereby reducing negative effects on reproductive success. FP-10 requires the applicant to minimize the construction footprint, which will limit the amount of habitat disturbed and lost, as well as individuals lost, by Covered Activities.

Blunt-Nosed Leopard Lizard

a. Central Coast Region

Covered activities could result in mortality or injury. Individual eggs, juveniles, or adults, may be crushed or buried by vehicles, equipment, or personnel performing covered activities in the species' habitat, either while lizards are above ground during their active or breeding season, or underground during their inactive period.

AMMs assigned during the *Environmental Review, Planning, and Screening Process* are also expected to reduce effects on the blunt-nosed leopard lizard. FP-02 restricts vehicles and equipment to designated areas, reducing the number of individual blunt-nosed leopard lizards that may be crushed or buried by vehicles or entombed in burrows. FP-03 requires minimizing the development of new roads, which will reduce the number of

individual blunt-nosed leopard lizards killed and injured by road construction during road grading by reducing the necessity for building new roads, and will minimize habitat loss and degradation during MRHCP implementation. FP-04 minimizes loss of natural vegetation, thereby reducing habitat degradation within the Plan Area. FP-13 requires escape ramps in open trenches and steep-walled holes, which will prevent blunt-nosed leopard lizards from becoming trapped and subsequently killed in such construction features. Finally BNLL-1 requires surveys, identification and avoidance of burrows, and the establishment of exclusion zones, which are collectively expected to reduce habitat degradation as well as the number of blunt-nosed leopard lizards injured or killed from Covered Activities.

In addition to the AMMs, the conservation strategy allows PG&E to restore habitat as mitigation for this species, either directly performing restoration themselves, or by contributing funds to other entities to perform restoration. As a result, we anticipate that new habitat will be available to this species as a result of the action.

California Red-Legged Frog

a. General Effects on the Species

Covered activities may result in mortality or injury. Individual frogs may be crushed or buried by vehicles or equipment performing vegetation removal, grading, trenching, or excavation work in upland habitat, particularly when in close proximity to breeding habitat or where individuals utilizing small animal burrows or may be moving between aquatic habitats or in search of more favorable conditions. Tadpoles and eggs could be crushed by vehicles or equipment operating in, or moving through, aquatic habitat. All life stages could be impacted by reduced water quality (through sedimentation or pollution) or quantity (through changes to hydrology) as a result of covered activities in or near habitat such that injury or mortality of one or more individuals could result. During a storm-related or other emergency construction event, crews could be active at night and could take adult and juvenile frogs that happen to be dispersing through a work site during winter rains. Covered activities may occasionally need to be implemented in or near aquatic habitat where there is the potential for death or injury of eggs, larvae, or adults. Crews working in or near aquatic habitat may introduce pathogens, such as the fungus *Batrachochytrium dendrobatidis* that causes chytridiomycosis in frogs.

Implementation of the following measures would occur: FP-02 restricts vehicles and equipment to designated areas, reducing the number of individual California red-legged frogs that may be crushed or buried by vehicles or entombed in burrows. FP-03 requires minimizing the development of new roads, which will reduce the number of individual California red-legged frogs killed and injured by road construction during road grading by reducing the necessity for building roads, and will minimize habitat loss and degradation during MRHCP implementation. FP-04 will keep vehicles and equipment out of wet areas and minimize impacts on natural vegetation, reducing the chances that crews may inadvertently degrade habitat by releasing pollutants, reducing the chances that work crews may injure or kill individuals while working in aquatic habitat, and reducing the chances that crews may introduce pathogens into habitat for California red-legged frogs. FP-11 will avoid soil and sediment runoff into water bodies, reducing the amount of sedimentation that will be experienced by aquatic habitat near work sites. FP-12 will limit stockpiles and require covering of spoils, reducing sedimentation in a similar

manner to FP-11. FP-13 requires escape ramps in open trenches and steep-walled holes, which will prevent California red-legged frogs from becoming trapped and subsequently killed in such construction features. FP-16 requires a 250-foot buffer around wetlands and ponds that may be habitat for this species, and/or requires biological monitoring, which is anticipated to keep most Covered Activities from occurring within aquatic habitat for this species, thereby reducing effects on the species similar to FP-11, as well as greatly reducing the chances for pathogens to be introduced into this species habitat. Wetland-2 requires 50-foot buffer for large activities around wetlands, ponds, and riparian areas, and will reduce effects on the species similar to FP-16. FP-06 requires inspection of materials and pipes prior to moving materials on-site, which will prevent frogs from being trapped, injured, or killed in pipes. FP-08 prevents degradation of upland and aquatic habitat by prohibiting trash dumping on or around work sites. FP-01 requires training construction crews the MRHCP's AMMs, ensuring that the avoidance and minimization of effects intended by those AMMs will be experienced by the species. FP-15 prohibits refueling within 250 feet of vernal pools, ponds, and streams, which is expected to prevent fuels from polluting this species habitat and killing or injuring eggs, larvae, dispersing juveniles, and breeding adults.

In addition to the AMMs, the conservation strategy allows PG&E to restore habitat as mitigation for this species, either directly performing restoration themselves, or by contributing funds to other entities to perform restoration. As a result, we anticipate that new habitat will be available to this species as a result of the action.

b. Central Coast Region

Critical Habitat

Covered Activities are expected to permanently remove 2.50 acres of critical habitat and temporarily remove 13.00 acres annually. The maximum possible 30-year loss of critical habitat is expected to be 75.0 acres of permanent habitat loss and 390.0 acres of temporary habitat loss. Combined, this represents 0.028% of the entire critical habitat designation for this species.

c. North Coast Region

Critical Habitat

Covered activities are expected to permanently remove 0.09-acre and temporarily remove 0.31-acre of critical habitat for this species annually. The maximum possible 30-year loss of critical habitat is expected to be 10.5 acres of permanent habitat loss and 36.0 acres of temporary habitat loss which, when combined, represent 0.003% of the entire critical habitat designation for this species.

d. Sacramento Valley and Foothills Region

Critical Habitat

Covered Activities are expected to permanently remove 0.16-acre of critical habitat and temporarily remove 0.72-acre annually. The maximum possible 30-year loss of critical habitat is expected to be 90 acres of permanent habitat loss and 400.5 acres of temporary

habitat loss. Combined, this represents 0.03% of the entire critical habitat designation for this species.

California Tiger Salamander – Central California and Santa Barbara DPS

a. General Effects on the Species

The general effects of the action on both DPSs of the California tiger salamander present in the action area are the same as those described for the California red-legged frog. However, additional AMMs are expected to avoid or minimize effects on this species as follows:

Wetland-1 requires a 250-foot buffer around wetland features in regions supporting vernal pool ecosystems, resulting in avoidance and minimization similar to Wetland-2 and FP-04. Hot Zone-6 requires flagging and avoidance of vernal pools, ensuring crews will not enter aquatic habitat in vernal pool ecosystems unless doing so cannot be avoided, which is expected to avoid or reduce injury and mortality of the species, degradation of its habitat, and introduction of pathogens into its habitat.

In addition to the AMMs, the conservation strategy allows PG&E to restore habitat as mitigation for this species, either directly performing restoration themselves, or by contributing funds to other entities to perform restoration. As a result, we anticipate that new habitat will be available to this species as a result of the action.

b. Central Coast Region

Critical Habitat for the Central California DPS

Covered activities are expected to permanently remove 0.15-acre and temporarily remove 0.69-acre of critical habitat for this DPS annually. . The maximum possible 30-year loss of critical habitat is expected to be 181.5 acres of permanent loss and 823.2 acres of temporary loss which, when combined, represent 0.51% of the entire critical habitat designation.

Critical Habitat for the Santa Barbara DPS

Covered activities are expected to permanently remove 0.028-acre and temporarily remove 0.18-acre of critical habitat for this species annually. The maximum possible 30-year loss of critical habitat is expected to be 11.7 acres of permanent loss and 77.4 acres of temporary loss which, when combined, represent 0.80% of the entire critical habitat designation.

c. Sacramento Valley and Foothills Region

Critical Habitat for the Central California DPS

Covered activities are expected to permanently remove 0.10-acre and temporarily remove 0.48-acre of critical habitat for this species annually. The maximum possible 30-year loss of critical habitat is expected to be 73.2 acres of permanent loss and 352.0 acres of temporary loss which, when combined, represent 0.21% of the entire critical habitat designation.

Conservancy Fairy Shrimp

a. General Effects on the Species

Covered activities have the potential to result in direct mortality, life cycle impacts, and reduced habitat quality for conservancy fairy shrimp. Vehicles and equipment could crush or bury shrimp cysts, immature shrimp, and adults when entering or passing through vernal pools or swales during travel to work sites, inspections, and other incidental activities. Shrimp cysts could be buried by soil moved into vernal pools or swales during ground-disturbing activities, which could prevent these cysts from hatching the following wet season. During the wet season conservancy fairy shrimp could also be impacted by changes to hydrology, within or between pools (e.g., reduced water quality, connectivity to other pools). Direct impacts on shrimp could also result from vehicles or equipment leaking or spilling oil or other contaminants into a pool or swale. We anticipate effects to the species' habitat to be the most common effects on the species.

AMMs proposed in the Conservation Strategy are expected to avoid or minimize effects on the species and its habitat. FP-04 will keep vehicles and equipment out of wet areas and minimize impacts on natural vegetation, reducing the chance that crews may inadvertently degrade habitat by releasing pollutants, and reducing the chance that work crews may injure or kill individuals while working in aquatic habitat. FP-11 will avoid soil and sediment runoff into water bodies, reducing the amount of sedimentation that will be experienced by aquatic habitat near work sites. FP-15 prohibits refueling within 250 feet of vernal pools, ponds, and streams, which is expected to prevent fuels from polluting this species habitat and killing or injuring eggs or adults. FP-16 requires a 250-foot buffer around wetlands and ponds that may be habitat for this species, and/or requires biological monitoring, which is anticipated to keep most Covered Activities from occurring within aquatic habitat for this species, thereby reducing effects on the species similar to FP-11. Hot Zone-2 prohibits ground-disturbing activities during the wet season within 250 feet of the edge of vernal pools, unless conducted from an existing roadway, which will reduce effects on the species similar to FP-04. Wetland-1 requires an avoidance zone 250 feet around vernal pools, which will also reduce effects on the species similar to FP-01.

In addition to the AMMs, the conservation strategy allows PG&E to restore habitat as mitigation for this species, either directly performing restoration themselves, or by contributing funds to other entities to perform restoration. As a result, we anticipate that new habitat will be available to this species as a result of the action.

b. Sacramento Valley and Foothills Region

Critical Habitat for the Conservancy Fairy Shrimp

Covered activities are expected to permanently remove 0.001-acre and temporarily remove 0.01-acre of critical habitat for this species annually. The maximum possible 30-year loss of critical habitat is expected to be 6 acres of permanent loss and 6 acres of temporary loss which, when combined, represent 0.008% of the entire critical habitat designation.

Foothill Yellow-Legged Frog

a. General Effects on the Species

The general effects of the action on this species are the same as those described for the California red-legged frog.

Giant Gartersnake

a. General Effects on the Species

Juveniles and adults may be killed or injured by being crushed or buried by vehicles and equipment performing covered activities in or near aquatic habitats or in upland areas within 200 feet of suitable aquatic habitat used for basking, foraging, or refuge. Work conducted near aquatic habitat may introduce pollutants, directly injuring or killing the species, or degrading its habitat by reducing prey availability. Work near aquatic habitat may also increase sedimentation, degrading habitat by making it more difficult for giant gartersnakes to locate prey in the water, altering hydrology, or by increasing or reducing aquatic vegetation. Giant gartersnakes are generally vulnerable to impacts on aquatic habitat during their active, breeding season (early spring to mid-fall) and to impacts on upland habitat during their inactive season (late fall though winter).

The Conservation Strategy includes measures to avoid and minimize effects of Covered Activities on the giant gartersnake and its habitat. FP-11 will avoid soil and sediment runoff into water bodies, reducing the amount of sedimentation that will be experienced by aquatic habitat near work sites. FP-13 requires escape ramps in open trenches and steep-walled holes, which will prevent giant gartersnakes from becoming trapped and subsequently killed in such construction features. FP-15 prohibits refueling within 250 feet of waterways, which is expected to reduce or prevent pollutants from entering habitat for the species, and FP-08 prevents degradation of upland and aquatic habitat by prohibiting trash dumping on or around work sites. FP-16 requires a 250-foot buffer around wetlands and ponds that may be habitat for this species, and/or requires biological monitoring, which is anticipated to keep most Covered Activities from occurring within aquatic habitat for this species, thereby reducing effects on the species similar to FP-11. AMM GGS-1is expected to reduce the number of individuals crushed in burrow or other refugia by restricting work to the giant gartersnake's active season, allowing snakes to leave work sites. This measure also requires the use exclusion fencing to mark areas of habitat to be avoided, which is expected to reduce instances of injury and mortality of this species. Wetland-2 requires 50-foot buffer for large activities around wetlands, ponds, and riparian areas, and will reduce effects on the species similar to FP-16.

