



**DEPARTMENT OF THE ARMY**  
**SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS**  
**450 GOLDEN GATE AVENUE**  
**SAN FRANCISCO, CALIFORNIA 94102**

**DEPARTMENT OF THE ARMY PERMIT**  
**REGIONAL GENERAL PERMIT 40**  
**Pacific Gas and Electric Bay Area Operations and Maintenance Program**

**PERMITTEE:** Jon Wilcox, Pacific Gas and Electric Company (PG&E)

**PERMIT NO.:** SPN-2018-00490

**ISSUING OFFICE:** San Francisco District

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate District or Division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

This Regional General Permit (RGP) will be used to authorize projects in accordance with the terms and conditions specified below:

**PROJECT DESCRIPTION:**

RGP 40 will be used to authorize routine activities under PG&E's Bay Area Operation and Maintenance (O&M) Program to maintain safe and operable electrical and gas utility infrastructure, including maintenance and repair of PG&E's gas and electrical transmission and distribution systems. Activities include inspecting and testing valves, enclosures, and other components; repairing and replacing facilities, structures, and access roads; electrical transmission and distribution reconditioning projects; and gas pipeline replacement. All proposed activities shall be submitted to the U.S. Army Corps of Engineers (USACE) for authorization under this RGP. Individual O&M projects eligible for coverage under this RGP include a variety of maintenance and related activities that may result in minor temporary or permanent impacts to waters of the United States. Covered projects will generally fall within the following categories (letter codes correspond with activity categories described in the 401 certification):

**Natural Gas Infrastructure**

- A. Internal pipeline inspection and repair: Inspection of pipelines for anomalies in accordance with the Pipeline Safety Act. If an anomaly is found, vegetation will be removed, the pipeline will be excavated, repaired and backfilled. Typical repairs include sleeve repairs involving sandblasting and welding.
- B. Valve recoating and replacement: Replacement or recoating of malfunctioning or worn valves. To coat the entire valve to the connection point, vegetation will be removed, the valve must be excavated to expose the pipe and then backfilled once work is complete.
- C. Pipeline cathodic protection: Installation of a type of anode (e.g., horizontal anode bed, flex anode, deep well anode) parallel and adjacent to the existing pipeline. The anode installation involves vegetation removal, trenching, backfilling, and recontouring upon completion.
- D. Pipeline lowering and replacement: Replacement of pipeline segments due to damage caused by construction projects, acts of nature, or aging and corrosion. Replacement involves clearing vegetation and grading the rights-of-way, trenching and excavating the existing pipeline, and installing the new pipeline parallel and adjacent to the existing pipeline. The minimum length of pipe replaced is typically 40 feet (for one joint of pipe), though up to 1 mile could be replaced.
- E. Pipeline recoating: Pipeline to be recoated is excavated (after any vegetation is removed) and old coating is removed from the pipeline by jetting, scraping, or sandblasting. The surface of the pipe is prepared for the new coating of epoxy by running a self-contained grit or shot-blasting machine over the area. Following repairs, the area is backfilled.
- I. Site-specific erosion solutions: Installation and maintenance of site-specific solutions such as biodegradable jute netting, riprap, or rock fill to remediate scouring and erosion within waterways resulting in pipe exposure and prevent further damage to the pipeline. Site preparation for site-specific erosion solutions may include vegetation removal. **RGP 40 does not cover installation of riprap or other hardscape in waters with salmonids or their designated critical habitat listed under the Endangered Species Act (ESA).**

- J. Water diversion (limited to freshwater features with no ESA-listed fish): Installation of diversion structures (e.g., dam/weir, pump, or headgate) to divert water through a temporary ditch or pipe to convey the water around a section of pipeline to be repaired. These techniques are employed to repair pipeline crossings within water features that have flowing water to minimize impacts to water quality and create a safe work area. Site preparation for water diversion may include vegetation removal. **RGP 40 does not cover dewatering/diversion for gas line activities in waters where ESA listed salmonids or green sturgeon may be present** – gas line maintenance in these waters can only be covered if all work can be conducted when the site is naturally dry (e.g. in high marsh areas which are typically only inundated during extreme high tides, or in seasonal stream reaches which have no surface flow during the summer dry season).

### Electrical Infrastructure

- G. Transmission tower maintenance: Conducting routine repair or replacement of towers and tower foundations located in waters of the U.S. Depending on the topography of the site, any of the following methods may be used to access the site and/or stage materials: vegetation removal, rubber mats placed at footings, temporary boardwalk constructed, barges or helicopter. Pile installation may be required, and temporary cofferdams may be used to dewater areas around foundation work in estuarine or lacustrine waters.
- H. Boardwalk maintenance: Repairs and maintenance related to boardwalks that service transmission facilities in the vegetated margins, mudflats, and open water around San Francisco Bay. All repair and replacement activities are completed manually and require the use of generators and handheld equipment. Access and staging to support boardwalk maintenance may require vegetation removal. Some work may be completed from barges and/or from the mudflat during low tide.
- K. Power pole maintenance: Reinforce poles by installing trusses to existing poles, or fiber-wrapping the pole with preservative material to reduce rate of deterioration. Steel trusses are driven to pre-define depths and secured with high-strength steel banding. Remove poles that cannot be repaired and replace with new wood poles or light-duty steel poles, which may require the installation of guy wires and anchors, which could consist of a screw or a concrete structure, and the removal of vegetation.
- L. Line reconductoring: Replacing existing conductors with new conductors along the line. This may require staging areas, work areas, temporary guard structures, and pull sites (temporary construction areas) within waters of the U.S. Reconductoring is typically completed in 2- to 3-mile sections with the use of pull sites. Vegetation mowing and minor grading may be required to prepare pull sites. Mats or gravel may also be used in wet locations. Guard structures are typically standard wood poles across which temporary netting is strung; in some cases, specifically equipped boom trucks are used instead of poles.

### General Maintenance and Mitigation

- F. Substation maintenance: Accessing substations to perform maintenance tasks, which may require use of station property or adjacent property for construction staging and materials storage, which might require vegetation removal and/or fill to develop safe temporary work areas for equipment and crews, which may affect waters of the U.S.
- M. Site access development and maintenance: Routine operations and maintenance activities may require access road maintenance such as blading, moving or establishing berms, vegetation or debris, clearing and making functional drain inlets to culverts, culvert repair or replacement, establishing waterbars, repairing over-side drains, and the repair or replacement of storm water diversion devices. Protective security fencing is sometimes installed around pipeline facilities, which requires digging holes to install fence posts using an auger. **RGP 40 does not cover dewatering for culvert repair/replacement in waters where ESA listed salmonids may be present** – culvert maintenance in these waters can only be covered if all work can be conducted when the site is naturally dry, and the finished culvert meets the most current NMFS guidelines for fish passage at stream crossings.
- N. Minor New Construction: Construction adjacent to existing facilities and/or in utility or road rights-of-way would be limited to new gas pressure limiting stations (with an impact of up to 1 acre of natural vegetation), electrical substation minor expansions (with up to 3 acres of impacts on natural vegetation), or underground electric lines.

- O. Other Activities: Additional operation and maintenance activities include natural gas line and electrical patrols and inspections, compressor station upgrades and maintenance, pipeline electric test system installations, telecom site maintenance, insulator washing or replacement, outage repairs, facility installations, and others. In the course of conducting these other activities, vegetation impacts may occur.
- P. Restoration and Mitigation Activities: Implementing approved compensatory mitigation associated with this permit (creation, reestablishment, restoration, or enhancement), with impacts to waters of the U.S. This RGP will cover compensatory mitigation activities by PG&E or by independent land managers in jurisdictional waters associated with habitat management, monitoring, and enhancement activities. These activities shall be consistent with all measures included in this permit and site-specific mitigation plans as approved by USACE and other agencies.

**PROJECT LOCATION:** Projects to be authorized under this RGP may occur at any of PG&E's gas and electric transmission and distribution facilities, facility rights-of-way and access routes, and mitigation areas which intersect waters of the U.S. within the O&M Program Area, consisting of the nine Bay Area counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Sonoma, and Solano (enclosure 1). The O&M program area totals approximately 288,495 acres and coincides with the PG&E Bay Area Habitat Conservation Plan (HCP) established in 2017. Most of the nine-county program area is within the USACE San Francisco District. Portions of the program area in eastern Solano and Contra Costa Counties and northeastern Alameda County are within the USACE Sacramento District, but O&M projects in these areas may be authorized by San Francisco District under this RGP.

**PERMIT CONDITIONS:**

**GENERAL CONDITIONS:**

1. The time limit for completing the work authorized ends on December 31, 2027. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.
2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.
4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.
5. For your convenience, a copy of the water quality certification or waiver is attached (enclosure 2). If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit.
6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.
7. You understand and agree that, if future operations by the United States require the removal, relocation or other alteration of the structure or work authorized herein, or if, in the opinion of the Secretary of the Army or his

authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, you will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

#### **SPECIAL CONDITIONS:**

1. To remain exempt from the prohibitions of Section 9 of the Endangered Species Act, the non-discretionary terms and conditions for incidental take of federally-listed species shall be fully implemented as stipulated in the Biological Opinions from US Fish and Wildlife Service (USFWS) titled “*Final Programmatic Formal Consultation for the Pacific Gas and Electric Company’s (PG&E) Bay Area Operation and Maintenance (O&M) Program in Alameda, Contra Costa, Marin, Napa, Santa Clara, San Francisco, San Mateo, Solano, and Sonoma Counties, California*” (USFWS file # 08FBDT00-2020-F-0197), dated August 6, 2021 (enclosure 3), and from National Marine Fisheries Service (NMFS) titled “*Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Pacific Gas and Electric Company’s Bay Area Operation and Maintenance Program*” (NMFS file # WCRO-2021-028), dated April 6, 2023 (enclosure 4). Projects shall also follow all applicable provisions of the 2017 Habitat Conservation Plan (HCP) and associated Incidental Take Permit (ITP) for the PG&E Bay Area O&M Program. Project authorization under this permit is conditional upon compliance with the mandatory terms and conditions associated with incidental take. Failure to comply with the terms and conditions for incidental take, where a take of a federally-listed species occurs, would constitute an unauthorized take and non-compliance with the authorization for your project. The USFWS and or NMFS are, however, the authoritative federal agency for determining compliance with their incidental take statements and for initiating appropriate enforcement actions or penalties under the Endangered Species Act.
2. NMFS and USFWS concurred with the determination that the program is not likely to adversely affect federally listed South-Central California Coast steelhead (*Oncorhynchus mykiss*), California Coastal Chinook salmon (*O. tshawytscha*), Central California Coast coho salmon (*O. kisutch*), or designated critical habitat for these species or for the soft bird’s-beak (*Chloropyron molle* ssp. *molle*). Their concurrences were premised, in part, on avoidance and minimization measures, conservation measures, and proposed mitigation listed on pages 19-25 of the April 6, 2023 NMFS BO (enclosure 4), and on pages 13-17 of the August 6, 2021 USFWS BO (enclosure 3). A complete list of avoidance and minimization measures and conservation measures for NMFS species and critical habitat are included in PG&E’s September 2022 Biological Assessment (section 2.1 and attachment A), and revised and expanded in PG&E’s March 2023 Supplemental Biological Assessment (section 4). All the above measures are incorporated as special conditions to this RGP to ensure unauthorized incidental take of species and loss of critical habitat does not occur.
3. USACE initiated consultation with NMFS to address project related impacts to Essential Fish Habitat (EFH). The conservation recommendations listed on page 85 of the NMFS Biological Opinion (enclosure 4) shall be implemented as follows:
  - a. EFH recommendations 1 and 2 shall be fully implemented by following all non-discretionary terms and conditions for incidental take of federally-listed species, as required in special condition 1.
  - b. To be consistent with EFH recommendation 3, PG&E shall perform hydroacoustic monitoring at a minimum of 2 sites per calendar year, on a minimum of 8 total piles when an impact hammer is utilized on steel piles between 20 inches and 60 inches diameter in water depths greater than 3 feet at MLLW, and when a coffer dam is not used to dewater the site prior to piledriving. If PG&E uses an impact hammer to install 20-60 inch piles at only one site and/or less than 8 total piles in a calendar year, then all piles installed under these conditions shall be hydro-acoustically monitored. Monitoring results shall be included along with other required hydroacoustic monitoring results in PG&E’s annual report to NMFS and USFWS.