In addition to the AMMs, the conservation strategy allows PG&E to restore habitat as mitigation for this species, either directly performing restoration themselves, or by contributing funds to other entities to perform restoration. As a result, we anticipate that new habitat will be available to this species as a result of the action.

Giant Kangaroo Rat

a. General Effects on the Species

Covered activities could result in mortality or injury. Individuals may be crushed or buried by vehicles, equipment, or personnel performing covered activities in the species'

habitat, either while individuals are above ground during the evenings, or underground during their inactive period. Capture of individuals required by AMM GKR-1 may injure or kill giant kangaroo rats, though such occurrence are expected to be rare.

AMMs assigned during the Environmental Review, Planning, and Screening Process are expected to reduce effects on the giant kangaroo rat. FP-02 restricts vehicles and equipment to designated areas, reducing the number of individuals that may be crushed or buried by vehicles or entombed in burrows. FP-03 requires minimizing the development of new roads, which will reduce the number of individuals killed and injured by road construction during access road grading, and will minimize habitat loss and degradation during MRHCP implementation. FP-04 minimizes loss of natural vegetation, thereby reducing habitat degradation within the Plan Area. FP-13 requires escape ramps in open trenches and steep-walled holes, which will prevent individuals from becoming trapped and subsequently killed in such construction features. Species-specific AMM GKR-1 requires pre-construction biological surveys, identification and avoidance of burrow precincts, pre-project trapping and post-project release of individuals within a work footprint, and biological monitoring in giant kangaroo rat habitat.

In addition to the AMMs, the conservation strategy allows PG&E to restore habitat as mitigation for this species, either directly performing restoration themselves, or by contributing funds to other entities to perform restoration. As a result, we anticipate that new habitat will be available to this species as a result of the action.

Ione Manzanita

a. General Effects on the Species

Based on plant density (using a mean of 23.4, as applicable) and assuming that plants are uniformly distributed across the occurrences, but recognizing that this may not account for local habitat quality, approximately 64 Ione manzanita plants could be expected to be lost from covered activities. Less than 1% of any occurrence would be impacted by covered activities. MRHCP Table 4-16 describes the amount of individuals and habitat loss anticipated for this species over the 30-year permit term. Based on those projections, we anticipate a total of 12.25 acres of habitat to be lost and 64 individual plants to be removed. If this amount of habitat and individual plant loss occurs, the action will result in preservation of 12.25 acres of habitat to be preserved, and up to 192 individuals to be planted over the 30-year permit term.

Anticipated effects on the species from vehicle access on Ione manzanita occurrences in the Plan Area include damage to individual plants. Vehicles may spread plant pathogens such as *Phytophthora cinnamomi* into uninfected areas. Individuals may be crushed by off-road vehicle travel, and damaged by vegetation management activities such as pruning. Vegetation management, when it removes portions of plants but does not kill them, may reduce the reproductive success of this species by reducing the amount of reproductive structures until the plant has regrown.

AMMs described in the *Conservation Strategy* are expected to avoid or minimize these effects when Covered Activities are carried out. Plant-02 requires heavy equipment to remain on roads within map book zones, which is expected to prevent individuals from being crushed or damaged. Plant-03 requires stockpiling the top 4 inches of soil before

commencing ground-disturbing activities in Map Book Zones, and returning it once work has been completed, which is expected to minimize impacts to the seed bank for this species and allow it to persist in its habitat after ground-disturbing Covered Activities have taken place. Plant-04 requires flagging and marking avoidance areas, reducing the amount of plants that will be damaged or crushed from Covered Activities, as well as reducing disturbance or removal of its habitat. Plant-05 requires PG&E to collect seeds if plants cannot be avoided, reducing negative effects on the species' reproductive success. Plant-06 requires plants to have set seed before Covered Activities have taken place, if plants cannot be avoided, thereby reducing negative effects on reproductive success. Plant-07 requires crews to avoid damaging perennial plants within work areas until after they have set seed, which, combined with measures to stockpile top soils, is expected to reduce the effects of vegetation management activities on reproductive success. Plant-08 requires vegetation management crews to prune shrubs in a manner that promotes resprouting, which is expected to reduce the amount of time it takes for individuals to recover from vegetation management activities. Plant-08 also requires measures to prevent the spread of *Phytophthora* sp. within this species' habitat. FP-10 requires the applicant to minimize the construction footprint, which will limit the amount of habitat disturbed and lost, as well as individuals lost, by Covered Activities.

The MRHCP anticipates the discovery of currently unknown populations of this species, so it is possible that other populations than those discussed in the Environmental Baseline for Individual Covered Species may be affected by the action in any of the ways discussed above.

Kern Mallow

a. General Effects on the Species

Covered activities associated with electric facilities have the potential to result in direct loss of plants. Assuming that plants are uniformly distributed across the occurrences, but recognizing that this may not account for local habitat quality, up to 1,226 Kern mallow plants could be lost as a result of covered activities. Less than 1% of the population at each element occurrence would be impacted. MRHCP Table 4-31 describes the amount of individuals and habitat loss anticipated for this species over the 30-year permit term. Based on those projections, we anticipate a total of 10.5 acres of habitat to be lost. If this amount of habitat and individual plant loss occurs, the action will result in preservation of 10.5 acres of habitat, and up to 3678 individuals established over the 30-year permit term. We recognize that year-to-year population numbers for an annual species will fluctuate and that in any given year the number of individuals established may be greater or less than this number; nevertheless, we expect that efforts to plant this species in response to permanent loss will result in a larger population overall than currently exists.

Covered activities may disrupt the seedbank as a result of excavation if seeds are removed from the soil or desiccate from exposure at the ground surface during the dry season. Seedbank disruption could result in reduced regrowth of this species once the soil is replaced. Seeds could also be buried by grading or lost where new facilities are constructed. Individuals may be crushed by off-road vehicle travel, which could reduce reproductive success.

Effects on this species at each EO will vary based on the amount of the habitat impacted and habitat quality. The amount of the habitat impacted across the occurrences would range from 0.03% to 2.8%; the habitat quality ranges from poor to good (CDFW 2018).

AMMs described in the *Conservation Strate*gy are expected to avoid or minimize these effects when Covered Activities are carried out. AMM Plant-02 requires heavy equipment to remain on roads within map book zones, which is expected to prevent individuals from being crushed. Plant-03 requires stockpiling the top 4 inches of soil before commencing ground-disturbing activities in Map Book Zones, and returning it once work has been completed, which is expected to minimize impacts to the seed bank for this species and allow it to persist in its habitat after ground-disturbing Covered Activities have taken place. Plant-04 requires flagging and marking avoidance areas, reducing the amount of plants that will be damaged or crushed from Covered Activities, as well as reducing disturbance or removal of its habitat. Plant-05 requires PG&E to collect seeds if plants cannot be avoided, reducing negative effects on the species' reproductive success. Plant-06 requires plants to have set seed before Covered Activities have taken place, if plants cannot be avoided, thereby reducing negative effects on reproductive success. FP-10 requires the applicant to minimize the construction footprint, which will limit the amount of habitat disturbed and lost, as well as individuals lost, by Covered Activities.

The MRHCP anticipates the discovery of currently unknown populations of this species, so it is possible that other populations than those discussed in the Environmental Baseline for Individual Covered Species may be affected by the action in any of the ways discussed above.

Layne's Ragwort

a. General Effects on the Species

Covered activities are expected to result in direct loss of plants. Based on reported population sizes 103 Layne's ragwort plants could be lost as a result of covered activities. MRHCP Table 4-20 describes the amount of individuals and habitat loss anticipated for this species over the 30-year permit term. Based on those projections, we anticipate a total of 2.86 acres of habitat to be lost. If this amount of habitat and individual plant loss occurs, the action will result in preservation of 2.86 acres of habitat, and up to 309 individuals established over the 30-year permit term. We recognize that year-to-year population numbers for an annual species will fluctuate and that in any given year the number of individuals established may be greater or less than this number; nevertheless, we expect that efforts to plant this species in response to permanent loss will result in a larger population overall than currently exists.

Covered activities may disrupt the seedbank as a result of excavation if seeds are removed from the soil or desiccate from exposure at the ground surface during the dry season. Seedbank disruption could result in reduced regrowth of this species once the soil is replaced. Seeds could also be buried by grading or lost where new facilities are constructed. Individuals may be crushed by off-road vehicle travel, which could reduce reproductive success.

Effects on this species at each EO will vary based on the amount of the habitat impacted and habitat quality. The amount of the habitat impacted across the occurrences would range from 0.04% to 5%; the habitat quality ranges from poor to excellent, though most occurrences of this species within the Plan Area have been heavily disturbed and fragmented, so it is anticipated that a greater proportion of habitat loss will occur in poor quality habitat (CDFW 2018).

AMMs described in the Conservation Strategy are expected to avoid or minimize these effects when Covered Activities are carried out. AMM Plant-02 requires heavy equipment to remain on roads within map book zones, which is expected to prevent individuals from being crushed. Plant-03 requires stockpiling the top 4 inches of soil before commencing ground-disturbing activities in Map Book Zones, and returning it once work has been completed, which is expected to minimize impacts to the seed bank for this species and allow it to persist in its habitat after ground-disturbing Covered Activities have taken place. Plant-04 requires flagging and marking avoidance areas, reducing the amount of plants that will be damaged or crushed from Covered Activities, as well as reducing disturbance or removal of its habitat. Plant-05 requires PG&E to collect seeds if plants cannot be avoided, reducing negative effects on the species' reproductive success. Plant-06 requires plants to have set seed before Covered Activities have taken place, if plants cannot be avoided, thereby reducing negative effects on reproductive success. FP-10 requires the applicant to minimize the construction footprint, which will limit the amount of habitat disturbed and lost, as well as individuals lost, by Covered Activities.

The MRHCP anticipates the discovery of currently unknown populations of this species, so it is possible that other populations than those discussed in the Environmental Baseline for Individual Covered Species may be affected by the action in any of the ways discussed above.

Longhorn Fairy Shrimp

a. General Effects on the Species

The general effects of the action on this species are the same as those described for the Conservancy fairy shrimp.

b. Central Coast Region

Critical Habitat

Covered Activities are expected to permanently remove 0.01-acre of critical habitat and temporarily remove 0.06-acre annually. The maximum possible 30-year loss of critical habitat is expected to be 1.8 acres of permanent habitat loss and 10.2 acres of temporary habitat loss. Combined, this represents 0.089% of the entire critical habitat designation for this species.

Marbled Murrelet

a. General Effects on the Species

Vegetation management activities may remove occupied nest trees and pruning of branches suitable as nesting habitat for this species; however, removal of nesting habitat is expected to be an infrequent event because most of the ROW has been cleared. ROW widening and hazard tree removal activities may remove nesting habitat for the species, although tree size class and species composition are not expected to be suitable for nesting in most instances. These activities could result in injury to or mortality of eggs or young. Other covered activities that generate noise or are otherwise perceived as a threat by individuals in proximity to an active nest could result in nest abandonment by adults or young during the incubation, brooding, or fledgling period, leading to failure of egg development or mortality of juveniles through starvation. AMMs have been proposed as part of the conservation strategy to avoid or minimize effects on this species as follows:

FP-04 minimizes loss of natural vegetation, thereby reducing habitat degradation within the Plan Area. FP-18 requires avoidance of nests with eggs or chicks. In instances where nests are discovered, FP-18 requires work stoppage and contacting a biologist or PG&E's Avian Protection Program manager, who will guide the project from that point forward to avoid loss of nests or individuals. This is expected to result in no loss of nests, eggs, or individuals except in instances of emergency implementation of activities.