4. For all projects proposed for authorization under this RGP, PG&E shall submit digital copies of project information to USACE, USFWS, and NMFS at least 45 days prior to any planned project activities. The project submissions shall include copies of the pre-construction notification/notice of intent (PCN-NOI) form for the PG&E Bay Area O&M Program (enclosure 5), detailing the types of activities planned, anticipated dates of commencement and completion, locations and descriptions of the proposed projects, project drawings or design plans, and summary of impacts to streams, wetlands, or other waters including proposed dewatering, grading, or other temporary or permanent fill discharge for each project. The project information submitted to USACE shall also include the latest version of the USACE ORM Aquatic Resources and Consolidated Upload Spreadsheet, using the Aquatic Resources tab and Impacts tab to provide required information for all proposed projects, including details on the aquatic resources and proposed fill impacts for each project.
5. PG&E shall provide a summary of cultural resource information for each project area, including surrounding archaeological sensitivity, and any known or suspected historic property, tribal cultural property, or other cultural resource within project areas. For any proposed project with the potential to affect a historic property, PG&E shall include sufficient information for USACE to initiate consultation with the State Historic Preservation Officer under section 106 of the National Historic Preservation Act. In the event any previously unknown historic, cultural or archeological remains or artifacts are discovered while conducting an activity authorized by this RGP, PG&E must immediately notify USACE of the discovery and avoid further activities that may affect the resource until the required section 106 coordination has been completed.
6. Proposed projects within the coastal zone must comply with Coastal Zone Management Act (CZMA) requirements. PG&E shall submit appropriate documentation of CZMA compliance to USACE, including current copies of any required permits from the San Francisco Bay Conservation and Development Commission (BCDC) or California Coastal Commission (CCC).
7. Compensatory mitigation compliant with the 2008 mitigation rule shall be provided for the expansion of hardscape or armoring within waters of the U.S., increasing culvert length, converting waters of the U.S. to upland, or permanent impacts to wetland waters of the U.S. Compensatory mitigation would not be required by USACE for replacement of existing hardscape that does not increase the footprint of the existing hardscape within waters of the U.S.; vegetation and sediment removal activities that do not permanently impact wetland waters of the U.S.; or biotechnical bank stabilization activities that do not result in a loss of wetland or other waters of the U.S.
8. For purposes of compensatory mitigation required by USACE under this RGP, the program area is divided into 4 mitigation regions: North Bay (Marin, Sonoma, Napa, and Solano Counties); East Bay (Contra Costa and Alameda Counties); Peninsula (San Francisco and San Mateo Counties); and South Bay (Santa Clara County). If the overall permanent impacts within any one mitigation region exceeds 0.1 acre within the 5- year period of this RGP, compensatory mitigation shall be required for all permanent impacts to waters of the U.S. within that mitigation region. Should the overall permanent impacts to waters of the U.S. within any mitigation region be anticipated to exceed 0.1 acre, a mitigation plan compliant with the 2008 mitigation rule shall be submitted for all impacts cumulatively greater than 0.1 acre in that mitigation region. Proposed compensatory mitigation shall ensure no overall net loss in quantity or quality of waters of the U.S., and shall occur within the same region as the impacts.
9. Compensatory mitigation for permanent impacts to waters of the U.S. may include enhancement, rehabilitation, establishment, or reestablishment of waters of the U.S. Preservation of particularly rare or threatened aquatic resources may only be considered if proposed in combination with other forms of mitigation. Compensatory mitigation for permanent impacts to waters of the U.S. shall be commensurate with the amount and type of impacts that have occurred/are proposed to occur under the O&M Program. Invasive plant removal and native plant establishment alone may not be considered acceptable mitigation for permanent impacts to waters of the U.S. but may be included as part of a larger mitigation plan.

10. PG&E shall be responsible for monitoring any permittee-responsible mitigation for a minimum of 5 years depending on the mitigation project. Mitigation sites involving revegetation shall be monitored by a qualified biologist or vegetation specialist to evaluate successful establishment and survival of plantings. Monitoring and reporting will be compliant with the 2008 mitigation rule. Any mitigation required by USACE will not be considered fulfilled until you have submitted documentation of final mitigation success, and have received written verification from USACE.

**FURTHER INFORMATION:**

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:
  - ( x ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. Section 403).
  - ( x ) Section 404 of the Clean Water Act (33 U.S.C. Section 1344).
  - ( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. Section 1413).
2. Limits of this authorization:
  - a. This permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.
  - b. This permit does not grant any property rights or exclusive privileges.
  - c. This permit does not authorize any injury to the property or rights of others.
  - d. This permit does not authorize interference with any existing or proposed Federal project.
3. Limits of Federal Liability: In issuing this permit, the Federal Government does not assume any liability for the following:
  - a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
  - b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
  - c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
  - d. Design or construction deficiencies associated with the permitted work.
  - e. Damage claims associated with any future modification, suspension, or revocation of this permit.
4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.
5. Reevaluation of Permit Decision: This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:
  - a. You fail to comply with the terms and conditions of this permit.

- b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate. (See Item 4 above.)
- c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 C.F.R. § 325.7 or enforcement procedures such as those contained in 33 C.F.R. §§ 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 C.F.R. § 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

- 6. Extensions: General Condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, USACE will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

**Jon Wilcox**



Digitally signed by Jon Wilcox  
Date: 2023.06.22 14:15:01 -07'00'

(PERMITTEE)

(DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.



Digitally signed by James Mazza  
Date: 2023.06.22 16:31:38 -07'00'

James Mazza  
Chief, Regulatory Division

(DATE)

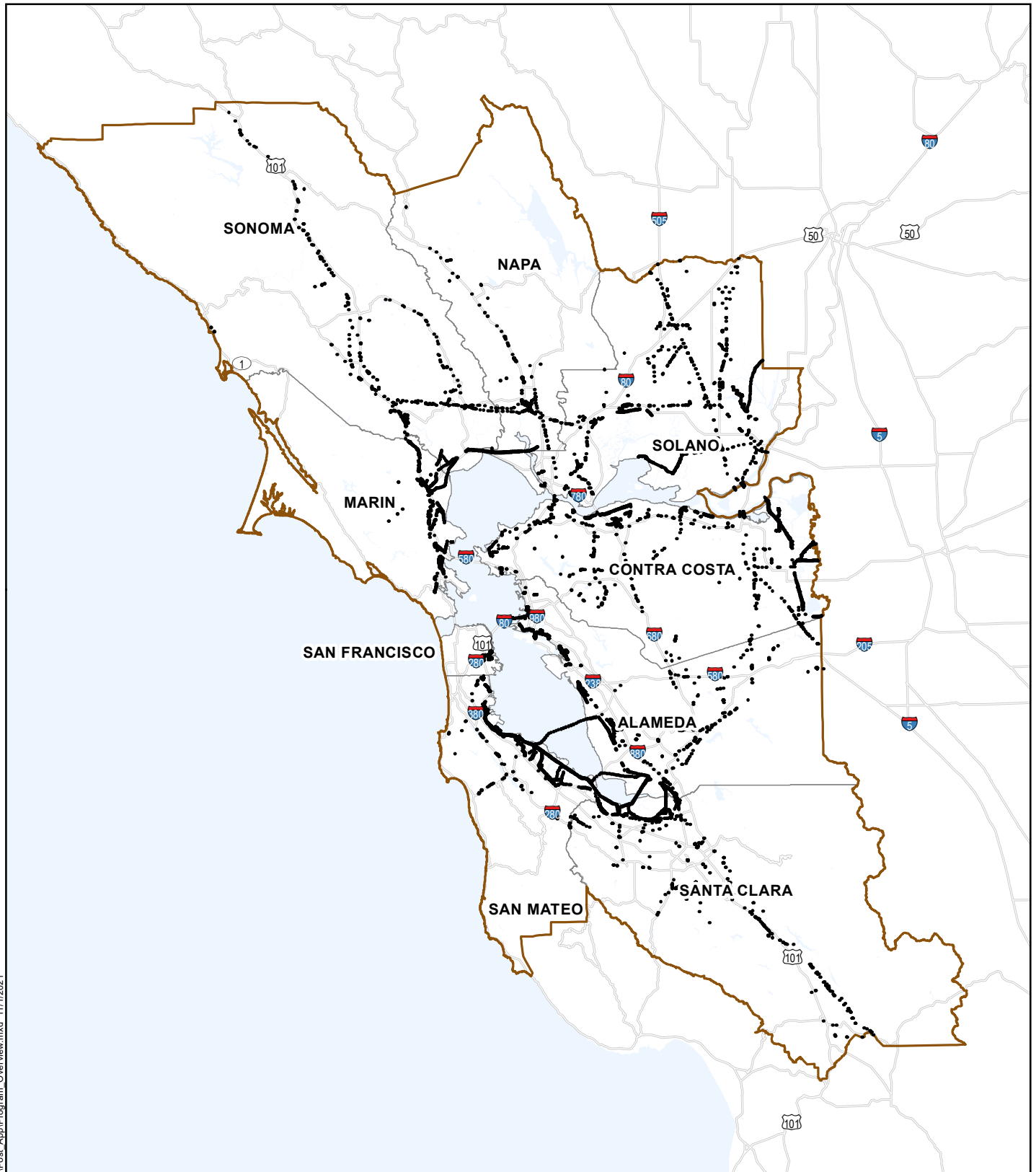
When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE)

(DATE)



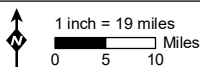




**Figure 2: Program Overview Map**

**PG&E Bay Area Regional General Permit**

- Facilities within Waters of the U.S. and/or Waters of the State in the Program Area
- ▭ Nine-county Area
- ▭ County Boundary
- Major Road





**Figure 1: Program Area Overview Map**

**PG&E Bay Area Regional General Permit**

- Bay Area Habitat Conservation Plan Boundary/Program Area
- County Boundary
- United States Army Corps of Engineers Regulatory Boundary
- Major Road
- San Francisco District (88% of Program Area)
- Sacramento District (12% of Program Area)

1 inch = 19 miles  
 Miles  
 0 5 10





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## State Water Resources Control Board

### WATER QUALITY ORDER NO. WQ 2023-0022-DWQ WASTE DISCHARGE REQUIREMENTS AND CLEAN WATER ACT SECTION 401 WATER QUALITY CERTIFICATION

<b>Effective Date:</b>	April 4, 2023	<b>Reg. Meas. ID:</b>	428347
<b>Program Type:</b>	Fill/Excavation	<b>Place ID:</b>	855396
<b>Project Type:</b>	Utilities	<b>WDID No:</b>	SB21039IN
		<b>USACE No:</b>	SPN-2018-00490

**Project:** Pacific Gas and Electric Company Bay Area Operations and Maintenance Program (Project)

**Applicant:** Pacific Gas and Electric Company

**Applicant Contact:** Mariano Mandler  
Senior Director, Environmental Management  
300 Lakeside Drive  
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**Water Board Staff:** Samantha Parker  
Environmental Scientist  
1001 I Street, PO Box 100  
Sacramento, CA 95814  
Phone: (916) 327-8653  
Email: [Samantha.Parker@waterboards.ca.gov](mailto:Samantha.Parker@waterboards.ca.gov)

**Water Board Contact Person:** If you have any questions, please call State Water Resources Control Board (State Water Board) Staff listed above or (916) 341-5478 and ask to speak with the Water Quality Certification Unit Supervisor.

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E. JOAQUIN ESQUIVEL, CHAIR | EILEEN SOBECK, EXECUTIVE DIRECTOR

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- Attachment A:** Project Area Map
- Attachment B:** Notice of Intent Form and Instructions
- Attachment C:** Reporting and Notification Requirements
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- Attachment F:** 40 CFR Part 121.7 Compliance
- Attachment G:** Request for Notice of Project Complete Letter Form

## **I. Summary**

This Order for Waste Discharge Requirements and Clean Water Act section 401 Water Quality Certification (Order), which includes Attachments A through G, provides Clean Water Act Section 401 Water Quality Certification for projects that require authorization from the U.S. Army Corps of Engineers (Corps) under Clean Water Act Section 404 and Rivers and Harbors Act of 1899 Section 10 and Section 14 (33 U.S.C. § 408, known as “Section 408”) and is issued at the request of Pacific Gas and Electric Company (hereinafter Permittee).

This Order covers operations and maintenance activities conducted by the Permittee related to natural gas pipelines and electric transmission and distribution line dredge, fill, excavation and associated activities that directly and indirectly discharge waste into waters and or impact water quality and beneficial uses in the nine counties surrounding the San Francisco Bay (Project Area Map—Attachment A). The categories of eligible operations and maintenance activities covered under this Order are listed in section V.

This Order is for the purpose described in application and supplemental information submitted by the Permittee. The application was received on January 10, 2019, and determined complete on December 20, 2021. Prior to receiving a complete application, State Water Board staff issued multiple incomplete application notices and the Permittee provided supplemental information that clarified and modified the original application. Additionally, State Water Board staff issued a Denial Without Prejudice on July 2, 2019.

## **II. Findings**

- A.** This Order is adopted pursuant to section 401 of the Clean Water Act and the California Porter-Cologne Water Quality Control Act (Wat. Code §§ 13000, et seq.). Notwithstanding any determinations made by the Corps or other federal agency pursuant to 40 C.F.R. section 121.9, dischargers must comply with the entirety of this Order because the Order also serves as waste discharge requirements. Discharges to waters of the state are prohibited except when authorized in accordance with Water Code section 13264.
- B.** Failure to comply with any condition in this Order shall constitute a violation of the Porter-Cologne Water Quality Control Act and the Clean Water Act. The discharger may then be subject to administrative and/or civil liability pursuant to Water Code section 13385.
- C.** In the event of any violation or threatened violation of the conditions of this Order, the violation or threatened violation shall be subject to any remedies, penalties, process, or sanctions as provided for under state and federal law.
- D.** In response to a suspected violation of any condition of this Order, the State Water Board or Regional Water Quality Control Board (collectively the Water

- Board) may require the Permittee to furnish, under penalty of perjury, any technical or monitoring reports the Water Board deems appropriate, provided that the burden, including costs, of the reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. The additional monitoring requirements ensure that the permitted dischargers and activities comport with any applicable effluent limitations, water quality standards, and/or other appropriate requirement of state law.
- E.** This Order and all of its conditions contained herein continue to have full force and effect regardless of the expiration or revocation of any license or permit issued for the project.
  - F.** This Order does not provide coverage under the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ or 2022-0057-DWQ; NPDES No. CAS000002) (Construction General Permit).
  - G.** This Order does not authorize any act which results in the taking of a threatened, endangered or candidate species, which is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and G. Code, §§ 2050-2097) or the Federal Endangered Species Act (16 U.S.C. §§ 1531-1544). If a “take” will result from any act authorized under this Order, the Permittee must obtain authorization for the take prior to any construction or operation of the portion of the project that may result in a take. The Permittee is responsible for meeting all requirements of the applicable endangered species act for the project authorized under this Order.
  - H.** This Order includes monitoring and reporting requirements pursuant to Water Code sections 13383 and 13267. The burden of preparing these reports, including costs, is reasonable to the need and benefits of obtaining the reports. The reports are intended to ensure that the best management practices required under this Order are sufficient to protect beneficial uses and water quality objectives. The reports related to accidental discharges also ensure that corrective actions that are necessary to prevent and minimize the impact of the discharge are taken as soon as possible. The anticipated costs are minimal as the reporting obligations require only visual monitoring and notification reporting.
  - I.** Consistent with Water Code section 189.7, the Water Board conducted outreach in affected disadvantaged and tribal communities.
  - J.** This Order authorizes future operation and maintenance activities throughout nine Bay Area counties. These activities may impact water quality in disadvantaged and tribal communities. Pursuant to Water Code section

13149.2, the Water Board makes the following findings regarding anticipated water quality impacts and environmental justice concerns within the Board's authority in disadvantaged or tribal communities resulting from the issuance of this Order:

1. Based on readily available information, the Water Board anticipates that the issuance of this Order will result in limited water quality impacts and environmental justice concerns within the scope of the Board's authority. This Order authorizes work near and within Bay Area surface waters, including wetlands, tidal waters, and stream channels. The activities covered by this Order are limited to operation and maintenance of existing facilities, and most impacts will be temporary and last for less than one year. The temporary impacts will generally be related to site access and staging areas. For example, there could be temporary impacts to water quality where a staging area is adjacent to a water or when a project is located in waters (e.g., a utility pole replacement) and the area must be dewatered to conduct maintenance activities. The types of wastes associated with temporary impacts are largely the same as the wastes associated with construction: sediment and oil and grease. Permanent impacts, with a permanent loss of a portion or all of a water, may be authorized under this Order. Only permanent impacts related to an existing facility are covered by this Order and permanent impacts are expected to be small. For example, an existing culvert may be replaced with a larger culvert.
2. The Water Board identified several conditions within the scope of its authority to address the permitted activity impacts. Those conditions are set forth in Order section IX. Even work within waters for a short duration can impact water quality in disadvantaged and tribal communities. For example, stream channel access may be temporarily blocked during utility pole replacement. To reduce impacts, this Order requires PG&E to restore impact sites as soon as possible after work occurs. Additionally, a sequence of actions must be taken before any impacts to waters may occur: impacts must be avoided (moved away from waters), minimized (through implementation of best management practices and design alternatives) and mitigated (with a beneficial project). Before any work is authorized under this Order, Water Board staff will review site-specific information to confirm that this sequence of actions has been taken. Implementation of these measures will ensure that impacts will be minimal. For permanent impacts, compensatory mitigation is required. Generally, mitigation should be provided within the impacted watershed. Compensatory mitigation shall provide a minimum of a one-to-one mitigation to impact ratio, and this ratio is subject to increase at Water Boards staff discretion depending on factors such as distance between the impact site and mitigation site; uncertainty associated with the successful

creation of a mitigation site; temporal loss; and whether the mitigation is in-kind or out-of-kind from the impacted aquatic resource(s).

### **III. Pacific Gas and Electric Company's Bay Area Operation and Maintenance Program**

The Pacific Gas and Electric Company's Bay Area Operation and Maintenance Program consists of activities required to maintain safe and operable electrical and gas utility infrastructure, including operation and maintenance of the Permittee's gas and electrical transmission and distribution systems and minor new construction (e.g., inspecting and testing valves, enclosures, and other components; repairing and replacing facilities, structures, and access roads; electrical transmission and distribution reconductoring projects; gas pipeline replacement; and emergency repair and replacement). Notification shall be provided to the appropriate Regional Water Board before commencement of each activity.

### **IV. Project Location and Receiving Waters Information**

An individual project authorized under this Order may occur at any of the Permittee's gas and electric transmission and distribution facilities, facility rights-of-way, access to the facilities, and mitigation areas located within the Operations and Maintenance Program Area, including all or portions of the nine Bay Area counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Sonoma, and Solano. A map showing the Project area is found in Attachment A of this Order.

The nine-county service area is within the jurisdiction of the San Francisco Bay Regional Water Quality Control Board, the Central Valley Regional Water Quality Control Board, the Central Coast Regional Water Quality Control Board, and the North Coast Regional Water Quality Control Board (collectively Regional Water Boards). Surface waters and groundwater potentially impacted by this Project are protected in accordance with the applicable water quality control plan or policy. Statewide and regional water quality control plans and policies may be accessed at the [State Water Resources Control Board's Plans and Policies Web page](http://www.waterboards.ca.gov/plans_policies/) ([http://www.waterboards.ca.gov/plans\\_policies/](http://www.waterboards.ca.gov/plans_policies/)). Water quality control plans and policies, including water quality standards which consist of existing and potential beneficial uses of waters of the state, water quality objectives to protect those uses, and the state and federal antidegradation policies, are issued in accordance with Water Code sections 13140, 13240 and 13170.

It is the policy of the State of California that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes. This Order promotes that policy by requiring discharges not to exceed maximum contaminant levels designed to protect human health and ensure that water is safe for domestic use.



## V. Description of Direct Impacts to Waters of the State

Individual projects eligible for coverage under this Order include a wide variety of activities that require a permit and may result in temporary impacts to waters of the state or may result in a permanent loss of waters of the state, including:

- A. Internal pipeline inspection and repair: Inspection of pipelines for anomalies in accordance with the Pipeline Safety Act. If an anomaly is found, vegetation will be removed, the pipeline will be excavated, repaired and backfilled. Typical repairs include sleeve repairs involving sandblasting and welding.
- B. Valve recoating and replacement: Replacement or recoating of malfunctioning or worn valves. To coat the entire valve to the connection point, vegetation will be removed, the valve must be excavated to expose the pipe and then backfilled once work is complete.
- C. Pipeline cathodic protection: Installation of a type of anode (e.g., horizontal anode bed, flex anode, deep well anode) parallel and adjacent to the existing pipeline. The anode installation involves vegetation removal, trenching, backfilling, and recontouring upon completion.
- D. Pipeline lowering and replacement: Replacement of pipeline segments due to damage caused by construction projects, acts of nature, or aging and corrosion. Replacement involves clearing vegetation and grading the rights-of-way, trenching and excavating the existing pipeline, and installing the new pipeline parallel and adjacent to the existing pipeline. The minimum length of pipe replaced is typically 40 feet (for one joint of pipe), though up to 1 mile could be replaced.
- E. Pipeline recoating and replacement: Pipeline to be recoated is excavated (after vegetation is removed) and old coating is removed from the pipeline by jetting, scraping, or sandblasting. The surface of the pipe is prepared for the new coating by running a self-contained grit or shot-blasting machine over the area. Following repairs, the area is backfilled.
- F. Substation maintenance: Accessing substations to perform maintenance tasks, which may require use of station property or adjacent property for construction staging and materials storage, which might require vegetation removal and/or fill to develop safe temporary work areas for equipment and crews, which may affect waters of the state.
- G. Transmission tower maintenance: Conducting routine tower replacement and tower foundation repair, which involves work on tower foundations located in waters of the state. Depending on the topography of the site, any of the following methods may be used to gain access to the site and/or stage materials: vegetation removal, rubber mats placed at footings, temporary boardwalk constructed, barges or helicopter. Cofferdams are installed for repairs to foundations submerged in water.

- H. Boardwalk maintenance: Repairs and maintenance related to boardwalks that service transmission facilities in the vegetated margins, mudflats, and open water around San Francisco Bay. All repair and replacement activities are completed manually and require the use of generators and handheld equipment. Access and staging to support boardwalk maintenance may require vegetation removal. Some work may be completed from barges and/or from the mudflat during low tide.
- I. Site-specific erosion solutions: Installation and maintenance of site-specific solutions such as biodegradable jute netting, riprap, or rock fill to remediate scouring and erosion that occurs within waterways resulting in pipe exposure and prevent further damage to the pipeline. Site preparation for site-specific erosion solutions may include vegetation removal.
- J. Water diversion techniques: Installation of a diversion structure (e.g., a dam or weir and a pump or headgate) to divert water through a temporary ditch or pipe to convey the water around a section of pipeline to be repaired. These techniques are employed to repair pipeline crossings within water features that have flowing water to minimize impacts to water quality and create a safe work area. Site preparation for water diversion may include vegetation removal.
- K. Power pole maintenance: Reinforce poles by installing trusses to existing poles, or fiber-wrapping the pole with preservative material to reduce rate of deterioration. Steel trusses are driven to pre-defined depths and secured with high-strength steel banding. Remove poles that cannot be repaired and replace with new wood poles or light-duty steel poles, which may require the installation of guy wires and anchors, which could consist of a screw or a concrete structure, and the removal of vegetation.
- L. Line reconductoring: Replacing existing conductors with new conductors along the line. This may require staging areas, work areas, temporary guard structures, and pull sites (temporary construction areas) within waters of the state. Reconductoring is typically completed in 2- to 3-mile sections with the use of pull sites. Vegetation mowing and minor grading may be required to prepare pull sites. Mats or gravel may also be used in wet locations. Guard structures are typically standard wood poles across which temporary netting is strung; in some cases, specifically equipped boom trucks are used instead of poles.
- M. Site access development and maintenance: Routine operations and maintenance activities may require routine access road maintenance such as blading, moving or establishing berms, vegetation or debris clearing and making functional drain inlets to culverts, culvert repair, establishing waterbars, repairing over-side drains, and the repair or replacement of storm water diversion devices. Protective security fencing is sometimes installed around pipeline facilities, which requires digging holes to install fence posts using an auger.