MM-1 requires work not be performed during from March 15 through August 31 of any year in order to avoid active nests. If work must be performed during this time, avoidance distances of 0.25-mile must be implemented. Reduced buffers are possible; however, avoidance of nests consistent with our guidance *Estimating the Effects of Auditory and Visual Disturbance to Northern Spotted Owls and Marbled Murrelets in Northwestern California* must occur (Service 2006e). This measure is expected to result in direct avoidance of most nests, and will minimize nest abandonment caused by the sounds associated with covered activities.

b. Central Coast Region

Critical Habitat

Covered Activities are expected to permanently remove 0.14-acre of critical habitat and temporarily remove 0.21-acre annually. The maximum possible 30-year loss of critical habitat is expected to be 15.0 acres of permanent habitat loss and 22.5 acres of temporary habitat loss. Combined, this represents 0.001% of the entire critical habitat designation for this species.

c. North Coast Region

Critical Habitat

Covered Activities are expected to permanently remove 0.55-acre of critical habitat and temporarily remove 1.10-acre annually. The maximum possible 30-year loss of critical habitat is expected to be 30.0 acres of permanent habitat loss and 60.0 acres of temporary habitat loss. Combined, this represents 0.002% of the entire critical habitat designation for this species.

Monterey Gilia

a. General Effects on the Species

Covered activities associated with gas and electric facilities have the potential to result in direct loss of plants. Reported population sizes vary widely, ranging from a few plants to two million plants (median plant density of 270 plants per acre). Assuming that plants are uniformly distributed across the occurrences, but recognizing that this may not account for local habitat quality, about 6,266 plants could be lost as a result of covered activities (Table 4-32). Less than 1% of the population at each occurrence would be impacted. MRHCP Table 4-32 describes the amount of individuals and habitat loss anticipated for this species over the 30-year permit term. Based on those projections, we anticipate a total of 6.6 acres of habitat to be lost and 6,266 individuals to be lost. If this amount of habitat and individual plant loss occurs, the action will result in preservation of 6.6 acres of habitat, and up to 18,798 individuals established over the 30-year permit term. We recognize that year-to-year population numbers for an annual species will fluctuate and that in any given year the number of individuals established may be greater or less than this number; nevertheless, we expect that efforts to plant this species in response to permanent loss will result in a larger population overall than currently exists.

Covered activities may disrupt the seedbank as a result of excavation if seeds are removed from the soil or desiccate from exposure at the ground surface during the dry season. Seedbank disruption could result in reduced regrowth of this species once the soil is replaced. Seeds could also be buried by grading or lost where new facilities are constructed. Individuals may be crushed by off-road vehicle travel, which could reduce reproductive success.

Effects on this species at each EO will vary based on the amount of the habitat impacted and habitat quality. The amount of the habitat impacted across the occurrences would range from 0.1% to 1.2%.

AMMs described in the Conservation Strategy are expected to avoid or minimize these effects when Covered Activities are carried out. AMM Plant-02 requires heavy equipment to remain on roads within map book zones, which is expected to prevent individuals from being crushed. Plant-03 requires stockpiling the top 4 inches of soil before commencing ground-disturbing activities in Map Book Zones, and returning it once work has been completed, which is expected to minimize impacts to the seed bank for this species and allow it to persist in its habitat after ground-disturbing Covered Activities have taken place. Plant-04 requires flagging and marking avoidance areas, reducing the amount of plants that will be damaged or crushed from Covered Activities, as well as reducing disturbance or removal of its habitat. Plant-05 requires PG&E to collect seeds if plants cannot be avoided, reducing negative effects on the species' reproductive success. Plant-06 requires plants to have set seed before Covered Activities have taken place, if plants cannot be avoided, thereby reducing negative effects on reproductive success. FP-10 requires the applicant to minimize the construction footprint, which will limit the amount of habitat disturbed and lost, as well as individuals lost, by Covered Activities.

The MRHCP anticipates the discovery of currently unknown populations of this species, so it is possible that other populations than those discussed in the Environmental Baseline for Individual Covered Species may be affected by the action in any of the ways discussed above.

Monterey Spineflower

a. General Effects on the Species

Using the median density (93.8 plants per acre) and assuming that plants are uniformly distributed across the occurrences, but recognizing that this may not account for local habitat quality, up to 4,376 plants could be lost as a result of covered activities. Less than 1% of the population at each occurrence will experience effects. Less than 1% of the plants will be affected by Covered Activities at most occurrences, but about 2% of the plants could be affected at EOs 7, 48, 55, and 57, 4% at EO 58, and 5%–6% at EO 46. MRHCP Table 4-32 describes the amount of individuals and habitat loss anticipated for this species over the 30-year permit term. Based on those projections, we anticipate a total of 46.6 acres of habitat to be lost and 4,376 individuals to be lost. If this amount of habitat and individual plant loss occurs, the action will result in preservation of 46.6 acres of habitat, and up to 13,123 individuals established over the 30-year permit term. We recognize that year-to-year population numbers for an annual species will fluctuate and that in any given year the number of individuals established may be greater or less than this number; nevertheless, we expect that efforts to plant this species in response to permanent loss will result in a larger population overall than currently exists.

Covered activities may disrupt the seedbank as a result of excavation if seeds are removed from the soil or desiccate from exposure at the ground surface during the dry season. Seedbank disruption could result in reduced regrowth of this species once the soil is replaced. Seeds could also be buried by grading or lost where new facilities are constructed. Individuals may be crushed by off-road vehicle travel, which could reduce reproductive success.

Effects on this species at each EO will vary based on the amount of the habitat impacted and habitat quality. The amount of the habitat impacted across the occurrences would range from 0.02% to 8%.

AMMs described in the Conservation Strategy are expected to avoid or minimize these effects when Covered Activities are carried out. AMM Plant-02 requires heavy equipment to remain on roads within map book zones, which is expected to prevent individuals from being crushed. Plant-03 requires stockpiling the top 4 inches of soil before commencing ground-disturbing activities in Map Book Zones, and returning it once work has been completed, which is expected to minimize impacts to the seed bank for this species and allow it to persist in its habitat after ground-disturbing Covered Activities have taken place. Plant-04 requires flagging and marking avoidance areas, reducing the amount of plants that will be damaged or crushed from Covered Activities, as well as reducing disturbance or removal of its habitat. Plant-05 requires PG&E to collect seeds if plants cannot be avoided, reducing negative effects on the species' reproductive success. Plant-06 requires plants to have set seed before Covered Activities have taken place, if plants cannot be avoided, thereby reducing negative effects on reproductive success. FP-10 requires the applicant to minimize the construction footprint, which will limit the amount of habitat disturbed and lost, as well as individuals lost, by Covered Activities.

The MRHCP anticipates the discovery of currently unknown populations of this species, so it is possible that other populations than those discussed in the Environmental Baseline for Individual Covered Species may be affected by the action in any of the ways discussed above.

b. Central Coast Region

Critical Habitat

This species has 11,055 acres of designated critical habitat in the Central Coast Region. Covered Activities are expected to permanently remove 10.7 acres of critical habitat annually. The maximum possible 30-year loss of critical habitat is expected to be 321 acres of permanent habitat loss. Combined, this represents 2.9% of the entire critical habitat designation for this species.

Morro Shoulderband Snail

a. General Effects on the Species

Covered activities are expected to result in the direct mortality of MSBS. Regardless of the type of covered activity, foot traffic and operation of vehicles or equipment in habitat could crush and kill individual snails (eggs, young or adults), which are often concealed in vegetation or leaf litter. Removal of vegetation may remove cover and expose individuals to sunlight, killing them. AMMs described in the Conservation Strategy are expected to avoid or minimize these effects when Covered Activities are carried out. FP-02 restricts vehicles and equipment to designated areas, reducing the number of individuals that may be crushed or buried by vehicles or entombed in burrows. FP-03 requires minimizing the development of new roads, which will reduce the number of individuals killed and injured by road construction during road grading by reducing the necessity for building new roads, and will minimize habitat loss and degradation during MRHCP implementation. FP-04 minimizes loss of natural vegetation, thereby reducing habitat degradation within the Plan Area and reducing the amount of cover lost for the species in work zones. Hot Zone-12 requires pre-construction biological survey and salvage of individuals when work cannot be conducted from paved roads or non-vegetated areas, which will reduce the number of individuals crushed during Covered Activities. Hot Zone-12 also requires pre-construction surveys and salvage of individuals when ground-disturbing O&M activities are conducted in urban environments where the species may be found in landscaping or horticultural vegetation and cannot be avoided, reducing deaths of individuals in urban habitat

b. Central Coast Region

Critical Habitat

Covered Activities are expected to permanently remove 0.1-acre of critical habitat and temporarily remove 0.2-acres annually. The maximum possible 30-year loss of critical habitat is expected to be 3 acres of permanent habitat loss and 6 acres of temporary habitat loss. Combined, this represents 0.35% of the entire critical habitat designation for this species.

Mount Hermon June Beetle

a. General Effects on the Species

Covered Activities are expected to result in direct mortality of this species. Vehicles and equipment could crush and kill individual eggs, larvae, pupae, or adults or destroy

burrows used by larvae. Under certain conditions, soil compaction or covering of pupation sites could inhibit or prohibit emergence of beetles. Indirect impacts on MHJB could result from vegetation removal or introduction of invasive plant species, which may reduce MHJB habitat or productivity by reducing favorable food sources. AMMs described in the Conservation Strategy are expected to avoid or minimize these effects when Covered Activities are carried out. FP-02 restricts vehicles and equipment to designated areas, reducing the number of individuals that may be crushed or buried by vehicles or entombed in burrows. FP-03 requires minimizing the development of new roads, which will reduce the number of individuals killed and injured by road construction during road grading by reducing the necessity for building new roads, and will minimize habitat loss and degradation during MRHCP implementation. FP-04 minimizes loss of natural vegetation, thereby reducing habitat degradation within the Plan Area and reducing the amount of cover lost for the species in work zones. Hot Zone Measure 14 calls for avoidance of work during the flight season and placement of excavated soils only on disturbed ground. Avoidance of work during the flight season is expected to greatly reduce encounters with the beetle, preventing it from being crushed by equipment or work crews. Restricting placement of excavated soils to previously disturbed ground will reduce the number of individuals that are entombed in the ground during the subterranean phase of their lifecycle.

Mountain Yellow-Legged Frog

a. General Effects on the Species

The general effects of the action on this species are the same as those described for the California red-legged frog. However, there are few PG&E facilities in MYLF habitat, so we anticipate disturbances in its habitat to happen much less frequently than the California red-legged frog.

Northern Spotted Owl

a. General Effects on the Species

Vegetation management activities may remove occupied nest trees and pruning of branches suitable as nesting habitat for this species; however, removal of nesting habitat is expected to be an infrequent event because most of the ROW has been cleared. ROW widening and hazard tree removal activities may remove nesting habitat for the species, although tree size class and species composition are not expected to be suitable for nesting in most instances. These activities could result in injury to or mortality of eggs or young. Other covered activities that generate noise or are otherwise perceived as a threat by individuals in proximity to an active nest could result in nest abandonment by adults or young during the incubation, brooding, or fledgling period, leading to failure of egg development or mortality of juveniles through starvation. AMMs have been proposed as part of the conservation strategy to avoid or minimize effects on this species as follows: Indirect impacts on NSO would include a reduction in its prey base as a result of covered activities. Such a reduction from maintenance or minor new construction of gas or electric facilities, however, is unlikely.

FP-18 requires avoidance of nests with eggs or chicks. In instances where nests are discovered, FP-18 requires work stoppage and contacting a biologist or PG&E's Avian

Protection Program manager, who will guide the project from that point forward to avoid loss of nests or individuals. This is expected to result in no loss of nests, eggs, or individuals except in instances of emergency implementation of activities. Hot Zone-14, to identify known NSO activity centers;

NSO-1, requires surveys of unsurveyed habitat within 0.25-mile of a work site and seasonal work restrictions for covered activities within 0.25 mile of a Covered Activity in the Northern Spotted Owl hot zone during the nesting season. If nests are discovered, then work is restricted to the time between August 1 and February 28. Reduced buffers are possible, but must conform with our guidance *Estimating the Effects of Auditory and Visual Disturbance to Northern Spotted Owls and Marbled Murrelets in Northwestern California* (Service 2006). This measure is expected to result in direct avoidance of most nests, and will minimize nest abandonment caused by the sounds associated with covered activities.

b. Sacramento Valley and Foothills Region

Critical Habitat

Covered Activities are expected to permanently remove 0.06-acre of critical habitat and temporarily remove 0.23-acre annually. The maximum possible 30-year loss of critical habitat is expected to be 15 acres of permanent habitat loss and 60 acres of temporary habitat loss. Combined, this represents 0.001% of the entire critical habitat designation for this species.

c. North Coast Region

Critical Habitat

Covered Activities are expected to permanently remove 0.58-acre of critical habitat and temporarily remove 2.33-acres annually. The maximum possible 30-year loss of critical habitat is expected to be 150 acres of permanent habitat loss and 600 acres of temporary habitat loss. Combined, this represents 0.008% of the entire critical habitat designation for this species.