- N. Minor New Construction: Construction of facilities adjacent to existing facilities and/or in utility or road rights-of-way would be limited to new gas pressure limiting stations with an impact of up to 1 acre of natural vegetation, electrical substation expansions with up to 3 acres of impacts on natural vegetation, and underground electric lines.
- O. Other Activities: Additional operation and maintenance activities include natural gas line and electrical patrols and inspections, compressor station upgrades and maintenance, pipeline electric test system installations, telecom site maintenance, insulator washing or replacement, outage repairs, facility installations, and others. In the course of conducting these other activities, vegetation impacts may occur.
- P. Restoration and Mitigation Activities: In the course of implementing on-site permittee responsible mitigation for impacts resulting from activities covered under this Order, additional impacts to waters of the state may occur. This Order covers restoration and mitigation activities (e.g. native plantings, water crossing removal and restoration, and wetland enhancement) that result in up to one half (0.5) acre of aquatic resource impacts associated with the habitat management, monitoring, and enhancement activities carried out by the Permittee or by independent land managers providing mitigation for the Permittee to offset enrolled project impacts. This Order does not cover large scale, multi-acre, mitigation projects that offset impacts from several impact sites. Site-specific restoration or mitigation plans must comply with Order section IX. G and H conditions and be approved by the Water Board before any discharge may occur; remaining applicable Order conditions also apply.

The Permittee should describe all proposed project features, including those potentially offsite and/or adjacent to waters of the state which could result in impacts to waters of the state, in the Notice of Intent (NOI- Attachment B), which must be completed for authorization under this Order.

## **VI. Description of Indirect Impacts to Waters of the State**

The Water Board recognizes the potential for indirect impacts to waters of the state associated with the Project. Indirect impacts may include, but are not limited to, sediment-laden stormwater runoff from bare surfaces exposed by operation and maintenance projects, spills of chemicals (fuels, lubricants, paints, etc.) used in operation and maintenance projects, and loss of shade to streams associated with impacts to riparian habitat. Impacts to waters of the state and their designated beneficial uses could potentially result from Project activities that are within or adjacent to the Project area. These potential indirect impacts are expected to be short term, and the expected severity of these impacts are adequately reduced through adherence to this Order and the Mitigation Measures described in the Pacific Gas and Electric Company Bay Area Operations and Maintenance Incidental Take Permit Environmental Impact Report.

## **VII. Avoidance and Minimization**

Projects that receive Water Board authorization must demonstrate that impacts to waters of the state are first avoided, and then minimized, to the greatest extent practicable. The avoidance and minimization measures in the Permittee's Bay Area Operations and Maintenance Habitat Conservation Plan and the Permittee's most current "Good Housekeeping Activity Specific Erosion and Sediment Control Plan" are incorporated by reference and shall be conducted during project activities. Additional activity-specific avoidance and minimization measures will be required for each project authorized by this Order.

## **VIII. Compensatory Mitigation**

As determined by the appropriate Regional Water Board, the Permittee is required to provide compensatory mitigation to compensate for permanent, temporary, direct and/or indirect impacts as described in sections IX.G and H.

## **IX. Conditions**

Compliance with conditions of this Order provides reasonable assurance that projects authorized under this Order will comply with state and federally approved water quality requirements. The Water Boards will review any project proposed for authorization under this Order to analyze impacts to water quality and designated beneficial uses within the applicable watershed(s). If the eligibility requirements set forth in this Order are not met, the Water Boards will not authorize the proposed project under this Order and instead require the project proponent to apply for an individual authorization or authorization under another order. In accordance with this Order, the Permittee may proceed with an authorized project under the following terms and conditions:

### **A. Reporting and Notification Requirements**

The following section details the reporting and notification types and timing of submittals. Requirements for the content of these reporting and notification types are detailed in Attachment C, including specifications for photo and map documentation during the Project. Written reports and notifications must be submitted using the Reporting and Notification Cover Sheet located in Attachment C, which must be signed by the Permittee or an authorized representative.

- 1. Request for Authorization:** The Permittee shall submit a complete NOI for authorization under this Order at least 45 days before any project activity. The NOI shall describe all proposed project impacts to waters of the state and project design steps taken to first avoid, and then minimize, impacts to waters of the state to the maximum extent practicable. The NOI shall also include a delineation of waters of the state within impact sites. The NOI must provide all information requested in NOI Attachment B. The NOI must be provided on the NOI form found in Attachment B until an electronic application form is available on the State Water Board's webpage, at which time electronic

submission will be required. An application fee must be provided with each NOI. The application fee amount is determined as required by the California Code of Regulations, title 23, sections 3833(b)(3) and 2200(a)(3).

2. The Water Boards shall determine whether the activity is eligible for Order coverage. The Water Boards will require the Permittee to apply for individual or general authorization where the activity would not comply with an applicable water quality control plan or policy even if coverage would otherwise be authorized by this Order. The Permittee may choose to apply for an individual water quality authorization.

### 3. Project Status Notifications

- a. **Commencement of Construction:** The Permittee shall submit a Commencement of Construction Report at least seven (7) days prior to start of initial ground disturbance activities and, if applicable, corresponding Waste Discharge Identification Number (WDID) issued under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ or 2022-0057-DWQ; NPDES No. CAS000002).
- b. **Project Reporting:** The Permittee shall submit an Annual Report unless a Quarterly Report is required by Water Board staff in the project's Notice of Applicability. Project reporting shall continue until the Water Board issues a Notice of Project Complete Letter to the Permittee.
- c. **Request for Notice of Project Complete Letter:** The Permittee shall submit a Request for Notice of Project Complete Letter when construction and any post-construction monitoring is complete, mitigation performance criteria have been achieved, and no further project activities will occur; this request may be provided using the Request for Notice of Project Complete Letter Form (Attachment G). This request shall be submitted to Water Board staff within thirty (30) days following completion of all project activities. Upon approval of the request, the Water Board staff shall issue a Notice of Project Complete Letter (written notice, email, or other verifiable means) to the Permittee which will end associated annual fees. Completion of post-construction monitoring shall be determined by Water Board staff and shall be contingent on successful attainment of restoration and mitigation performance criteria.

#### 4. Conditional Notifications and Reports:

The following notifications and reports are required as applicable.

##### a. Accidental Discharges of Hazardous Materials<sup>1</sup>

Following an accidental discharge of a reportable quantity of a hazardous material, sewage, or an unknown material, the following applies (Water Code, Section 13271):

- i. As soon as (A) Permittee has knowledge of the discharge or noncompliance, (B) notification is possible, and (C) notification can be provided without substantially impeding cleanup or other emergency measures then:
  1. First call – 911 (to notify local response agency)
  2. Then call – Office of Emergency Services (OES) State Warning Center at: (800) 852-7550 or (916) 845-8911
  3. Lastly, follow the required OES procedures as set forth in the [Office of Emergency Services' Accidental Discharge Notification Web Page](https://www.caloes.ca.gov/FireRescueSite/Documents/CalOES-Spill_Booklet_Feb2014_FINAL_BW_Acc.pdf) ([https://www.caloes.ca.gov/FireRescueSite/Documents/CalOES-Spill\\_Booklet\\_Feb2014\\_FINAL\\_BW\\_Acc.pdf](https://www.caloes.ca.gov/FireRescueSite/Documents/CalOES-Spill_Booklet_Feb2014_FINAL_BW_Acc.pdf))
- ii. Following notification to OES, the Permittee shall notify the appropriate Water Board, as soon as practicable (ideally within 24 hours). Notification may be delivered via written notice, email, or other verifiable means.
- iii. Within five (5) working days of notification to the Water Board, the Permittee must submit an Accidental Discharge of Hazardous Material Report.

##### b. Violation of Compliance with Water Quality Standards:

- i. The Permittee shall notify the Water Board of any event causing a violation of compliance with water quality standards. Notification may be delivered via written notice, email, or other verifiable means.

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<sup>1</sup> "Hazardous material" means any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous waste, and any material that a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment. (Health & Saf. Code, § 25501.)

- ii. This notification must be followed within three (3) working days by submission of a Violation of Compliance with Water Quality Standards Report.

**c. In-Water Work and Diversions:**

- i. If required by the Water Board, the Permittee shall notify the Water Board at least forty-eight (48) hours prior to initiating work in water or installation of stream diversions. Notification may be delivered via written notice, email, or other verifiable means.
- ii. If required by the Water Board, within seven (7) working days following completion of in-stream water work or stream diversions, an In-Water Work/Diversions Water Quality Monitoring Report must be submitted to Water Board staff.

**d. Modifications to Project:**

The Permittee shall give advance notice to Water Board staff if project implementation as described in the NOI is altered in any way or by the imposition of subsequent permit conditions by any local, state or federal regulatory authority by submitting a Modifications to Project Report. Project modifications that may prevent compliance with this Order are prohibited.

**e. Transfer of Long-Term BMP Maintenance:**

If maintenance responsibility for post-construction BMPs is legally transferred, the Permittee must submit to the Water Board a copy of such documentation and must provide the transferee with a copy of a long-term BMP maintenance plan that complies with manufacturer or designer specifications. The Permittee must provide such notification to the Water Board with a Transfer of Long-Term BMP Maintenance Report at least 10 days prior to the transfer of BMP maintenance responsibility.

**B. Water Quality Monitoring**

1. **General:** If surface water is present, continuous visual monitoring shall be conducted during active construction to detect accidental discharge of construction related pollutants (e.g., oil and grease, turbidity plume, or uncured concrete).
2. **In-Water Work or Diversions:** For projects involving planned in-stream water work or stream diversions, an in-water work/stream diversion and water quality monitoring plan shall be submitted with the NOI. Water quality monitoring shall be conducted in accordance with the approved plan.
3. **Accidental Discharges/Noncompliance:** If an accidental discharge occurs, the Permittee shall determine whether the discharge includes hazardous materials or will cause or contribute to an exceedance of water quality

objectives, and if so, notify the Water Board in accordance with IX.A.4.a. Water Board staff may require additional water quality monitoring based on the discharge constituents and/or related water quality objectives and beneficial uses.

- 4. Post-Construction:** For activities that result in exposed soil in or on the banks of waters and that have not received a Notice of Project Complete Letter, the Permittee will visually inspect the project site between October 30 and April 15 or as required in the approved restoration plan following each rain event that results in 0.5 inch of rainfall or more within a 48 hour period, until the Permittee demonstrates that applicable erosion control Best Management Practices are properly installed and the site is stabilized to prevent future erosion. The Permittee must demonstrate that excessive erosion, stream instability, and other water quality pollution is not occurring in or downstream of the project site. If water quality pollution is occurring, contact the Water Board staff member overseeing the project within three (3) working days. The Water Board may require the submission of a Violation of Compliance with Water Quality Standards Report.

#### **C. Standard Conditions**

1. This action is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to Water Code section 13330, and California Code of Regulations, title 23, chapter 28, Article 6 commencing with section 3867.
2. This Order is not intended and shall not be construed to apply to any activity involving hydroelectric facility requiring a Federal Energy regulatory Commission (FERC) license or an amendment to a FERC license, unless pertinent certification application was filed pursuant to subsection 2855(b) of chapter 28, title 23 of the California Code of Regulations, and that application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.
3. This Order is conditioned upon total payment of any fee required under title 23 of the California Code of Regulations.

#### **D. General Conditions**

1. Permitted actions must not cause a violation of any applicable water quality standards, including impairment of designated beneficial uses for receiving waters as adopted in the Basin Plans by any applicable Regional Water Board, or any applicable Water Board water quality control plan or policy. The source of any such discharge must be eliminated as soon as practicable.



2. The Permittee must conform to the engineering plans, specifications, and technical reports submitted with the application materials. Water Code section 13264 prohibits any discharge that is not specifically authorized in this Order.
3. The Permittee shall adhere to all requirements in the mitigation monitoring and reporting program (MMRP) (Pacific Gas and Electric Bay Area Operation and Maintenance Incidental Take Permit Mitigation Monitoring and Reporting Program, July 2022) which is incorporated herein by reference and any additional measures as outlined in Attachment E, CEQA Findings of Fact.
4. **Avoidance and Minimization:** Projects authorized under this Order shall be designed to avoid and minimize impacts to waters of the state to greatest practicable extent.

#### E. Administrative

1. Signatory requirements for all document submittals required by this Order are presented in Attachment D of this Order.
2. **Site Access:** The Permittee shall grant Water Board staff, Regional Water Board staff or an authorized representative (including an authorized contractor acting as a Water Board representative), upon presentation of credentials and other documents as may be required by law, permission to:
  - a. Enter upon the project or compensatory mitigation site(s) premises where a regulated facility or activity is located or conducted, or where records are kept.
  - b. Have access to and copy any records that are kept and are relevant to the Project or the requirements of this Order.
  - c. Inspect any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order.
  - d. Sample or monitor for the purposes of assuring compliance.
3. The Permittee shall be responsible for work conducted by its consultants, contractors, and any subcontractors. A copy of this Order shall be provided to any consultants, contractors, and subcontractors working on the project. Copies of this Order and the project's Notice of Applicability shall remain at the project site for the duration of the project. All personnel performing work on the project shall be familiar with the content of this Order and the project's Notice of Applicability and its posted location at the project site.
4. **Lake and Streambed Alteration Agreement:** The Permittee shall submit a signed copy of the California Department of Fish and Wildlife's Lake or Streambed Alteration Agreement (LSAA) to the Water Board prior to any discharge to waters of the state that requires an LSAA.

## **F. Construction Conditions**

1. All materials and supplies necessary for implementing these construction conditions must be on site and ready for use at the start of the construction activity and must remain in supply and ready for implementation throughout the construction process. All non-structural best management practice materials (e.g., training documents, compliance tracking procedures) must be ready for use at the start of construction.
2. All personnel who engage in construction activities or their oversight at the Project site (superintendent, construction manager, foreman, crew, contractor, biological monitor, etc.) must attend trainings on the conditions of this Order and how to perform their duties in compliance with those conditions. Every person shall attend an initial training within five working days of their start date at the Project site. Trainings shall be conducted by a qualified individual with expertise in 401 Water Quality Certification conditions and compliance.
3. Construction material, debris, rubbish, spoils, soil, silt, sawdust, rubbish, steel, welding slag, welding rods, waste material, waste containers, other organic or earthen material, or any other substances which could be detrimental to water quality or hazardous to aquatic life that is discharged as a result of project related activities shall be prevented from entering waters of the state. Spoils from excavations shall not be stored in waters of the state.
4. Environmentally sensitive areas and environmentally restricted areas, including any avoided waters of the state, must be clearly identified in the field for exclusion prior to the start of construction. Such identification must be properly maintained until construction is completed and the soils have been stabilized. Equipment, materials, or any other substances or activities that may impact waters of the state outside of the limits of project disturbance are prohibited.
5. Bridges, culverts, dip crossings, or other structures must be installed so that water and in-stream sediment flow is not impeded. Project design practices and materials which appropriately minimize impacts to waters must be used in areas where access roads intersect waters of the state.
6. Temporary materials placed in any water of the state must be removed as soon as construction is completed at that location, and all temporary roads must be removed or re-contoured and restored according to approved re-vegetation and restoration plans.
7. A method of containment must be used below any temporary bridge, trestle, boardwalk, and/or other stream crossing structure to prevent any debris or spills from falling into the waters of the state. Containment must be maintained and kept clean for the life of the temporary crossing structure.

8. Vegetation removal shall be limited to the minimum necessary to complete the proposed operation and maintenance activities as listed in this section. This Order does not allow vegetation management removal as a standalone activity.
9. Unless authorized for restoration, material excavated to prepare a site for placement of the permitted fill material must be properly disposed of in an upland area. The disposal site must be located at a sufficient distance away from flowing or standing water such that the excavated material does not erode or move in any way into any water of the state. The disposal area shall be identified in the project NOI.
10. **Topsoil:** For any excavation, including utility line trenches, the top 6 to 12 inches of topsoil shall be removed and stockpiled separately during construction. Following installation, the topsoil shall be replaced and restored to preexisting conditions.
11. Any structure, including but not limited to, culverts, pipes, piers, and coffer dams, placed within a stream where fish (as defined in Fish and Game Code section 45) exist or may exist, must be designed, constructed, and maintained such that it does not constitute a barrier to upstream or downstream movement of aquatic life, or cause an avoidance reaction by fish due to impedance of their upstream or downstream movement. This includes, but is not limited to, maintaining the supply of water and maintaining flows at an appropriate depth, temperature, and velocity to facilitate upstream and downstream fish migration. If any structure results in a long-term reduction in fish movement, the discharger shall be responsible for restoration of conditions as necessary (as determined by the Water Board) to secure passage of fish across the structure.
12. **Dust Abatement:** Dust abatement chemicals added to water can be hazardous to wildlife and, if allowed to enter streams, detrimental to water quality. Therefore, dust abatement activities shall be conducted so that sediment or dust abatement chemicals are not discharged into waters of the state. Dust abatement products or additives that are known to be detrimental to water quality or wildlife shall not be used, unless specific management needs are documented, and product-specific application plans are approved by Water Board staff.
13. **Use of Mechanized Equipment:** Activities permitted under this Order shall be conducted in a manner that minimizes ground disturbance, soil compaction, rutting and other mechanical impacts. Equipment shall be operated and maintained in a manner that reduces the risk of spills or the accidental exposure of fuels or hazardous materials to water bodies or wetlands.

**14. Piers or Piles:** Piers or piles placed in the stream channel to support a linear transportation structure over a creek channel must be aligned parallel with the direction of flow to prevent erosive eddies.

**15. Access Routes**

- a. The number of access routes, number, and size of staging areas, and the total area of the ground disturbance shall be limited to the minimum necessary to achieve the project goal.
- b. Access routes that are intended for seasonal deactivation<sup>2</sup> or permanent decommissioning<sup>3</sup> shall be decommissioned as soon after use as possible, as follows:
  - i. Access routes shall be in a condition that enables long-term, disconnected and maintenance-free drainage.
  - ii. Drainages shall be fortified to endure the duration of planned decommissioning and prevent direct flows into waters.
  - iii. Where feasible, a permanently decommissioned stream crossing shall be excavated to exhume the original, stable, stream bed and channel side-slopes, and then banks must be stabilized with materials including, but not limited to, mulch, seeding, replanting, and rock armoring, if anticipated flows may erode vegetated creek banks.
  - iv. Soils exposed during seasonal deactivation or permanent decommissioning shall be stabilized or removed to prevent spoils erosion and sedimentation.
  - v. Permanent access route decommissioning requires the restoration of natural drainage patterns and implementation of the approved restoration plan.
- c. Access routes shall be constructed using full bench construction and incorporate drainage structures with enough frequency to prevent saturated soils and erosion of access routes at the spacings specified in Table 1. If the spacings specified in Table 1 are infeasible for the

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<sup>2</sup> “Seasonal deactivation” is the temporary decommissioning of a road to encourage disconnected drainage, stabilized soils, and prevent vehicle travel during the rainy season.

<sup>3</sup> “Permanent decommissioning” is the decommissioning of a road, in a location is no longer intended for vehicle travel, soils are stabilized, watercourse crossings are removed or stabilized, and the area’s natural drainage patterns are restored.

work area, an explanation of the infeasibility must be provided, and an alternative means to preventing erosive discharges to waters of the state must be provided within the NOI.

Table 1. Drainage Structure Spacing Requirements (in feet) Depending on Road Grade and Erosion Hazard Rating<sup>4</sup>

Estimated Erosion Hazard Rating	Road Grade Less Than 10 % Feet	Road Grade 11-25% Feet	Road Grade 25-50% Feet	Road Grade Greater than 50% Feet
Extreme	100	75	50	50
High	150	100	75	50
Moderate	200	150	100	75
Low	300	200	150	100

Note: Estimated Erosion Hazard Rating evaluation procedures specified in California Code of Regulations, title 14, § 912.5.

**16. Road Surface Drainages**

- a. To the extent feasible, road surfaces and ditches shall be hydrologically disconnected from streams and stream crossings. Road surface runoff must be designed to disperse flows to appropriate upland areas, rather than concentrating flows to waters of the state.
- b. Sediment contributions from roads, cutbanks, and ditches shall be minimized by utilizing the appropriate closures depending on site activity and incorporating the following surface drainage structures: berm removal, road surface shaping (outsloping, insloping or crowning), rolling dips, ditch relief culverts, waterbars and other designs. Where feasible, access route construction and reconstruction shall outslope the access route to facilitate natural drainage patterns.
- c. Disconnected drainage structures shall be installed upslope of and in close proximity to watercourse crossings. The disconnected drainage

<sup>4</sup> California Department of Forestry and Fire Protection Resource Management, Forest Practice Program. 2021. California Forest Practice Rules

structure should be installed according to the spacing requirements in Table 1.

- d. Dischargers shall prioritize locating the outflow of the road surface drainage structures towards stable areas with effective filter strips containing a high infiltration capacity, dense vegetation, or obstructions. Road surface drainage structure outflow shall not directly discharge to waters of the state or significant existing or potential erosion sites. Road surface drainage shall be managed to prevent erosion.
- e. Functional ditch relief, including culverts, rolling dips, and crossroad drains, shall be spaced with enough frequency to prevent saturated soils and erosion of access routes.
- f. All sediment and other material disturbed during blading and other road construction activities shall be contained and removed or stabilized with effective engineered sediment and erosion control practices. Cut or bladed sediment or other material shall not be pushed off the roadway and left uncontrolled and un-stabilized.

## **17. Watercourse Crossings**

- a. Rock ford or rock armored fill crossings shall be installed instead of culverts on watercourses in locations where watercourse crossings have a higher risk of failure due to their landscape position (e.g., in areas prone to debris flows or landslides) or in areas that lack seasonal access or in remote areas.
- b. Remove or stabilize watercourse crossings as follows:
  - i. Fills shall be excavated to form a channel as close as feasible to the natural watercourse grade, and that is wider than the natural channel upstream and downstream of the crossing to be removed;
  - ii. Any resulting cut bank shall not exceed a grade of 65 percent from the outside edge of the channel to prevent slumping and prevent erosion; and
  - iii. Where it is not feasible to remove a watercourse crossing on a road proposed for abandonment, the NOI must identify how erosion and sedimentation will be avoided and minimized.

## **18. Culvert Construction or Maintenance**

- a. Cured in Place Pipe (CIPP) is prohibited in the absence of formulation specific toxicity data that establishes that it will not cause detrimental

physiological responses to human, plant, animal, or aquatic life, or cause discharges to waters of the state that do not comply with water quality objectives or goals.

- b.** Replacement of culverts acting as grade control structures is not authorized under this Order. A vertical gap between the culvert and the immediate downstream stream channel indicates that the culvert likely functions as a grade control structure.
- c.** Projects proposing to replace culverts must design and implement a fluvial geomorphically appropriate channel stabilization project to prevent any existing scour or headcutting from migrating upstream. Repairs may include, but are not limited to, fill of scour holes with appropriately sized rock riprap or the construction of rock weirs with appropriately sized rock that are keyed well into the channel banks to minimize the risk of flanking.
- d.** The replaced or maintained culvert shall be in alignment with the stream channel upstream and downstream of the culvert.
- e.** Any replacement culvert or culvert that is to be left in place by a repair or maintenance project must be placed at a gradient and orientation that will not result in erosional scour at the outlet.
- f.** Replacement of a culvert with a similarly sized culvert is allowable only where there is no visual indication that the existing culvert is undersized. Visual indications of undersized culverts include, but are not limited to: sediment aggradation upstream of the culvert; evidence of flow over the top of the culvert (e.g., erosional rills in dirt road surfaces or erosion of shoulders adjacent to paved road surfaces), erosion of the fill between the culvert and the road surface, scour pools at the culvert outlet, or erosion of creek banks immediately downstream of the culvert.
- g.** Unless infeasible, replacement culverts must be sized to convey a 100-year flow event with debris, without pressurizing flow passing through the culvert. The 100-year flow event should be modeled under climate change projections, if available.
- h.** Deep fills (deeper than a backhoe can reach from the roadbed) with undersized culverts or culverts with high plugging potential must be fitted with an emergency overflow structure to accommodate 100-year floods.
- i.** Culvert inlets shall have low plug potential (debris barriers or deflectors are installed where needed, as long as they will not create a barrier to passage in fish bearing creeks).
- j.** Culverts shall be installed at the base of the fill and in line with the natural channel.

- k. Replaced or maintained culverts shall be in upstream and downstream alignment with the stream channel.
- l. Extend culvert outlets to length that prevents erosion and sediment discharges into waters of the state at levels that exceed water quality objectives or impairs beneficial uses.
- m. The Permittee shall first consider using arch culverts or free-span bridge alternatives to solid bottom culverts (e.g., cylindrical culverts or box culverts) during culvert installation and replacement.
- n. New culverts must not be located in a meander bend of the stream channel. If a failed culvert is within a meander bend of the stream, the replacement culvert should be placed away from the meander bend.
- o. Plastic culverts are prohibited from being installed in high-threat fire areas as mapped by CAL FIRE's Fire and Resource Protection Program<sup>5</sup>.