Ohlone Tiger Beetle

a. General Effects on the Species

The general effects of the action on this species are the same as those described for the Mount Herman June beetle. The Conservation Strategy includes an additional AMM for this species: Hot Zone-11. This measure requires PG&E to stockpile soil only on disturbed areas within this species' habitat, thereby avoiding crushing or entombing individuals under large soil stockpiles.

Point Arena Mountain Beaver

a. General Effects on the Species

Because this species spends a significant portion of their lives in underground burrows, covered activities are most likely to result in direct impacts on PAMB while they are

underground. Vegetation removal and excavation activities that affect burrow entrances could expose individuals to an elevated risk of predation. These activities also could alter the micro-climate and remove critical food plants for the species. Vehicles or equipment operating over a burrow entrance could collapse the burrow entrance and entomb an animal or its young. Although burrows are generally deep, vehicles or equipment could crush and kill or injure individuals in burrows. If an individual is above ground, it could be struck by vehicles or equipment. Ground vibration caused by large activities could affect behavior during breeding season. Permanent removal of forage vegetation could reduce habitat quality.

AMMs have been proposed as part of the conservation strategy to avoid or minimize effects on this species as follows: FP-02 restricts vehicles and equipment to designated areas, reducing the number of individuals that may be crushed or buried by vehicles or entombed in burrows. FP-03 requires minimizing the development of new roads, which will reduce the number of individuals killed and injured by road construction during road grading by reducing the necessity for building new roads, and will minimize habitat loss and degradation during MRHCP implementation. FP-13 requires escape ramps in open trenches and steep-walled holes, which will prevent individuals from becoming trapped and subsequently killed in such construction features. Hot Zone-13, applies to all activities in the Point Arena Mountain Beaver hot zone, and restricts off-road travel to the non-breeding season for the species, which is expected to reduce effects such as death or abandonment on this species' young. Work may be performed during the breeding season, but will require a biological monitor to search for occupied burrows, which, if found, will be avoided if work will destroy burrows. Hot zone-13 is expected to greatly reduce injury and mortality of this species.

Pine Hill Ceanothus

a. General Effects on the Species

Other than the amount of habitat and individuals expected to be lost, the effects of the action on Pine Hill ceanothus are expected to be the same as those for Ione Manzanita. Extrapolating from reported population sizes and the amount of habitat potentially affected, about 33 Pine Hill ceanothus plants could be lost from covered activities. Less than 1% of the population would be impacted at each occurrence. MRHCP Table 4-17 describes the amount of individuals and habitat loss anticipated for this species over the 30-year permit term. Based on those projections, we anticipate a total of 3.67 acres of habitat to be lost and 33 individual plants to be removed. If this amount of habitat and individual plant loss occurs, the action will result in preservation of 3.67 acres of habitat to be preserved, and up to 99 individuals to be planted over the 30-year permit term, which represents an increase in the population as a result of the action.

Pine Hill Flannelbush

a. General Effects on the Species

Other than the amount of habitat and individuals expected to be lost, the effects of the action on Pine Hill flannelbush are expected to be the same as those for Ione Manzanita. Extrapolating from reported population sizes and the amount of habitat potentially affected, about 33 Pine Hill flannelbush plants could be lost from covered activities. Less

than 1% of the population would be impacted at each occurrence. MRHCP Table 4-18 describes the amount of individuals and habitat loss anticipated for this species over the 30-year permit term. Based on those projections, we anticipate a total of 1.19 acres of habitat to be lost and 2 individual plants to be removed. If this amount of habitat and individual plant loss occurs, the action will result in preservation of 1.19 acres of habitat to be preserved, and up to 4 individuals to be planted over the 30-year permit term, which represents an increase in the population as a result of the action.

Robust Spineflower

a. General Effects on the Species

Other than the amount of habitat and individuals expected to be lost, the effects of the action on robust spineflower are expected to be the same as those for Monterey spineflower. Using the median density (2,000 plants per acre) to estimate the impacts on EO 31, and assuming that plants are uniformly distributed across the occurrences, but recognizing that this may not account for local habitat quality, up to 3,765 robust spineflower plants could be lost as a result of covered activities. At three of the occurrences, less than 1% of the population would be impacted. At EO 16, about 16% of the population could be impacted. The degree of the impact would vary at each EO based on the amount of habitat impacted and habitat quality. The amount of the habitat impacted at the occurrences would range from 0.1% to 16%; habitat quality is good to excellent (CDFW 2018). MRHCP Table 4-30 describes the amount of individuals and habitat loss anticipated for this species over the 30-year permit term. Based on those projections, we anticipate a total of 1.3 acres of habitat to be lost and 3,765 individual plants to be removed. If this amount of habitat and individual plant loss occurs, the action will result in preservation of 1.3 acres of habitat to be preserved, and up to 11, 295 individuals to be planted over the 30-year permit term. We recognize that year-to-year population numbers for an annual species will fluctuate and that in any given year the number of individuals established may be greater or less than this number; nevertheless, we expect that efforts to plant this species in response to permanent loss will result in a larger population overall than currently exists.

Critical Habitat

Designated critical habitat for robust spineflower encompasses 469 acres, all of which is within Santa Cruz County in the Central Coast Region. Covered Activities are expected to permanently remove 0.7 acres of critical habitat annually. The maximum possible 30-year loss of critical habitat is expected to be 21 acres of permanent habitat loss. Combined, this represents 4.47% of the entire critical habitat designation for this species.

San Benito Evening Primrose

a. General Effects on the Species

Proposed covered activities associated with electric facilities have the potential to result in direct loss of plants. Assuming that plants are uniformly distributed across the occurrences, but recognizing that this may not account for local habitat quality, 1,888 San

Benito evening-primrose plants could be lost as a result of covered activities. Most of these impacts would be at EO 16. About 10% of the plants at this occurrence could be impacted. The degree of the impact would vary at each EO based on the amount of habitat impacted and habitat quality. The amount of the habitat impacted at the occurrences would range from 0.1% to 10%. MRHCP Table 4-28 describes the amount of individuals and habitat loss anticipated for this species over the 30-year permit term. Based on those projections, we anticipate a total of 0.37-acre of habitat to be lost. If this amount of habitat and individual plant loss occurs, the action will result in preservation of 0.37 acres of habitat to be preserved, and up to 5,664 individuals to be planted over the 30-year permit term. We recognize that year-to-year population numbers for an annual species will fluctuate and that in any given year the number of individuals established may be greater or less than this number; nevertheless, we expect that efforts to plant this species in response to permanent loss will result in a larger population overall than currently exists.

Covered activities may disrupt the seedbank as a result of excavation if seeds are removed from the soil or desiccate from exposure at the ground surface during the dry season. Seedbank disruption could result in reduced regrowth of this species once the soil is replaced. Seeds could also be buried by grading or lost where new facilities are constructed. Individuals may be crushed by off-road vehicle travel, which could reduce reproductive success.

AMMs described in the Conservation Strategy are expected to avoid or minimize these effects when Covered Activities are carried out. AMM Plant-02 requires heavy equipment to remain on roads within map book zones, which is expected to prevent individuals from being crushed. Plant-03 requires stockpiling the top 4 inches of soil before commencing ground-disturbing activities in Map Book Zones, and returning it once work has been completed, which is expected to minimize impacts to the seed bank for this species and allow it to persist in its habitat after ground-disturbing Covered Activities have taken place. Plant-04 requires flagging and marking avoidance areas, reducing the amount of plants that will be damaged or crushed from Covered Activities, as well as reducing disturbance or removal of its habitat. Plant-05 requires PG&E to collect seeds if plants cannot be avoided, reducing negative effects on the species' reproductive success. Plant-06 requires plants to have set seed before Covered Activities have taken place, if plants cannot be avoided, thereby reducing negative effects on reproductive success. FP-10 requires the applicant to minimize the construction footprint, which will limit the amount of habitat disturbed and lost, as well as individuals lost, by Covered Activities.

The MRHCP anticipates the discovery of currently unknown populations of this species, so it is possible that other populations than those discussed in the Environmental Baseline for Individual Covered Species may be affected by the action in any of the ways discussed above.

San Joaquin Kit Fox

a. General Effects on the Species

Vehicles or equipment operating near a den entrance could collapse the entrance and entomb an individual or its young and lead to injury or mortality. Vehicles traveling

through habitat may strike individuals, killing or injuring them. Construction sites may attract SJKF during non-work hours, potentially elevating their risk for injury or death if they become trapped in open trenches or seek cover under equipment or materials (i.e., pipes) that are later moved. Ground vibration caused by large activities could affect behavior during breeding season, reducing reproductive success or survivorship of pups. Covered Activities may result in reductions of SJKF prey base on either a temporary or permanent basis, depending on whether or not a Covered Activity results in temporary or permanent habitat loss.

AMMs have been proposed as part of the *Conservation Strategy* to avoid or minimize effects on this species as follows: FP-02 restricts vehicles and equipment to designated areas, reducing the number of individuals that may be crushed or buried by vehicles or entombed in burrows. FP-04 minimizes loss of natural vegetation, thereby reducing habitat degradation within the Plan Area and damage to mammal burrows. FP-06 requires inspection of materials and pipes prior to moving materials on-site, which will prevent individuals from being trapped, injured, or killed in pipes. FP-08 limits vehicle speeds, reducing the likelihood of vehicle strikes, and also prevents degradation of habitat by prohibiting trash dumping on or around work sites. FP-13 requires escape ramps in open trenches and steep-walled holes, which will prevent individuals from becoming trapped and subsequently killed in such construction features. SJKF-1 requires pre-construction biological surveys, identification and avoidance of dens, dusting of den entrances to determine SJKF activity, and establishment of exclusion zones, which is expected to avoid young during the pupping season.

In addition to the AMMs, the conservation strategy allows PG&E to restore habitat as mitigation for this species, either directly performing restoration themselves, or by contributing funds to other entities to perform restoration. As a result, we anticipate that new habitat will be available to this species as a result of the action

Santa Cruz Long-Toed Salamander

a. General Effects on the Species

The general effects of the action on this species are the same as those described for the California red-legged frog. However, additional AMMs are expected to avoid or minimize effects on this species as follows:

Wetland-1 requires a 250-foot buffer around wetland features in regions supporting vernal pool ecosystems, resulting in avoidance and minimization similar to Wetland-2 and FP-04.

In addition to the AMMs, the conservation strategy allows PG&E to restore habitat as mitigation for this species, either directly performing restoration themselves, or by contributing funds to other entities to perform restoration. As a result, we anticipate that new habitat will be available to this species as a result of the action.

Sierra Nevada Yellow-Legged Frog

a. General Effects on the Species

The general effects of the action on this species are the same as those described for the California red-legged frog. However, there are few PG&E facilities in SNYLF habitat, so we anticipate disturbances in its habitat to happen much less frequently than the California red-legged frog.

Smith's Blue Butterfly

a. General Effects on the Species

Covered Activities could result in death or injury of individuals. Grading, trenching, or excavation activities could crush or bury eggs, larvae, or pupae, but such effects are generally unlikely because of AMMs proposed in the Conservation Strategy. Vehicles and equipment traveling to and from work areas also could potentially harm butterfly eggs, larvae or pupae, and adults. During construction activities, moving vehicles could take adults while they are nectaring, resting, basking, or roosting, particularly during cool times of the day when low temperatures make flight metabolically impossible. Similarly, increased dust in a work area during the flight period could cause butterflies to avoid the area or could result in the inability of host or nectar plants to provide food resources for butterflies during critical periods.

The inadvertent introduction of invasive plant species could indirectly affect individuals by displacing host plants and degrading habitat quality over time. Such an outcome could result from leaving ground bare, or from transport of seeds by construction equipment or personnel, or from contaminated seed or straw. Invasive plants could displace native host or nectar plant species by outcompeting them for space, sun, and water. Permanent loss of butterfly habitat would result if habitat is replaced by facility infrastructure (e.g., gravel roads, foundations, poles). Ground-disturbing activities, such as construction of new access roads or maintenance of existing roads, could permanently remove habitat.