#### **19. Toxic and Hazardous Materials**

- a. Activities permitted under this Order shall not discharge toxic substances in concentrations that produce detrimental physiological responses to human, plant, animal, or aquatic life. CIPP formulations that have not been appropriately tested to demonstrate that they are not toxic to aquatic life that is likely to be present in the local watershed shall not be used in culvert rehabilitation projects.
- b. Discharge of unset cement, concrete, grout, slurry, damaged concrete spoils, concrete dust, or water that has contacted uncured concrete or cement, or related washout to surface waters, ground waters, or land is prohibited. If concrete washout is necessary at the site, washout containment shall be used to prevent any discharge. Wastewater may only be disposed by delivery to a sanitary wastewater collection system/facility (with authorization from the facility's owner or operator) or a properly licensed disposal or reuse facility.
- c. Appropriate BMPs must be implemented throughout project activities to prevent and control potential leaks/spills/drainage of potentially hazardous materials such as: non-petroleum hydraulic fluid; epoxies; paints and other protective coating materials; cement concrete or asphalt concrete; and washings and cuttings thereof.

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<sup>5</sup> California Department of Forestry and Fire Protection. 2022. Fire and Response Assessment Program (FRAP). Accessed May 2022. Available at: <https://frap.fire.ca.gov/>



- d. Activities permitted under this Order shall not discharge waste classified as “hazardous” as defined in California Code of Regulations title 22, section 66261 and Water Code section 13173. These BMPs shall include, at a minimum:
- i. All personnel handling fuels and other hazardous materials shall be properly trained.
  - ii. Adequate spill prevention and cleanup equipment and materials shall be present on site at all times during project implementation.
  - iii. All mechanized equipment shall be maintained in good operating order and inspected on a regular basis.
  - iv. All on-site fuel trucks or fuel containers shall be stored in an area where risk of contamination of water bodies by leaks or spills is minimized.
  - v. All equipment shall be fueled, maintained, and/or parked overnight in an upland area at least 100 feet from any delineated waters of the state.
  - vi. Hazardous materials, including chemicals, fuels, and lubricating oils, shall not be stored within 100 feet of any delineated waters of the state, and shall be stored in appropriate containers with appropriate secondary containment.
  - vii. Pumps or other stationary equipment operating within 100 feet of a waterbody or wetland shall utilize appropriate secondary containment systems to prevent spills.
  - viii. Any spills or leaks of hazardous materials, chemicals, fuels, lubricants or any other potential pollutants shall be promptly and completely treated using appropriate materials and equipment.
  - ix. Spill containment supplies shall be on site in all work areas in sufficient quantities to allow immediate remediation of fuel, oil, hydraulic fluid or similar leaks and spills.
  - x. Staging area for equipment and vehicle fueling and storage shall be designated at least one-hundred (100) feet away from waters of the state, in a location where accidental discharges of fluids or fuels cannot flow into waters of the state. Whenever not feasible, as when staging is from barges, secondary containment around fuels and other fluids, such as lubricants and secondary fuels, shall be implemented.

- e. Projects that create new wetlands or affect existing wetlands shall be designed to include features or management measures that reduce the production of methylmercury in the wetland, including minimizing the repeated wetting and drying of soils by keeping wetlands flooded. In addition, sediment control measures shall be implemented to reduce the transport of total mercury or methylmercury out of the wetland.

## **20. Invasive Species and Soil Borne Pathogens**

- a. The Permittee is responsible for ensuring that all project personnel follow proper weed control practices, and that appropriate weed prevention measures are included in project plans.
- b. Any straw, hay or other unprocessed plant material used for any purpose must be certified or documented as being weed free.
- c. To prevent the spread of soil borne pathogens<sup>6</sup>, equipment must be cleaned prior to entering the site. Any equipment leaving the project area shall be thoroughly cleaned using methods appropriate for the known pathogen before leaving the project area, unless the Permittee documents that no known soil borne pathogen infestations are present within the project area. If equipment is to be cleaned on site, the cleaning station must be identified in the NOI and cannot be located within one-hundred feet of any waters of the state.

## **21. Work in Delineated Waters of the State**

- a. Work in waters of the state must not cause or contribute to an exceedance of water quality objectives in the receiving waters. Work in delineated waters commences at the onset of the regulated activity and continues until the activity is finished and all restoration of the affected work area is complete. The term “work” means any ground disturbing activities in any delineated waters of the state that are permitted under this Order, regardless of the presence or absence of flowing or standing water.
- b. All temporary dewatering activities are subject to the work-in-water reporting and monitoring conditions presented in the Water Quality Monitoring Section of this Order.

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<sup>6</sup> Soil borne pathogens are any nematodes, or any bacterial, protozoan, viral or fungal pathogens that can cause disease or death to native plants, agricultural crops or ornamental plants (e.g., *Phytophthora ramorum*, the cause of sudden oak syndrome, and *Phytophthora lateralis*, the cause of Port Orford cedar root disease). The fungus that causes Valley Fever, *Coccidioides* spp., is not considered a soil borne pathogen in this Order.

- c. Temporary diversions or impoundments of water, cofferdams, or similar structures installed for the purpose of temporarily dewatering work areas shall be performed according to the In-water Work/Stream Diversion and Water Quality Monitoring Plan provided by the Permittee, and approved by the appropriate Regional Water Board, including appropriate monitoring for water quality upstream and downstream of diversion structures as required in the Water Quality Monitoring section of this Order.
- d. All surface waters, including ponded waters, shall be diverted away from areas undergoing grading, construction, excavation, vegetation removal, and/or any other activity which may result in a discharge to waters of the state.
- e. Equipment may not be operated in standing or flowing waters unless implementing the following conditions:
  - i. All construction activities must be effectively isolated from water flows to the greatest extent possible. This may be accomplished by working in the dry season or dewatering the work area. When work in standing or flowing water is required, structures for isolating the in-water work area and/or diverting the water flow must not be contaminated by construction activities. All open flow temporary diversion channels must be lined with filter fabric or other appropriate liner material to prevent erosion. Structures used to isolate the in-water work area and/or diverting the water (e.g., coffer dam, geotextile silt curtain) must not be removed until all disturbed areas are stabilized.
  - ii. If groundwater dewatering is required for the project, the Permittee shall comply with applicable existing PG&E NPDES permit requirements. If additional Water Board dewatering permits are required, the designated Water Board staff contact must be notified and copied on pertinent correspondence pertaining to those other required permits.
  - iii. All temporary dewatering and stream diversion methods shall be designed to have the minimum necessary impacts to waters of the state. All stream diversion methods shall be installed such that natural flow is maintained upstream and downstream of the diversion area. Any temporary dams or diversions shall be installed such that the diversion does not cause sedimentation, siltation, or erosion upstream or downstream of the diversion area. Diverted flows must be of sufficient quality and quantity, and of appropriate temperature, to support existing fish and other aquatic life both above and below the diversion. Pre-project flows must be restored to the affected surface water body upon completion of work at that

location. All dewatering and stream diversion methods shall be removed immediately upon completion of activities for which dewatering or diversions are needed.

## **22. Stormwater**

If the project is required to obtain coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ or 2022-0057-DWQ; NPDES No. CAS000002) (Construction General Permit), the Permittee shall comply with the requirements in the Construction General Permit. Generally, coverage under the Construction General Permit is required for construction activity resulting in a land disturbance of one acre or more, or less than one acre but is part of a larger common plan of development or sale that results in a land disturbance of one acre or more. Covered activities are described with additional detail in the Construction General Permit.

Compliance with the Construction General Permit constitutes compliance with Erosion and Sediment Control Conditions a and b below.

### **a. Erosion and Sediment Control**

- i.** No later than 24 hours prior to the start of a likely precipitation event, the Permittee shall ensure that disturbed areas that drain to waters of the state are protected with correctly installed erosion and sediment control measures (e.g., jute, straw, coconut fiber erosion control fabric, coir logs, straw wattles, silt fence) or revegetated with propagules (e.g., seeds, cuttings, divisions) of locally collected native plants. Erosion control measures that contain monofilament mesh shall not be used. The likely precipitation event is defined as any weather pattern that is forecast to have a 50 percent or greater probability of producing precipitation in the project area. The Permittee shall maintain a daily record of precipitation forecast information which can be provided to the Water Board upon request.
- ii.** The timing for installation of the post-construction stormwater BMP subdrains, soils, mulch, and plants shall be scheduled to ensure that the installed bioretention areas do not receive runoff from exposed or disturbed areas that have not been landscaped. The constructed post-project stormwater BMPs shall not receive site runoff until all project landscaping is planted, and effective erosion control measures implemented to ensure that the stormwater features are protected from sediment accumulation.

**b. Storm Water Management**

- i. Disturbed areas in delineated waters of the state and adjacent areas that drain to waters of the state must be temporarily stabilized to prevent erosion and accidental discharges into waters of the state at least 24 hours prior to any likely precipitation event. A likely precipitation event is any weather pattern that is forecast to have a 50 percent probability of producing precipitation in the project area, as predicted by a reliable weather forecast. If commencement of a precipitation event is predicted to begin less than 24 hours after the forecast is issued, temporary stabilization of the disturbed in-water work areas must begin immediately.
- ii. No individual construction activity that could discharge sediment or other pollutants may be initiated if that activity and its associated erosion control measures cannot be completed prior to the onset of precipitation. After any rain event, the discharger shall inspect all sites currently under construction and all sites scheduled to begin construction within the next 72 hours for erosion and sedimentation problems and take corrective action as needed.

**23. Directional Drilling**

Because Horizontal Directional Drilling (HDD) and similar drilling operations may affect water quality, the following conditions shall apply to all drilling operations under waters of the state:

- a. The discharge of bentonite, drilling muds, lubricants, or any drilling compounds into waters of the state is prohibited. A draft HDD or drilling plan shall be prepared and submitted to the Water Board for review at least 30 days before drilling activities under waters of the state.
- b. Release of bentonite, drilling muds, lubricants, or any drilling compounds through fractures in the streambed or bank substrate during drilling is referred to as a “frack-out.” Because of the potential for frack-outs to occur, the HDD drilling plan shall include a frack-out response plan. The frack-out response plan shall specify all measures to be initiated if frack-outs should occur during HDD operations.
- c. For all HDD and other drilling sites, a means of containment (e.g., damming, fluming) or screen capable of capturing all of the potential discharge shall be described in the HDD drilling plan. The downstream end of any such containment structure shall be capable of containing all bentonite or other drilling muds or debris that may be released during boring or drilling. Any drilling mud, spoils, etc. must be completely

removed from the streambed prior to removal of the containment structures (e.g., dam, flume, and screen).

- d. An environmental monitor shall provide monitoring for compliance with the HDD or drilling plan throughout drilling operations under waters of the state.
- e. Any HDD or other drilling operation shall be designed and directed in such a way as to minimize the risk of discharging spoils or other materials, including the frack-out release of drilling lubricants through fractures in the streambed or bank substrates, to waters of the state. In substrates where frack-outs are likely to occur, HDD contractors shall employ all reasonable means and methods available to minimize potential for frack-out.
- f. All drilling muds or compounds will be contained and properly disposed of after drilling activities are completed.
- g. If bore pits are excavated to support drilling operations, spoils shall be stored a minimum of 25 feet from the top of the bank of streams or wetland/riparian boundary, where feasible; if site specific conditions warrant storing spoils less than 25 feet from the top of the bank of streams or wetland/riparian boundary this request must be provided in the HDD or drilling plan submitted to the Water Board prior to any drilling activities with potential impacts to waters of the state. Spoils shall be stored behind a sediment barrier and covered with plastic or otherwise stabilized (e.g., tackifiers, mulch, or detention).

### **G. Restoration and Mitigation for Temporary Impacts**

1. The Permittee shall restore all areas of temporary impacts to waters of the state and all project site upland areas of temporary disturbance which could result in a discharge to waters of the state as described in a restoration plan approved by the appropriate Regional Water Board.

The restoration plan shall be submitted to the appropriate Regional Water Board for review and approval with the NOI. The restoration plan shall provide the following: a schedule; plans for grading of disturbed areas to pre-project contours; a planting palette with plant species native to the project area; seed collection location; invasive species management; performance standards; and maintenance requirements (e.g., watering, weeding, and replanting).

2. In cases where implementation actions in the restoration plan cannot be reasonably conducted within one year of impacts to waters of the state, or where the adverse temporary impacts result in temporary loss of aquatic resource function(s), the Permittee may be required to provide compensatory mitigation to offset temporal loss of waters of the state. Examples of additional mitigation include, but are not limited to, enhancement activities

such as increasing the presence of native species and reducing dominance of non-native/invasive species, native willow staking, planting of native riparian vegetation, and trash removal.

3. The Water Board may extend the monitoring period beyond requirements of the restoration plan upon a determination by Water Board staff that the performance standards have not been met or are not likely to be met within the monitoring period.

#### **H. Mitigation for Permanent Impacts**

1. Compensatory mitigation is required to offset permanent impacts to waters of the state, unless the Permittee has demonstrated that the project authorized by this Order will restore or improve the ecological function of the impacted aquatic resource. Generally, compensatory mitigation shall take place within the same watershed as the impact site, but the permitting Water Board may approve compensatory mitigation in a different watershed or programmatic mitigation across one or multiple watersheds. Mitigation that occurs outside of the impacted watershed may require additional mitigation. When compensatory mitigation is required, the Permittee shall provide the following:
  - a. A draft compensatory mitigation plan at a level of detail sufficient to accurately evaluate whether compensatory mitigation offsets the adverse impacts attributed to the project considering the overall size and scope of impact.
  - b. Compensatory mitigation shall provide a minimum of a one-to-one mitigation to impact ratio, measured in area and length for mitigation banks, advanced mitigation, and in-lieu fee programs. Mitigation is required to ensure compliance with Executive Order W-59-93 that requires no net loss of the structure or function of California's wetland resources.<sup>7</sup> Mitigation should be in kind as much as is feasible. If mitigation is out-of-kind, the amount of mitigation should be increased. When mitigation is constructed, enhanced, or preserved offsite, the amount of mitigation should be increased to account for the distance between the impact site and the mitigation site. The amount of mitigation should also account for the uncertainty associated with the successful creation of a mitigation site. The Water Board will require a higher overall mitigation ratio where necessary to ensure replacement of lost aquatic resource functions and

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<sup>7</sup> Includes temporary direct impacts to waters of the state and does not include upland areas of temporary disturbance which could result in a discharge to waters of the state. Temporary impacts, by definition, are restored to pre-project conditions and therefore do not include a physical loss of area or permanent degradation of ecological condition.

for permittee responsible mitigation conducted concurrently with impacts, subject to approval by the appropriate Regional Water Board.

- c. Subject to approval by the appropriate Water Board, mitigation may be satisfied using any of the following compensatory mitigation methods: restoration, enhancement, and/or establishment.
- d. No discharge of dredged or fill material to waters of the state shall occur prior to Water Board approval of a final mitigation plan covering the impacted site. The mitigation plan may be provided in advance of the identification of specific projects subject to Regional Water Board approval.

#### **X. Public Notice**

The State Water Board provided public notice of the application and draft certification pursuant to California Code of Regulations, title 23, section 3861 from July 12, 2022, to August 26, 2022. The State Water Board did not receive any comments during that comment period. In addition, the State Water Board noticed the draft order in accordance with Water Code section 13167.5 beginning on February 7, 2023 and ending on March 9, 2023. The State Water Board did not receive any comments during that comment period.

#### **XI. California Environmental Quality Act (CEQA)**

On June 21, 2022, the California Department of Fish and Wildlife, as lead agency, certified an environmental impact report State Clearinghouse No. 2017122028 for the Project and filed a Notice of Determination at the State Clearinghouse on July 7, 2022. Pursuant to CEQA, the Water Board has made Findings of Facts (Findings) which support the issuance of this Order and are included in Attachment E.

#### **XII. Petitions for Reconsideration**

Any person aggrieved by this action may petition the Water Board to reconsider this Order in accordance with California Code of Regulations, title 23, section 3867. A petition for reconsideration must be submitted in writing and received within 30 calendar days of the issuance of this Order.

#### **XIII. Water Quality Certification and Waste Discharge Requirements**

I hereby issue the Order for the Pacific Gas and Electric Company Bay Area Operations and Maintenance Program, SB21039IN, certifying that as long as all of the conditions listed in this Order are met, any discharge from the referenced Project will comply with the applicable provisions of Clean Water Act sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 303 (Water Quality Standards and Implementation Plans), 306 (National Standards of Performance), and 307 (Toxic and Pretreatment Effluent Standards).



All Order actions are contingent on: (a) the discharge being limited and all proposed mitigation being completed in strict compliance with the conditions of this Order and the attachments to this Order; and (b) compliance with all applicable requirements of Statewide Water Quality Control Plans and Policies and the Regional Water Boards' Water Quality Control Plans.

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Date

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Karen Mogus, Deputy Director  
Division of Water Quality





# United States Department of the Interior



FISH AND WILDLIFE SERVICE  
San Francisco Bay-Delta Fish and Wildlife Office  
650 Capitol Mall, Suite 8-300  
Sacramento, California 95814

In reply refer to:  
08FBDT00-2020-F-0197

August 6, 2021

Katerina Galacatos, Ph.D.  
South Branch Chief, Regulatory Division  
San Francisco District  
U.S. Army Corps of Engineers  
450 Golden Gate Avenue, 4th Floor  
San Francisco, CA 94102

Subject: Final Programmatic Formal Consultation for the Pacific Gas and Electric Company's (PG&E) Bay Area Operation and Maintenance (O&M) Program in Alameda, Contra Costa, Marin, Napa, Santa Clara, San Francisco, San Mateo, Solano, and Sonoma Counties, California (Corps File Number: 2018-00490)

Dear Dr. Galacatos:

This letter is in response to the U.S. Army Corps of Engineers' (Corps) June 11, 2020, letter requesting formal consultation with the U.S. Fish and Wildlife Service (Service) on the Corps issuance of a Regional General Permit (RGP) for PG&E's Bay Area O&M Program in Alameda, Contra Costa, Marin, Napa, Santa Clara, San Francisco, San Mateo, Solano, and Sonoma Counties, California. In the June 11, 2020, letter, the Corps determined that activities covered under the RGP may affect, and are likely to adversely affect the following species not included in PG&E's Bay Area O&M Habitat Conservation Plan (HCP): the endangered California least tern (*Sterna antillarum browni*) (CLT), the threatened western snowy plover (*Charadrius nivosus nivosus*) (WSP), endangered palmate-bracted bird's-beak (*Cordylanthus palmatus*), and the endangered soft bird's-beak (*Chloropyron molle* ssp. *molle*). The Corps also determined that activities covered under the RGP may affect, but are not likely to adversely affect the WSP designated critical habitat, and the soft bird's-beak designated critical habitat. The Corps initially requested consultation on the threatened delta smelt (*Hypomesus transpacificus*) and its critical habitat and the endangered Sonoma alopecurus (*Alopecurus aequalis* var. *sonomensis*) but later withdrew those requests.

The Corps also requested concurrence from the Service that the proposed Federal action and any associated incidental take of the federally listed species listed below were considered in the intra-Service section 7 consultation for PG&E's Section 10(a)(1)(B) permit for PG&E's Bay Area O&M HCP. The species included in the HCP that may be affected by the activities under the RGP are: the endangered California freshwater shrimp (*Syncaris pacifica*), the endangered

conservancy fairy shrimp (*Branchinecta conservatio*) and its designated critical habitat, the endangered longhorn fairy shrimp (*Branchinecta longiantenna*), the threatened vernal pool fairy shrimp (*Branchinecta lynchi*) and its designated critical habitat, the endangered vernal pool tadpole shrimp (*Lepidurus packardii*) and its designated critical habitat, the threatened Delta green ground beetle (*Elaphrus viridis*) and its designated critical habitat, the threatened California tiger salamander (*Ambystoma californiense*) (Central California distinct population segment (DPS)) and its designated critical habitat, the endangered California tiger salamander (Sonoma County DPS) and its designated critical habitat, the threatened California red-legged frog (*Rana draytonii*) and its designated critical habitat, the threatened Alameda whipsnake (*Masticophis lateralis euryxanthus*) and its designated critical habitat, the endangered San Francisco garter snake (*Thamnophis sirtalis tetrataenia*), the endangered California clapper rail (*Rallus longirostris obsoletus*)<sup>1</sup>, the endangered salt marsh harvest mouse (*Reithrodontomys raviventris*), the endangered Burke's goldfields (*Lasthenia burkei*), the endangered Contra Costa goldfields (*Lasthenia conjugens*) and its designated critical habitat, the endangered fountain thistle (*Cirsium fontinale* var. *fontinale*), and the endangered Sebastopol meadowfoam (*Limnanthes vinculans*).

This response is provided under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 *et seq.*) (Act), and in accordance with the implementing regulations pertaining to interagency cooperation (50 CFR 402).

In reviewing this project, the Service has relied upon: (1) the Corps' June 11, 2020, letter requesting consultation; (2) the June 2020, *Biological Assessment for the Regional General Permit for Pacific Gas and Electric Company's Bay Area Operation and Maintenance Program* (BA) prepared by Insignia Environmental (consultants); (3) the updated December 2020, BA; (4) PG&E's Bay Area O&M HCP; (5) electronic mail, telephone, and teleconference communications between the Service, PG&E, the Corps, and PG&E's consultants; and (6) other information available to the Service.

### **PG&E's Bay Area O&M HCP**

The purpose of this programmatic consultation is to evaluate the effects of PG&E's Bay Area O&M Program on listed species that were not covered under PG&E's Bay Area O&M HCP (ICF 2017). The Service issued an Incidental Take Permit (Permit Number TES6826C-0 (Service 2017)) (ITP) to PG&E, in October of 2017 pursuant to section 10(a)(1)(B) of the Act. The Service also issued the September 28, 2017 intra-Service biological opinion (2017 BO) (Service File No. 08ESMF00-2013-F-0102) for issuance of the ITP. This programmatic consultation and the appurtenant species evaluations serve to coincide with the 30-year term of PG&E's Bay Area O&M HCP set to expire October 2, 2047 which would leave the remainder of approximately 26 years for the term of this PBO. In the 2017 BO, the Service concluded that the effects of PG&E's O&M activities and level of incidental take were not likely to jeopardize the continued existence of endangered California freshwater shrimp, the endangered conservancy fairy shrimp, the endangered longhorn fairy shrimp, the threatened vernal pool fairy shrimp, the endangered vernal pool tadpole shrimp, the threatened Delta green ground beetle, the threatened California tiger salamander (Central California DPS), the endangered California tiger salamander (Sonoma County DPS), the threatened California red-legged frog, the threatened Alameda whipsnake, the

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<sup>1</sup> Until the Service officially adopts recent nomenclature changes made by the American Ornithologists' Union to Ridgway's Rail (*Rallus obsoletus*), we maintain the use of California clapper rail (*Rallus longirostris obsoletus*) in this correspondence. Note, the change in taxonomic assignment does not change the listing status of the species.

endangered San Francisco garter snake, the endangered California clapper rail, the endangered salt marsh harvest mouse, the endangered Burke's goldfields, the endangered Contra Costa goldfields, the endangered fountain thistle, and the endangered Sebastopol meadowfoam or result in the adverse modification or destruction of their respective designated critical habitats. We do not anticipate any additional adverse effects to the aforementioned 17 species or their critical habitats that were not previously evaluated in our 2017 BO. Thus, no incidental take beyond that anticipated in the 2017 biological opinion is likely to occur as a result of issuance of the RGP for PG&E's Bay Area O&M Program. Consistent with the 2017 BO, the Service concludes that issuance of the RGP for PG&E's Bay Area O&M Program is not likely to jeopardize the aforementioned 17 species or result in the adverse modification or destruction of their respective designated critical habitats. Activities under the RGP, if implemented as described in the updated BA, comply with all applicable conditions required by the PG&E Bay Area O&M HCP, ITP, and our intra-Service 2017 biological opinion and its associated incidental take statement. Therefore, by this consultation, incidental take for the aforementioned 17 species for this RGP is exempted by the ITP for the Bay Area O&M HCP.

### **Soft Bird's-beak Critical Habitat**

The Service concurs that activities covered under the RGP may affect and are not likely to adversely affect the soft bird's-beak critical habitat. Although the Action Area intersects critical habitat for soft bird's-beak, overall impacts to critical habitat are anticipated to be short term and relatively minor due to the nature of the O&M activities. PG&E anticipates up to 0.02 acre of temporary impacts and no permanent impacts to soft bird's-beak critical habitat as a result of the proposed activities. Habitat affected by temporary disturbance is anticipated to return to its functionality as critical habitat for the species. Impacts are anticipated to be further minimized with the implementation of PG&E's avoidance and minimization measures (AMMs).