AMMs have been proposed as part of the Conservation Strategy to avoid or minimize effects on this species as follows: FP-02 restricts vehicles and equipment to designated areas, reducing the number of individuals that may be crushed by vehicles, and reducing damage to host plants. FP-03 and FP04 would minimize the development of new roads and access routes in natural habitat, avoiding or minimizing effects in a similar manner to FP-02. For large activities, SMBB-1 requires pre-construction surveys to locate host plants and avoid them if found, which is expected to ensure that most activities within this species habitat will have small amounts of habitat disturbance, thereby avoiding killing individuals or damaging host plants for the species.

Stebbins' Morning Glory

a. General Effects on the Species

Extrapolating from reported population sizes and the amount of habitat potentially affected, about 787 Stebbins' morning-glory plants could be lost from covered activities, mostly within occurrence 2. Much less than 1% of each population would be impacted. MRHCP Table 4-19 describes the amount of individuals and habitat loss anticipated for this species over the 30-year permit term. Based on those projections, we anticipate a total of 2.31 acres of habitat to be lost. If this amount of habitat and individual plant loss

occurs, the action will result in preservation of 2.31 acres of habitat to be preserved, and up to 787 individuals to be planted over the 30-year permit term.

Anticipated effects on the species from vehicle access on occurrences in the Plan Area include damage to individual plants. Individuals may be crushed by off-road vehicle travel, and damaged by vegetation management activities. Vegetation management, when it removes portions of plants but does not kill them, may reduce the reproductive success of this species by reducing the amount of reproductive structures until the plant has regrown.

AMMs described in the Conservation Strategy are expected to avoid or minimize these effects when Covered Activities are carried out. Plant-02 requires heavy equipment to remain on roads within map book zones, which is expected to prevent individuals from being crushed or damaged. Plant-03 requires stockpiling the top 4 inches of soil before commencing ground-disturbing activities in Map Book Zones, and returning it once work has been completed, which is expected to minimize impacts to the seed bank for this species and allow it to persist in its habitat after ground-disturbing Covered Activities have taken place. Plant-04 requires flagging and marking avoidance areas, reducing the amount of plants that will be or crushed from Covered Activities, as well as reducing disturbance or removal of its habitat. Plant-05 requires PG&E to collect seeds if plants cannot be avoided, reducing negative effects on the species' reproductive success. Plant-06 requires plants to have set seed before Covered Activities have taken place, if plants cannot be avoided, thereby reducing negative effects on reproductive success. Plant-07 requires crews to avoid damaging perennial plants within work areas until after they have set seed, which, combined with measures to stockpile top soils, is expected to reduce the effects of vegetation management activities on reproductive success. Plant-08 requires vegetation management crews to prune shrubs in a manner that promotes resprouting, which is expected to reduce the amount of time it takes for individuals to recover from vegetation management activities. FP-10 requires the applicant to minimize the construction footprint, which will limit the amount of habitat disturbed and lost, as well as individuals lost, by Covered Activities.

The MRHCP anticipates the discovery of currently unknown populations of this species, so it is possible that other populations than those discussed in the Environmental Baseline for Individual Covered Species may be affected by the action in any of the ways discussed above.

Valley Elderberry Longhorn Beetle

a. General Effects on the Species

Covered activities could result in direct mortality. Elderberry stems that are at least 1 inch in diameter may contain one or more eggs, larvae, pupae, or pre-emergent adults. In these life stages within the elderberry host plant, individuals could be crushed and killed, or eventually die, as a result of the death and decay of host plant material subsequent to damage or its removal from the growing host plant. During adult emergence, feeding, or dispersal, beetles could be injured or killed by vehicles or equipment during covered activities. Elderberry removal may cause population reductions on individual elderberry shrubs through the reduction or loss of habitat and food sources.

It is anticipated that most operations and maintenance activities that affect elderberry shrubs will involve maintaining vegetation clearance away from energized powerline facilities, which typically involves the upper canopy of elderberry shrubs. Thus, pruning, rather than removal, of elderberry shrubs is more likely to be performed than shrub removal. Shrubs in riparian and non-riparian habitats can be affected, and take of adults, pupae, larvae, or eggs could result regardless of whether the activity results in temporary or permanent loss of elderberry shrubs.

AMMs described in the Conservation Strategy are expected to avoid or minimize these effects when Covered Activities are carried out FP-02 restricts vehicles and equipment to designated areas, reducing the number of elderberry shrubs that may be removed or damaged accessing worksites, which is anticipated to reduce effects on the species habitat. FP-03 requires minimizing the development of new roads, which will reduce the number of individuals killed and injured road construction during road grading by reducing the necessity for building new roads, which will reduce the amount of elderberries removed or damaged. FP-04 minimizes loss of natural vegetation, which is expected to result in avoidance of elderberry shrubs or minimization of damage to them, reducing mortality of individual valley elderberry longhorn beetles and preserving habitat for them. VELB-1 requires anyone working within habitat for the valley elderberry longhorn beetle to be able to identify an elderberry shrub. The measure also requires avoidance of shrubs by 20-feet, clearly marked to ensure avoidance. Both permanent removal and temporary damage of shrubs will be mitigated regardless of whether or not an individual shrub is likely to have valley elderberry longhorn beetles on it. Shrubs unlikely to be habitat for the Valley elderberry longhorn beetle will be mitigated. As such, the conservation strategy for this species is expected to result in an increase of available habitat for this species.

b. Sacramento Valley and Foothills Region

Critical Habitat

Covered Activities are expected to permanently remove 0.0003-acre of critical habitat and temporarily remove 0.001-acre annually. The maximum possible 30-year loss of critical habitat is expected to be 0.175 acres of permanent habitat loss and 0.175-acre of temporary habitat loss. Combined, this represents 0.067% of the entire critical habitat designation for this species.

Vernal Pool Fairy Shrimp

a. General Effects on the Species

The general effects of the action on this species are the same as those described for the Conservancy fairy shrimp. However, the species' range is greater than that of the Conservancy fairy shrimp, and so we anticipate effects described for that species to affect vernal pool fairy shrimp more frequently than they do the Conservancy fairy shrimp.

b. Central Coast region

Critical Habitat

Covered Activities are expected to permanently remove 0.40-acre of critical habitat and temporarily remove 1.78-acres annually. The maximum possible 30-year loss of critical habitat is expected to be 12 acres of permanent habitat loss and 65.4-acres of temporary habitat loss. Combined, this represents 0.011% of the entire critical habitat designation for this species.

c. Sacramento Valley and Foothills Region

Critical Habitat

Covered Activities are expected to permanently remove 0.2-acre of critical habitat and temporarily remove 1.9-acre annually. The maximum possible 30-year loss of critical habitat is expected to be 30.0 acres of permanent habitat loss and 285.3-acres of temporary habitat loss. Combined, this represents 0.053% of the entire critical habitat designation for this species.

Vernal Pool Tadpole Shrimp

a. General Effects on the Species

The general effects of the action on this species are the same as those described for the Conservancy fairy shrimp. However, the species' range is greater than that of the Conservancy fairy shrimp, and so we anticipate effects described for that species to affect vernal pool tadpole shrimp more frequently than they do the Conservancy fairy shrimp.

b. Sacramento Valley and Foothills Region

Critical Habitat

Covered Activities are expected to permanently remove 0.25-acre of critical habitat and temporarily remove 2.39 acres annually. The maximum possible 30-year loss of critical habitat is expected to be 30.0 acres of permanent habitat loss and 285.3-acres of temporary habitat loss. Combined, this represents 0.138% of the entire critical habitat designation for this species.

Yosemite Toad

a. General Effects on the Species

The general effects of the action on this species are the same as those described for the California red-legged frog. However, this species' range is much smaller than the California red-legged frog's within the Plan Area, and so we anticipate the Yosemite toad to experience effects less often.

b. Sacramento Valley and Foothills Region

Critical Habitat

Covered Activities are expected to permanently remove 0.02-acre of critical habitat and temporarily remove 0.07-acres annually. The maximum possible 30-year loss of critical habitat is expected to be 0.5-acre of permanent habitat loss and 2.0-acres of temporary

habitat loss. Combined, this represents 0.0003% of the entire critical habitat designation for this species.

Yadon's Rein Orchid

a. General Effects on the Species

Based on the population sizes, approximately 64 Yadon's rein orchids could be expected to be lost from covered activities. Less than 1% of the population at each occurrence will experience effects. Less than 1% of the plants will be affected by Covered Activities. MRHCP Table 4-33 describes the amount of individuals and habitat loss anticipated for this species over the 30-year permit term. Based on those projections, we anticipate a total of 2.1 acres of habitat to be lost and 64 individuals to be lost. If this amount of habitat and individual plant loss occurs, the action will result in preservation of 2.1 acres of habitat, and up to 128 individuals established over the 30-year permit term, which represents an increase in the population as a result of the action. We anticipate that efforts to plant this species in response to permanent loss will result in a larger population overall than currently exists.

Covered activities may disrupt the seedbank as a result of excavation if seeds are removed from the soil or desiccate from exposure at the ground surface during the dry season. Seedbank disruption could result in reduced regrowth of this species once the soil is replaced. Seeds could also be buried by grading or lost where new facilities are constructed. Individuals may be crushed by off-road vehicle travel, which could reduce reproductive success.

Effects on this species at each EO will vary based on the amount of the habitat impacted and habitat quality. The amount of the habitat impacted across the occurrences would range from 0.02% to 8%.

AMMs described in the Conservation Strategy are expected to avoid or minimize these effects when Covered Activities are carried out. AMM Plant-02 requires heavy equipment to remain on roads within map book zones, which is expected to prevent individuals from being crushed. Plant-03 requires stockpiling the top 4 inches of soil before commencing ground-disturbing activities in Map Book Zones, and returning it once work has been completed, which is expected to minimize impacts to the seed bank for this species and allow it to persist in its habitat after ground-disturbing Covered Activities have taken place. Plant-04 requires flagging and marking avoidance areas, reducing the amount of plants that will be damaged or crushed from Covered Activities, as well as reducing disturbance or removal of its habitat. Plant-05 requires PG&E to collect seeds if plants cannot be avoided, reducing negative effects on the species' reproductive success. Plant-06 requires plants to have set seed before Covered Activities have taken place, if plants cannot be avoided, thereby reducing negative effects on reproductive success. Plant-07 requires crews to avoid damaging perennial plants within work areas until after they have set seed, which, combined with measures to stockpile top soils, is expected to reduce the effects of vegetation management activities on reproductive success. FP-10 requires the applicant to minimize the construction footprint, which will limit the amount of habitat disturbed and lost, as well as individuals lost, by Covered Activities.

The MRHCP anticipates the discovery of currently unknown populations of this species, so it is possible that other populations than those discussed in the Environmental Baseline for Individual Covered Species may be affected by the action in any of the ways discussed above.

b. Central Coast Region

Critical Habitat

Designated critical habitat for Yadon's rein orchid encompasses approximately 2,117 acres in the Central Coast Region. The critical habitat found in the region constitutes 100% of this species' total critical habitat in the state. Covered Activities are expected to permanently remove 3.9 acres of critical habitat annually. The maximum possible 30-year loss of critical habitat is expected to be 117.7 acres of permanent habitat loss. Combined, this represents 2.56%of the entire critical habitat designation for this species.

Zayante Band-Winged Grasshopper

a. General Effects on the Species

Covered activities could result in direct mortality of individuals. Eggs, nymphs, and adults may be crushed or buried by vehicles, equipment, and foot traffic. Adults could be struck by vehicles during flight or while feeding on vegetation. Most of PG&E's facilities in this species range are near roadsides, allowing the applicant to do most work from existing roadways and limiting effects on habitat for this species, as well as limiting the chances that individuals will be taken during Covered Activities.

AMMs described in the Conservation Strategy are expected to avoid or minimize these effects when Covered Activities are carried out. FP-02 restricts vehicles and equipment to designated areas, reducing the amount of habitat, including silver bush lupine habitat important for this species, which may be removed or damaged accessing worksites. This is anticipated to reduce effects on the species' habitat as well as reduce the number of individuals killed and injured. FP-03 requires minimizing the development of new roads, which will reduce the number of individuals killed and injured by road construction during road grading by reducing the necessity for building new roads, which will minimize habitat loss and degradation during MRHCP implementation. FP-04 minimizes loss of natural vegetation, which is expected to result in avoidance of this species' habitat in most cases, reducing mortality of individuals and preserving habitat for the species. Hot Zone-10 specifically requires avoidance of silver bush lupine for any activities that occur within this species' habitat.

Indirect impacts on ZBWG could result from introduction of invasive plant species that outcompete ZBWG host plants. Potential indirect effects of covered activities would be minimized by using weed-free seed mixes and straw in revegetation and erosion control applications.

b. Central Coast Region

Critical Habitat

Covered Activities are expected to permanently remove 0.12-acre of critical habitat and temporarily remove 0.51-acre annually. The maximum possible 30-year loss of critical habitat is expected to be 3.6 acres of permanent habitat loss and 15.3 acres of temporary habitat loss. Combined, this represents 0.18% of the entire critical habitat designation for this species.

Cumulative Effects

Most lands included in the 565,781-acre plan area are privately owned but within a right-of-way or easements deed with PG&E. Under the terms of these deeds, the landowner may use the right-of-way lands for any purpose that will not interfere with PG&E's use of the right-of-way. Buildings or other structures cannot be erected within the boundary of the right-of-way, as these would interfere with PG&E's activities. Consequently, the right-of-way easement deed provides no protection from land-use change within the ROWs, with the exception that buildings will not be constructed within the ROW boundaries. Other State or private activities are expected to occur within these rights-of-way, including cattle grazing, extensive agricultural development, timber harvesting, fuel wood cutting, fire suppression, road building, and herbicide use. Although housing development is not expected within the boundary of a right-of-way, development or other land-use changes may occur on lands directly bordering the ROWS. Land-cover in a right-of-way area may stay in a natural condition, but development or other land-use changes on bordering lands would substantially reduce the habitat value of the ROW lands. These future activities may not be subject to section 7 consultation (and thus are considered to enter into cumulative effects). These activities are not associated with the proposed project.

The proposed project will not contribute to the local and rangewide trend of urbanization, habitat loss, fragmentation, and degradation, the principal causes of the decline of the species addressed in this biological opinion. The proposed action allows the on-going operation and maintenance of existing natural gas and electric distribution facilities, and minor extensions of gas and electric lines. PG&E would construct the facility extensions in advance or simultaneous to the new energy need, and the capacity of the new pipelines would not exceed the peak-need of the new subdivisions and businesses, on a sustained basis. Therefore, the new facility extensions would occur in response to urban development, would not remove an obstacle for future urban development, and are not considered growth-inducing.

Continued human population growth in action area is expected to drive further development of agriculture, cities, industry, transportation, and water resources in the foreseeable future. This future development, and the associated infrastructure will further contribute to the continued loss and fragmentation of natural areas, including areas harboring the Covered Species. Ongoing loss and fragmentation of natural land-cover in the action area and anthropogenic factors such as pesticides and invasion of exotic species is expected to continue for the 30-year term of the proposed permit.

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. During this consultation, the Service did not identify any future non-federal actions that are reasonably certain to occur in the action area of the proposed project.

Conclusion

Adverse Modification Determination

After reviewing the current status of designated critical habitat for the Covered Species, the environmental baseline for the action area, the effects of the proposed Pacific Gas and Electric Company Multi-Regional Operations & Maintenance Habitat Conservation Plan, and the cumulative effects, it is the Service's biological opinion that the Pacific Gas and Electric Company Multi-Regional Operations & Maintenance Habitat Conservation 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 Covered Species critical habitat to serve its intended conservation role for the Covered Species. We have reached this conclusion because the effects of the action, relative to the amount of critical habitat remaining in each unit for each species, are expected to be so small as to be discountable, and the effects of the action are not expected to impair the ability of any unit of critical habitat in the action area to continue to provide habitat for any Covered Species for which critical habitat has been designated.

Jeopardy Determination

After reviewing the current status of all Covered Species, the environmental baseline for the action area, the effects of the proposed Pacific Gas and Electric Company Multi-Regional Operations & Maintenance Habitat Conservation Plan, and the cumulative effects, it is the Service's biological opinion that the Pacific Gas and Electric Company Multi-Regional Operations & Maintenance Habitat Conservation Plan, as proposed, is not likely to jeopardize the continued existence of any of the Covered Species. The Service reached this conclusion because the project-related effects to the species, when added to the environmental baseline and analyzed in consideration of all potential cumulative effects, will not rise to the level of precluding recovery or reducing the likelihood of survival of the Covered Species. Our rationale for these non-jeopardy determinations are as follows:

Beach Layia

Covered Activities will be undertaken almost entirely on existing facilities within the action area. A total of 142 plants across one occurrence of the species within the action area are expected to be injured or removed. A total of 0.22-acre of habitat is expected to be permanently lost. Effects on the species from this level of individual and habitat loss are expected to be negligible. The applicant has committed to conserving habitat for this species, through the various measures described in the *Conservation Strategy*, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has also committed to salvaging, or compensating for individual plants temporarily affected or permanently destroyed as a result of Covered Activities. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on beach layia are expected to be minimized by implementation of the *Conservation Measures*.

Blunt-Nosed Leopard Lizard

Covered Activities will be undertaken almost entirely on existing facilities within the action area. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-

acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementing individual Covered Activities. The Service views the maximum projected permanent loss of 17.52 acres of modeled core habitat, 13.28 acres of modeled suitable habitat, as well as the temporary disturbance of 96.75 acres of modeled core habitat and 57.56 acres of modeled suitable habitat as a considerable adverse effect on the species; however, the applicant has agreed to conserve habitat for this species into perpetuity to offset the habitat loss, and take that may occur as a result of temporary disturbance at a level sufficient to minimize the effects of the action. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any portion of its range within the action area. Through the *Conservation Strategy*, the applicant has committed to implement several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species.

California Tiger Salamander Central DPS

Covered Activities will be undertaken almost entirely on existing facilities within the action area. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. The Service views the maximum projected permanent loss of 154.75 acres (148.81 acres of modeled upland and 5.91 modeled breeding) and temporary disturbance of 1,174.85 acres (1,145.71 acres of modeled upland and 29.14 acres of modeled breeding) as a considerable adverse effect on the species; however, the applicant has agreed to conserve habitat for this species into perpetuity to offset the habitat loss and take that may occur as a result of temporary disturbance at a level sufficient to minimize the effects of the action. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any portion of its range within the action area. The applicant has committed to implement several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on the California tiger salamander Central DPS are expected to be minimized by implementation of the *Conservation Strategy.*

California Tiger Salamander Santa Barbara DPS

Covered Activities will be undertaken almost entirely on existing facilities within the action area. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. The Service views the maximum projected permanent loss of 11.79 acres (11.77 acres of modeled upland and 0.02 acres of modeled breeding) and temporary disturbance of 77.15 acres (77.01 modeled upland and 0.14 acres of modeled breeding) as a considerable adverse effect on the species; however, the applicant has agreed to conserve habitat for this species into perpetuity to offset the habitat loss, and take that may occur as a result of temporary disturbance at a level sufficient to minimize the effects of the action. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any portion of its range within the action area. The applicant has committed to implement several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on the California

tiger salamander Santa Barbara DPS are expected to be minimized by implementation of the *Conservation Strategy*.

Conservancy Fairy Shrimp

Covered Activities will be undertaken almost entirely on existing facilities within the action area. Minor new construction is not expected to occur within aquatic habitat for this species. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. Covered Activities are not expected to occur often within aquatic habitat for this species. The species is rare throughout its range, reducing the likelihood that Covered Activities undertaken at a given location would affect this species. The expected loss resulting from implementation of Covered Activities of 7.50 acres of permanent habitat loss and 57.92 acres of temporary loss over the 30-year permit term, as an adverse effect on the species; however, the applicant has agreed to conserve habitat for this species into perpetuity to offset the habitat loss and take that may occur as a result of temporary disturbance at a level sufficient to minimize the effects of the action. The applicant has committed to implement several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on the Conservancy fairy shrimp are expected to be minimized by implementation of the *Conservation Strategy*.

Foothill Yellow-Legged Frog

Covered Activities will be undertaken almost entirely on existing facilities within the action area. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. The Service views the maximum projected permanent loss of 21.88 acres (20.23 modeled dispersal and 1.65 modeled breeding) and temporary disturbance of 128.46 acres (118.76 modeled dispersal and 9.7 modeled breeding) as a considerable adverse effect on the species; however, the applicant has agreed to conserve habitat for this species into perpetuity to offset the habitat loss and take that may occur as a result of temporary disturbance at a level sufficient to minimize the effects of the action. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any portion of its range within the action area. The applicant has committed to implement several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on the foothill yellow-legged frog are expected to be minimized by implementation of the *Conservation Strategy*.

Giant Gartersnake

Covered Activities will be undertaken almost entirely on existing facilities within the action area. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementing individual Covered Activities. The Service views the maximum projected permanent loss of 101.24 acres (50.48 of modeled rice, 38.01 modeled upland, and 12.75 modeled wetland and marsh) and temporary disturbance of 690.00 acres (300.00 of

modeled rice, 300.00 modeled upland, and 90.00 modeled wetland and marsh) as a considerable adverse effect on the species; however, the applicant has agreed to conserve habitat for this species into perpetuity to offset the habitat loss and take that may occur as a result of temporary disturbance at a level sufficient to minimize the effects of the action. Furthermore, much of the disturbance is expected to be in areas that experience active agriculture for rice. Such habitat is useful during certain parts of the species' lifecycle, but experiences regular and intense levels of disturbance, and we do not anticipate that PG&E's activities will disturb the species in these areas more than currently occurs. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any portion of its range within the action area. Through the *Conservation Strategy*, the applicant has committed to implement several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species.

Giant Kangaroo Rat

Covered Activities will be undertaken almost entirely on existing facilities within the action area. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. The expected loss resulting from implementation of Covered Activities of 30.0 acres of permanent habitat loss and 150 acres of temporary loss over the 30-year permit term, in comparison to the habitat remaining for this species throughout its range, and in light of the fact that effects will be distributed throughout its range within the action area, is small. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any extant occurrences. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation Measures, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on the giant kangaroo rat are expected to be minimized by implementation of the *Conservation Strategy.*

Ione Manzanita

Covered Activities will be undertaken almost entirely on existing facilities within the action area. A total of 64 plants across 5 occurrences of the species within the action area are expected to be injured or removed. A total of 12.25 acres of habitat is expected to be permanently lost; however, this amount of habitat loss is expected to be distributed across all 5 occurrences, with a maximum loss at any affected occurrences expected to 0.3% of the total habitat at a given occurrence. Effects on the species from this level of individual plant and habitat loss are expected to be negligible. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation Strategy, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has also committed to salvaging, or compensating for individual plants temporarily affected or permanently destroyed as a result of Covered Activities. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on Ione manzanita are expected to be minimized by implementation of the *Conservation Strategy*.

Kern Mallow

Covered Activities will be undertaken almost entirely on existing facilities within the action area. A total of 1,226 plants across 9 occurrences of the species within the action area are expected to be injured or removed. A total of 10.5 acres of habitat is expected to be permanently lost; however, this amount of habitat loss is expected to be distributed across all 9 occurrences, with a maximum loss at any affected occurrences expected to be 0.4% of the total habitat at a given occurrence, except for CNDDB occurrence #181, where 2.8% of that occurrence is expected to be lost over the 30-year permit term. Effects on the species from this level of individual plant and habitat loss are expected to be negligible. The applicant has committed to conserving habitat for this species, through the various measures described in the *Conservation Strategy*, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has also committed to salvaging, or compensating for individual plants temporarily affected or permanently destroyed as a result of Covered Activities. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on Kern mallow are expected to be minimized by implementation of the *Conservation Strategy*.

Layne's Ragwort

Covered Activities will be undertaken almost entirely on existing facilities within the action area. A total of 103 plants across 20 occurrences of the species within the action area are expected to be injured or removed. A total of 2.86 acres of habitat is expected to be permanently lost; however, this amount of habitat loss is expected to be distributed across all 103 occurrences, with a maximum loss at any affected occurrences expected to be 1.0% of the total habitat at a given occurrence, except for CNDDB occurrences #27 and 62, where 5.0% and 3.0% of those occurrence is expected to be lost over the 30-year permit term, respectively. Effects on the species from this level of individual plant and habitat loss are expected to be negligible. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation Strategy, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has also committed to salvaging, or compensating for individual plants temporarily affected or permanently destroyed as a result of Covered Activities. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on Kern mallow are expected to be minimized by implementation of the *Conservation Strategy*.

Longhorn Fairy Shrimp

Covered Activities will be undertaken almost entirely on existing facilities within the action area. Minor new construction is not expected to occur within aquatic habitat for this species. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. Covered Activities are not expected to occur often within aquatic habitat for this species. The species is rare throughout its range, reducing the likelihood that Covered Activities undertaken at a given location would affect this species. The expected loss resulting from implementation of Covered Activities of 3.32 acres of permanent habitat loss and 21.06 acres of temporary loss over the 30-year permit term, in comparison to the habitat remaining to this species throughout its range, and in light of the fact that effects will be distributed throughout its range within the action area, is small. The

distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any extant occurrences. The applicant has agreed to conserve habitat for this species into perpetuity to offset the habitat loss and take that may occur as a result of temporary disturbance at a level sufficient to minimize the effects of the action. The applicant has committed to implement several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on the longhorn fairy shrimp are expected to be minimized by implementation of the *Conservation Strategy*.

Marbled Murrelet

Covered Activities will be undertaken almost entirely on existing facilities within the action area. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. The expected loss resulting from implementation of Covered Activities of 45 acres of permanent habitat loss and 82.5 acres of temporary loss over the 30-year permit term, in comparison to the habitat remaining to this species throughout its range, and in light of the fact that effects will be distributed throughout its range within the action area, is small. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any extant occurrences. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation Measures, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on the marbled murrelet are expected to be minimized by implementation of the *Conservation Strategy*.

Monterey Gilia

Covered Activities will be undertaken almost entirely on existing facilities within the action area. A total of 6,266 plants across 6 occurrences of the species within the action area are expected to be injured or removed. Occurrences of this species are known to have tens of thousands to millions of individuals in a given year, so this amount of loss of individuals is not expected to affect any population of this species within the action area in a measurable way. A total of 6.6 acres of habitat is expected to be permanently lost; however, this amount of habitat loss is expected to be distributed across all 103 occurrences, with a maximum loss at any affected occurrences expected to be 1.2% of the total habitat at a given occurrence over the 30-year permit term. Effects on the species from this level of individual plant and habitat loss are expected to be negligible. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation Strategy, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has also committed to salvaging, or compensating for individual plants temporarily affected or permanently destroyed as a result of Covered Activities. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on Monterey gilia are expected to be minimized by implementation of the *Conservation Strategy*.

Monterey Spineflower

Covered Activities will be undertaken almost entirely on existing facilities within the action area. A total of 4,376 plants across 13 occurrences of the species within the action area are expected to be injured or removed. Occurrences of this species are known to have tens of thousands to millions of individuals in a given year, so this amount of loss of individuals is not expected to affect any population of this species within the action area in a measurable way. A total of 46.6 acres of habitat is expected to be permanently lost; however, this amount of habitat loss is expected to be distributed across all 4 occurrences, with a maximum loss at any affected occurrences expected to be 3.8% of the total habitat at a given occurrence over the 30-year permit term. Effects on the species from this level of individual plant and habitat loss are expected to be negligible. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation Strategy, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has also committed to salvaging, or compensating for individual plants temporarily affected or permanently destroyed as a result of Covered Activities. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on Monterey spineflower are expected to be minimized by implementation of the *Conservation Strategy*.

Morro Shoulderband Snail

Covered Activities will be undertaken almost entirely on existing facilities within the action area. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. The expected loss resulting from implementation of Covered Activities of 3 acres of permanent habitat loss and 6 acres of temporary loss over the 30-year permit term, in comparison to the habitat remaining to this species throughout its range, and in light of the fact that effects will be distributed throughout its range within the action area, is so small as to be discountable. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any extant occurrences. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation Measures, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on the Morro shoulderband snail are expected to be minimized by implementation of the *Conservation Strategy*.

Mount Hermon June Beetle

Covered Activities will be undertaken almost entirely on existing facilities within the action area. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. The expected loss resulting from implementation of Covered Activities of 7.50 acres of permanent habitat loss and 22.50 acres of temporary loss, over the 30-year permit term, as a considerable adverse effect on the species; however, the applicant has agreed to conserve habitat for this species into perpetuity to offset the habitat loss and take that may occur as a result of temporary disturbance at a level sufficient to

minimize the effects of the action. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any extant occurrences. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation Measures, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on the Mount Hermon June beetle are expected to be minimized by implementation of the *Conservation Strategy*.

Mountain Yellow-Legged Frog

Covered Activities will be undertaken almost entirely on existing facilities within the action area. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. The Service views the maximum projected permanent loss of 0.60 acres and temporary disturbance of 3.00 acres (118.76 modeled dispersal and 9.7 modeled aquatic), in comparison to the habitat remaining to this species throughout its range, and in light of the fact that effects will be distributed throughout its range within the action area, as so small as to be discountable. Furthermore, because PG&E's facilities cross only a small portion of this species' range, we expect effects on this species to occur infrequently. The applicant has agreed to conserve habitat for this species into perpetuity to offset the habitat loss and take that may occur as a result of temporary disturbance at a level sufficient to minimize the effects of the action. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any portion of its range within the action area. The applicant has committed to the implementation several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on the mountain yellow-legged frog are expected to be minimized by implementation of the *Conservation Strategy*.

Northern Spotted Owl

Covered Activities will be undertaken almost entirely on existing facilities within the action area. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. The expected loss resulting from implementation of Covered Activities of 165 acres of permanent habitat loss and 660 acres of temporary loss, over the 30-year permit term, is a considerable adverse effect on the species; however, the applicant has agreed to conserve habitat for this species into perpetuity to offset the habitat loss and take that may occur as a result of temporary disturbance at a level sufficient to minimize the effects of the action. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any extant occurrences. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation Measures, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on the northern spotted owl are expected to be minimized by implementation of the *Conservation Strategy*.

Ohlone Tiger Beetle

Covered Activities will be undertaken almost entirely on existing facilities within the action area. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. The expected loss resulting from implementation of Covered Activities of 7.50 acres of permanent habitat loss and 22.50 acres of temporary loss, over the 30-year permit term, as a considerable adverse effect on the species; however, the applicant has agreed to conserve habitat for this species into perpetuity to offset the habitat loss and take that may occur as a result of temporary disturbance at a level sufficient to minimize the effects of the action. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any extant occurrences. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation Measures, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on the Ohlone tiger beetle are expected to be minimized by implementation of the *Conservation Strategy*.

Point Arena Mountain Beaver

Covered Activities will be undertaken almost entirely on existing facilities within the action area. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. The expected loss resulting from implementation of Covered Activities of 3.0 acres of permanent habitat loss and 7.5 acres of temporary loss over the 30-year permit term, in comparison to the habitat remaining to this species throughout its range, and in light of the fact that effects will be distributed throughout its range within the action area, is small. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any extant occurrences. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation Measures, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on the Point Arena mountain beaver are expected to be minimized by implementation of the *Conservation Strategy*.

Pine Hill Ceanothus

Covered Activities will be undertaken almost entirely on existing facilities within the action area. A total of 33 plants across 6 occurrences of the species within the action area are expected to be injured or removed. A total of 3.67 acres of habitat is expected to be permanently lost; however, this amount of habitat loss is expected to be distributed across all 5 occurrences, with a maximum loss at any affected occurrences expected to 1.0% of the total habitat at a given occurrence, with most occurrences experiencing significantly less loss. Effects on the species from this level of individual plant and habitat loss are expected to be negligible. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation Strategy, prior to engaging in any Covered Activities that may result in habitat

disturbance. The applicant has also committed to salvaging, or compensating for individual plants temporarily affected or permanently destroyed as a result of Covered Activities. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on Pine Hill ceanothus are expected to be minimized by implementation of the *Conservation Strategy*.

Pine Hill Flannelbush

Covered Activities will be undertaken almost entirely on existing facilities within the action area. A total of 2 plants across 6 occurrences of the species within the action area are expected to be injured or removed. A total of 1.19 acres of habitat is expected to be permanently lost; however, this amount of habitat loss is expected to be distributed across all 5 occurrences, with a maximum loss at any affected occurrences expected to 1.0% of the total habitat at a given occurrence, with most occurrences experiencing significantly less loss. Effects on the species from this level of individual plant and habitat loss are expected to be negligible. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation Strategy, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has also committed to salvaging, or compensating for individual plants temporarily affected or permanently destroyed as a result of Covered Activities. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on Pine Hill flannelbush are expected to be minimized by implementation of the Conservation Strategy.

Robust Spineflower

Covered Activities will be undertaken almost entirely on existing facilities within the action area. A total of 3,765 plants across 4 occurrences of the species within the action area are expected to be injured or removed. Occurrences of this species are known to have tens of thousands to millions of individuals in a given year, so this amount of loss of individuals is not expected to affect any population of this species within the action area in a measurable way. A total of 1.3 acres of habitat is expected to be permanently lost; however, this amount of habitat loss is expected to be distributed across all 4 occurrences, with a maximum loss at any affected occurrences expected to be 0.8% of the total habitat at a given occurrence over the 30-year permit term, with most occurrences experiencing significantly less loss. Effects on the species from this level of individual plant and habitat loss are expected to be negligible. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation Strategy, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has also committed to salvaging, or compensating for individual plants temporarily affected or permanently destroyed as a result of Covered Activities. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on Robust spineflower are expected to be minimized by implementation of the *Conservation Strategy*.

San Benito Evening Primrose

Covered Activities will be undertaken almost entirely on existing facilities within the action area. A total of 1,888 plants across 6 occurrences of the species within the action area are expected to be injured or removed. Occurrences of this species are known to have tens of thousands to millions of individuals in a given year, so this amount of loss of individuals is not expected to affect any population of this species within the action area in a measurable way. A total of 0.37-

acree of habitat is expected to be permanently lost; however, this amount of habitat loss is expected to be distributed across all 4 occurrences, with a maximum loss at any affected occurrences expected to be up to 10% of occurrence 16, with the rest of affected occurrences experiencing significantly less loss. Effects on the species from this level of individual plant and habitat loss are expected to be negligible. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation Strategy, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has also committed to salvaging, or compensating for individual plants temporarily affected or permanently destroyed as a result of Covered Activities. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on San Benito evening primrose are expected to be minimized by implementation of the *Conservation Strategy*.

San Joaquin Kit Fox

Covered Activities will be undertaken almost entirely on existing facilities within the action area. The effects resulting from individual Covered Activities are expected to be small (less than 2.5 acres), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. The expected loss resulting from implementation of Covered Activities of 257.92 acres (15 acres of modeled high-value habitat, 29.06 acres of modeled moderate-value habitat, and 213.86 acres of modeled low-value habitat) of permanent habitat loss and temporary loss of 1,234.48 acres (90.00 acres of modeled high-value habitat, 141.49 acres of modeled moderate-value habitat, and 1,002.99 acres of modeled low-value habitat) over the 30-year permit term, in comparison to the habitat remaining to this species throughout its range, and in light of the fact that effects will be distributed throughout its range within the action area, is small. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any extant occurrences. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation Measures, prior to engaging in any Covered Activities that may result in habitat disturbance. San Joaquin kit foxes exist at a low population density within the action area, rendering them less likely to be affected by individual Covered Activities since they are less likely to inhabit a given Covered Activity location. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on the San Joaquin kit fox are expected to be minimized by implementation of the *Conservation Strategy*.

Santa Cruz Long-Toed Salamander

Covered Activities will be undertaken almost entirely on existing facilities within the action area. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. The Service views the maximum projected permanent loss of 18.00 acres (15.00 acres of modeled upland and 3.00 acres of modeled breeding) and temporary disturbance of 48 acres (45.00 modeled upland and 3.00 acres of modeled breeding) as a considerable adverse effect on the species; however, the applicant has agreed to conserve habitat for this species into perpetuity to offset the habitat loss and take that may occur as a result of temporary disturbance at a level sufficient to minimize the effects of the action. The distribution of permanent loss is not expected to cause or contribute to the extirpation

of this species from any portion of its range within the action area. The applicant has committed to implement several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on the Santa Cruz Long-Toed Salamander are expected to be minimized by implementation of the *Conservation Strategy*.

Smith's Blue Butterfly

Covered Activities will be undertaken almost entirely on existing facilities within the action area. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. The expected loss resulting from implementation of Covered Activities of 15.25 acres of permanent habitat loss and 72.69 acres of temporary loss over the 30-year permit term, in comparison to the habitat remaining to this species throughout its range, and in light of the fact that effects will be distributed throughout its range within the action area, is insignificant. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any extant occurrences. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation measures, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on Smith's blue butterfly are expected to be minimized by implementation of the *Conservation Strategy*.

Stebbins' Morning Glory

Covered Activities will be undertaken almost entirely on existing facilities within the action area. A total of 787 plants across 7 occurrences of the species within the action area are expected to be injured or removed. Some occurrences of this species are known to have tens of thousands to millions of individuals in a given year, so this amount of loss of individuals is not expected to affect any population of this species within the action area in a measurable way. A total of 2.31 acres of habitat is expected to be permanently lost; however, this amount of habitat loss is expected to be distributed across all 7 occurrences. The maximum loss at an affected occurrence expected to be 2.6% of the total habitat at occurrence 26; other occurrences will experience less than 1% habitat loss over the 30-year permit term. Effects on the species from this level of individual plant and habitat loss are expected to be negligible. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation Strategy, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has also committed to salvaging, or compensating for individual plants temporarily affected or permanently destroyed as a result of Covered Activities. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on Stebbins' morning glory are expected to be minimized by implementation of the Conservation Strategy.

Valley Elderberry Longhorn Beetle

Covered Activities will be undertaken almost entirely on existing facilities within the action area. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the

effects of implementation of individual Covered Activities. The expected loss resulting from implementation of Covered Activities of 78.93 acres of permanent habitat loss and 281.67 acres of temporary loss, over the 30-year permit term, as a considerable adverse effect on the species; however, the applicant has agreed to conserve habitat for this species into perpetuity to offset the habitat loss and take that may occur as a result of temporary disturbance at a level sufficient to minimize the effects of the action. Additionally, the Conservation Strategy states that temporary disturbance to this species' habitat will be mitigated repeatedly, which is expected to result in much more habitat becoming available to this species than will be lost as a result of the action. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any extant occurrences. The applicant has committed to conserving habitat for this species, through the various measures described in the Conservation Measures, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on the valley elderberry longhorn beetle are expected to be minimized by implementation of the *Conservation Strategy*.

Vernal Pool Fairy Shrimp

Covered Activities will be undertaken almost entirely on existing facilities within the action area. Minor new construction is not expected to occur within aquatic habitat for this species. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. Covered Activities are not expected to occur often within aquatic habitat for this species. The species is rare throughout its range, reducing the likelihood that Covered Activities undertaken at a given location would affect this species. The expected loss resulting from implementation of Covered Activities of 41.97 acres of permanent habitat loss and 338.57 acres of temporary loss over the 30-year permit term, in comparison to the habitat remaining to this species throughout its range, and in light of the fact that effects will be distributed throughout its range within the action area, is small. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any extant occurrences. The applicant has agreed to conserve habitat for this species into perpetuity to offset the habitat loss and take that may occur as a result of temporary disturbance at a level sufficient to minimize the effects of the action. The applicant has committed to the implementation several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on the vernal pool fairy shrimp are expected to be minimized by implementation of the *Conservation Strategy*.

Vernal Pool Tadpole Shrimp

Covered Activities will be undertaken almost entirely on existing facilities within the action area. Minor new construction is not expected to occur within aquatic habitat for this species. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. Covered Activities are not expected to occur often within aquatic habitat for this species. The species is rare throughout its range, reducing the likelihood that Covered Activities undertaken at a given location would affect this species. The expected loss resulting from implementation of Covered Activities of 41.97 acres of

permanent habitat loss and 338.57 acres of temporary loss over the 30-year permit term, in comparison to the habitat remaining to this species throughout its range, and in light of the fact that effects will be distributed throughout its range within the action area, is small. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any extant occurrences. The applicant has agreed to conserve habitat for this species into perpetuity to offset the habitat loss and take that may occur as a result of temporary disturbance at a level sufficient to minimize the effects of the action. The applicant has committed to implement several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on the vernal pool tadpole shrimp are expected to be minimized by implementation of the *Conservation Strategy*.

Yadon's Rein Orchid

Covered Activities will be undertaken almost entirely on existing facilities within the action area. A total of 64 plants across 7 occurrences of the species within the action area are expected to be injured or removed. Some occurrences of this species are known to be occupied by over one hundred thousand individuals in a given year, so this amount of loss of individuals is not expected to affect any population of this species within the action area in a measurable way. A total of 2.1 acres of habitat is expected to be permanently lost; however, this amount of habitat loss is expected to be distributed across all 7 occurrences. The maximum loss at an affected occurrence expected to be 1.3% of the total habitat at occurrence 9; other occurrences will experience less than 1% habitat loss over the 30-year permit term. Effects on the species from this level of individual plant and habitat loss are expected to be negligible. The applicant has committed to conserving habitat for this species, through the various measures described in the *Conservation Strategy*, prior to engaging in any Covered Activities that may result in habitat disturbance. The applicant has also committed to salvaging, or compensating for individual plants temporarily affected or permanently destroyed as a result of Covered Activities. The applicant has committed to several avoidance and minimization measures intended to reduce or eliminate indirect effects of the action on this species. The effects of the action on Yadon's rein orchid are expected to be minimized by implementation of the *Conservation Strategy*.

Yosemite Toad

Covered Activities will be undertaken almost entirely on existing facilities within the action area. The effects resulting from individual Covered Activities are expected to be small (less than 0.10-acre per activity in most cases), most often temporary in nature, and distributed throughout this species' range in the action area rather than condensed into one location, thereby minimizing the effects of implementation of individual Covered Activities. The Service views the maximum projected permanent loss of 0.50 acres and temporary disturbance of 2.00 acres, in comparison to the habitat remaining to this species throughout its range, and in light of the fact that effects will be distributed throughout its range within the action area, as so small as to be discountable.

Furthermore, because PG&E's facilities cross only a small portion of this species' range, we expect effects on this species to occur infrequently. The applicant has agreed to conserve habitat for this species into perpetuity to offset the habitat loss and take that may occur as a result of temporary disturbance at a level sufficient to minimize the effects of the action. The distribution of permanent loss is not expected to cause or contribute to the extirpation of this species from any portion of its range within the action area. The applicant has committed to the implementation several avoidance and minimization measures intended to reduce or eliminate

indirect effects of the action on this species. The effects of the action on the mountain yellow-legged frog are expected to be minimized by implementation of the Conservation Strategy.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by Service regulations at 50 CFR 17.3 as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the same regulations as an act which actually kills or injures wildlife. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The Pacific Gas and Electric Company Multi-Regional Operations and Maintenance Habitat Conservation Plan and its associated documents clearly identify anticipated effects on Covered Species and the measures that will be taken to minimize those effects. The Plan's conservation strategy (Chapter 5) and monitoring and adaptive management program (Chapter 6), together with the terms and conditions described in the section 10(a)(1)(B) permit issued with respect to the proposed Plan, are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this Incidental Take Statement pursuant to 50 CFR §402.14(i). Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 10(a)(1)(B) and section 7(o)(2) of the Act to apply. If the Applicant fails to adhere to these terms and conditions, the protective coverage of the section 10(a)(1)(B) permit and section 7(o)(2) may lapse. The anticipated amount or extent of the incidental take and associated reporting requirements are described in the Plan and its accompanying section 10(a)(1)(B) permit.

Section 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants or the malicious damage of such plants on areas under Federal jurisdiction or the destruction of endangered plants on non-Federal areas in violation of State law or regulation or in the course of any violation of a State criminal trespass law.

Amount or Extent of Take

All of the Covered Species except for the foothill yellow-legged frog are listed under the Act. The Service anticipates incidental take in terms of numbers of individuals of all covered animal species may be difficult to detect because of population dynamics, small body size, seasonal fluctuations in populations, and habitat type (i.e. underground burrows). However, take of these listed species can be anticipated by loss or degradation of suitable habitat modeled under the Plan. The HCP based its effect analysis for each Covered Animal Species based on modeled

habitat. Therefore the HCP estimates amount of take in the form of habitat loss as a surrogate for number of individuals in most cases and doesn't anticipate direct injury and mortality of all Covered animal Species. Additionally, implementation of the BMPs, AMMs, Hot Zone, and Map Book Zones measures are further expected to reduce the amount of direct injury and mortality. However, some amount of direct injury and mortality is possible. Therefore the Service's incidental take statement includes a small number of individuals for Covered animal Species (as identified in Table 7 below), except the vernal pool invertebrates. Due to the very small size of all life stages of the Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp, it will not be possible to determine the number of individuals lost during the permit term; therefore, we are using habitat as a surrogate for take of individuals for those species, and will measure take of these species in terms of the area of habitat lost over the permit term.

Table 7: Maximum loss of Individuals and Habitat for Covered Species

Common Name	**Maximum 30-Year Permanent + Temporary Habitat Loss (Acres)**	**Maximum Annual Take of Individuals**	**Maximum 30-Year Take of Individuals**
Blunt-nosed leopard lizard		1	30
Core Habitat	114.27		
Suitable Habitat	70.94		
California red-legged frog		15	450
Breeding Habitat	234.00		
Upland Habitat	768.00		
California tiger salamander (Central CA DPS)		18	540
Breeding Habitat	35.04		
Upland Habitat	1394.51		
California tiger salamander (Santa Barbara DPS)		5	150
Breeding Habitat	0.16		
Upland Habitat	88.78		
Conservancy fairy shrimp	65.42	All within boundaries of individual	All within boundaries of individual

Common Name	Maximum 30-Year Permanent + Temporary Habitat Loss (Acres)	Maximum Annual Take of Individuals	Maximum 30-Year Take of Individuals
		Covered Activities	Covered Activities
Foothill yellow-legged frog		15	450
Breeding Habitat	11.57		
Dispersal Habitat	139.00		
Giant garter snake		10	300
Aquatic Habitat	102.75		
Rice Habitat	350.48		
Upland Habitat	338.01		
Giant kangaroo rat	180.00	5	150
Longhorn fairy shrimp	24.39	All within boundaries of individual Covered Activities	All within boundaries of individual Covered Activities
Marbeled murrelet	127.50	1 every other year	15
Morro shoulderband snail	9.00	15	450
Mount Hermon June beetle	30.00	15	450
Mountain yellow-legged frog	3.60	15	450
Northern spotted owl	825.00	1	30
Ohlone tiger beetle	30.00	10	300
Point Arena mountain beaver	10.50	3	90
San Joaquin kit fox		1	30
High Value Habitat	105.00		
Moderate Value Habitat	170.55		

Common Name	Maximum 30-Year Permanent + Temporary Habitat Loss (Acres)	Maximum Annual Take of Individuals	Maximum 30-Year Take of Individuals
Low Value Habitat	1216.85		
Santa Cruz long-toed salamander		5	150
Breeding Habitat	6.00		
Upland Habitat	60.00		
Sierra Nevada yellow-legged frog	5.16	15	450
Smith's blue butterfly	87.94	20	600
Valley elderberry longhorn beetle	No Limit on Shrubs Disturbed	20	600
Vernal pool fairy shrimp	384.71	All within boundaries of individual Covered Activities	All within boundaries of individual Covered Activities
Vernal pool tadpole shrimp	384.71	All within boundaries of individual Covered Activities	All within boundaries of individual Covered Activities
Yosemite toad	2.50	15	450
Zayante band-winged grasshopper	18.75	15	450

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

Reasonable and Prudent Measures

The Service believes that implementation of the entire Pacific Gas and Electric Company Multiple-Region Operations and Maintenance HCP constitutes reasonable and prudent measures

necessary and appropriate to minimize take of all Covered Species, all of which but the foothill yellow-legged frog are listed under the Act.

Salvage and Disposition of Individuals:

Injured listed species must be cared for by a licensed veterinarian or other qualified person(s), such as the Service-approved biologist. Dead individuals must be sealed in a resealable plastic bag containing a paper with the date and time when the animal was found, the location where it was found, and the name of the person who found it, and the bag containing the specimen frozen in a freezer located in a secure site, until instruction s are received from the Service regarding the disposition of the dead specimen. The Service contact person is the Conservation Planning Division Chief of the Endangered Species Program at the Sacramento Fish and Wildlife Office at (916) 414-6600.

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. Conservation recommendations 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. The Service has no conservation recommendations for the proposed action considered in this Opinion.

REINITIATION—CLOSING STATEMENT

This concludes formal consultation on the Pacific Gas and Electric Company Multi-Regional Operations and Maintenance HCP. As provided in 50 CFR §402.16, reinitiation of formal consultation is required and shall be requested by the Federal agency or by the Service where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and:

1) If the amount or extent of taking specified in the incidental take statement 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;

3) If the identified 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 written concurrence, or

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

If you have any questions regarding this biological opinion for the proposed Pacific Gas and Electric Company Bay Area Habitat Conservation Plan, please contact Joshua Emery, Senior Biologist (joshua_emery@fws.gov) or Eric Tattersall, Assistant Field Supervisor (eric_tattersall@fws.gov), at the letterhead address or at (916) 414-6600.

Attachments

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