The Service does not concur that activities covered under the RGP may affect, but are not likely to adversely affect the WSP designated critical habitat. Although PG&E has identified that activities will likely result in only a small percentage of permanent impacts to the WSP designated critical habitat, the permanent loss of critical habitat, particularly over an annual basis, is still a reduction of the overall critical habitat and/or the primary constituent elements (PCEs) which therefore constitutes an adverse effect and warrants formal consultation.

The remainder of this document represents the Service's programmatic biological opinion on the effects of PG&E's Bay Area O&M Program on the CLT, the WSP and its critical habitat, the palmate-bracted bird's-beak, and the soft bird's-beak.

## **ADMINISTRATION OF THIS PROGRAMMATIC BIOLOGICAL OPINION**

Many of the proposed O&M activities, projects, and conservation measures occur in waters regulated by the Corps and require a Corps' permit. Many of these projects have a small, individual footprint and can be permitted under the Corps' RGP. By providing a programmatic-level biological opinion for these O&M activities and projects, the Corps would not have to consult separately for each activity described in this programmatic biological opinion (PBO). The Service supported this approach because it allows for a more efficient workload and is more appropriate than the current approach of consulting on individual projects that are covered activities under the HCP.

Projects determined inconsistent with this biological opinion are those that exceed minimal effects to this species and would require a separate consultation. Restoration projects proposed as a conservation measure and associated with mitigation for these on-site O&M activities are not included in the analysis for this PBO and will require separate consultation with the Service.

### CONSULTATION HISTORY

- |                   |   |
|-------------------|---|
| June 11, 2020     | The Service receives the Corps' initiation letter for the project.  |
| October 6, 2020   | The Service requests a meeting with the Corps and PG&E to discuss PG&E's application for a RGP and to recommend a PBO to cover species not covered under the PG&E Bay Area O&M HCP.   |
| October 16, 2020  | The Service attends a meeting with the Corps, PG&E, and PG&E's consultant via teleconference. The Service, the Corps, and PG&E agree that a PBO would be appropriate for the issuance of the RGP. The Service recommended that PG&E and the Corps utilize the Service's December 1, 2004 PBO for delta smelt for activities proposed under PG&E's Bay Area O&M Program.   |
| December 28, 2020 | The Service receives an updated BA which addresses utilization of the Service's December 1, 2004, PBO for delta smelt and updated conservation measures with regard to CLT and WSP.   |
| March 16, 2021    | The Corps requests an official "Draft" of the PG&E O&M programmatic biological opinion and requests to withdraw the delta smelt and the delta smelt critical habitat from the consultation.   |
| April 28, 2021    | The Corps requests to withdraw the delta smelt and the Sonoma alopecurus from the consultation. The Corps will address effects to delta smelt by appending appropriate projects to the Service's December 1, 2004 PBO for delta smelt for activities proposed under PG&E's Bay Area O&M Program. The Corps determined that the Sonoma alopecurus would not be affected by the proposed project as the species is not anticipated to occur within the Action Area. |
| June 11, 2021     | PG&E proposed modifications to their conservation measures. For the two plant species (i.e., palmate-bracted bird's-beak and soft bird's-beak), PG&E will create Map Book Zones and implement conservation measure Plant-04 to be consistent with the HCP. PG&E also proposed changes to the breeding season avoidance window for the CLT and WSP to be consistent with the Don Edwards Fish and Wildlife Refuge's Special Use Permit.                            |
| June 15, 2021     | The Service issued a Draft PBO to the Corps and PG&E for their review and to provide comment.   |

- July 21, 2021 PG&E provided minor comments to the Draft PBO.
- July 27, 2021 The Service met with the Corps and PG&E to discuss comments provided by PG&E. After minor language edits, the Corps and PG&E agreed they were satisfied with the Draft PBO and requested issuance of a Final PBO.

## BIOLOGICAL OPINION

### Description of the Proposed Action

#### *Electrical System Activities*

PG&E's electric system consists of a transmission system and a distribution system. The electric transmission system consists of approximately 4,430 miles of transmission lines, 23,015 miles of distribution lines, and 207 substations. Within this system, approximately 2,699 electric structures (e.g., poles, boardwalks, pole foundations, and tower footings) are located within waters of the U.S. in the nine Bay Area counties.

#### Substation Maintenance

Typical major maintenance tasks include transformer, switch, fuse, cutout, meter, and insulator repair and replacement. Maintenance of substation systems requires this type of work approximately once per year. Load demands may require modifications to station equipment or installation of new facilities. Maintenance activities could require use of station property or adjacent property for construction staging, materials storage, permanent facilities, and land management. Substation maintenance is anticipated to result in approximately 20,000 square feet of temporary disturbance, which is not anticipated to occur every year.

#### Tower Replacement and Repair

PG&E performs routine O&M activities on towers throughout the Bay Area, including tower replacement and tower foundation repair. Old tower footings may be abandoned in place as necessary. Where 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 area. If a large quantity of material is needed at the job site, PG&E builds a temporary section of boardwalk laterally from the existing boardwalk or utilizes barges for work areas. A helicopter or barge is then used to place the material on the temporary boardwalk, and workers move the material to the work site by hand or wheelbarrow. A barge with a crane or helicopter is used to repair or replace the upper portion of the tower. In areas where there are no existing boardwalks, and/or construction of a temporary boardwalk is not feasible, all work will be conducted from a barge or helicopter. Barges may rest on the bottom of the bay at low tide depending on the local conditions.

For typical foundation repair procedures, the material is first brought to the site by helicopter or barge, or a combination of both. To repair foundations submerged in shallow water, such as in the fringes of San Francisco Bay, a cofferdam is installed during low tide around the footing to be repaired (or around the entire tower). The cofferdam is usually built out of 1.125-inch plywood and 4-inch by 4-inch strong backs, or with metal sheet piles. In the case of plywood cofferdams, mud near the base of the footing is removed using hand tools and the cofferdam is

pushed down to the required depth to expose the solid piling, which is usually 3 feet below the mud line. Metal sheet piles will be driven by a vibratory hammer to the appropriate depth. Typically, any removed mud or sediments are placed in bags and taken to a landfill. If there is limited mud collected, then it is returned to the base of the footing after the repair is complete.

To strengthen tower foundations, concrete from the existing footings is removed to expose the steel reinforcements. New pins are inserted, a new rebar cage is installed, and forms are constructed. The concrete is then poured, allowed to cure, and the form is removed. In some instances, grade beams are installed between adjacent foundations. This involves installing forms, pouring concrete, and removing the forms. Once the repair is complete, the cofferdam is removed by excavating around the outside and hoisting it from the workspace.

New tower piles are installed by first installing a cofferdam within the tower work area. The cofferdam keeps the enclosed area dry and minimizes the mobilization of sediment during construction activities. Any water in the cofferdam is pumped directly onto the adjacent land or into the adjacent water. Once the cofferdam is installed and dewatered, a barge-mounted pile driver is used to embed piles approximately 70 feet into the ground. The piles are usually composed of wood and surrounded by metal cages and cement. Temporary effects result from the approximately 25-foot by 40-foot footprint for the crane (when necessary for repairs) and an approximately 25-foot by 100-foot work area.

A crew of six to ten personnel is typically required, and tower/foundation repairs usually take 1 to 5 weeks to complete for each tower. Access occurs primarily on existing roads, though some overland access with small trucks or sport utility vehicles is also expected. In-water access will occur with the use of boats and barges primarily for towers within the San Francisco, San Pablo, Suisun, and Grizzly bays, and tributaries that are large enough for barges to access.

#### Boardwalk Replacement or Repair

PG&E has many miles of boardwalks that service transmission facilities in the vegetated margins, mudflats, and open water around the San Francisco Bay. The boardwalks typically extend from levees and provide access across marshes and salt ponds to transmission tower footings. Support equipment for replacement and repair may include, but is not limited to boats, barges, and helicopters. Barges may rest on the bottom of the bay at low tide depending on the local conditions. A staging yard located on land is often also used to store materials. All boardwalk replacement and repair activities are completed manually and require the use of generators and handheld equipment including, but not limited to, drills, chain saws, and skill saws. A crew of three to five personnel conduct the repair or replacement activities, which typically take 2 months to complete. Crews typically work from existing installed sections of boardwalks, which minimizes the need for access below and around the boardwalk. However, in some instances, work is conducted from barges and/or from the mudflat during low tide.

Replacement pilings are pushed into the ground using a steel bar for leverage, or hammered in using sledge hammers or similar tools. Degraded piles that have been replaced will be removed as close to the mudline as possible. Replacement planking is transported along the boardwalk on special hand-dollies. Planking is then slid into place, drilled, and bolted. The handrails are wood planks that are connected to the boardwalk by the support beams. If the existing boardwalk is substantially degraded, crews perform the work within an approximately 10-foot radius around the boardwalk being replaced. Handrails are then installed, which are wood planks that are



connected to the boardwalk with support beams. Support beams and then handrails are put in place, drilled, and bolted.

### Pole Reinforcement and Replacement

Pole reinforcement methods may include attaching trusses to existing poles to provide additional support, or fiber-wrapping the pole at or below ground level with a material that has been impregnated with preservatives to retard external deterioration of the pole. The most common way to restore ground-level strength to utility poles involves the installation of a single (or in some cases, a double) steel truss. Steel trusses are usually galvanized to reduce corrosion potential. Steel trusses are driven to pre-defined depths and secured to the pole with high-strength steel banding. The pole is not removed to install the truss. Composite or fiberglass installations involve excavating around the pole, cleaning the pole, and treating the pole to arrest any decay. Composite fabric sheets are wrapped around the pole in layers, and a resin material is applied to each layer. The excavated area around the pole is then backfilled. The pole is not removed to install the composite materials. PG&E determines the type of reinforcement method after reviewing the results of an inspected line segment. This may require the installation of guy wires and anchors, by line truck auger, which could consist of a screw or a concrete structure. The work is generally performed by a crew of two to five personnel and takes 1 to 2 days to complete. Temporary impacts typically total approximately 6,500 square feet per year from work areas. When replacing a wooden transmission or distribution pole, the new pole is framed (i.e., crossarms, 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. To replace a pole, the line is typically de-energized. A line truck auger is used to drill a hole, the new pole is placed into the new hole, the void is backfilled and compacted, and 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. This may require the installation of guy wires and anchors, which could consist of a screw or a concrete structure. Pole and equipment replacement and repair require an approximately 10-foot-long by 7-foot-wide work area. The work is generally performed by a crew of four to five personnel and is completed in 1 day for a distribution pole and up to 3 days for a transmission pole. Temporary impacts typically total approximately 0.80 acre per year as a result of using the work areas.

### Line Reconductoring

PG&E replaces conductors (i.e., wires) once the wires have outlasted their usefulness or if increased capacity is required. Work crews install replacement conductors by temporarily splicing them to the ends of the existing conductors and pulling them through travelers (i.e., pulleys) attached to the arms of the towers or pole cross-arms. Conductor replacement begins with the installation of travelers 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. Once the travelers are in place, the conductor is unclipped from the insulators and a hoist is used to lower the existing conductor onto the travelers. Next, the existing conductor removed from the structures within a pull section. Once the new conductor is pulled into place, it is removed from the travelers and clipped onto the insulators. The travelers are then removed.

Reconductoring typically is done in 2- to 3-mile sections with the use of pull and tension sites (i.e., pull sites). Pull sites are temporary construction areas that are used during the removal of existing conductors and the placement of new conductors along the transmission line. Pull sites are typically located within relatively flat areas that are in line with the conductor. Several pieces of equipment are used at the pull sites, including tensioners (i.e., rope trucks) to feed out the new conductor and adjust tension, conductor reels to receive the existing conductor as it is removed, and reels of new conductors. Trailers pulled by semi-trucks, which also are parked on site, typically deliver and remove the reels. On-site cranes move the conductor reels on and off the semi-trucks. Pull sites are generally rectangular and vary in size from 50 to 350 feet wide for small pull sites and 100 to 1,250 feet long for large pull sites. Distances between pull sites vary, but on average, approximately 2.70 miles of conductor separates single pull sites or groups of pull sites. Vegetation mowing and minor grading may be required to prepare pull sites for use. Mats or gravel may also be used in wet locations. The work is generally conducted by a crew of three to eight personnel and potentially one helicopter crew over a period of 1 to 2 months.

### Facility Access

Electric transmission and distribution O&M activities may require routine access road maintenance, including blading to smooth over washouts, eroded areas, and washboard surfaces as needed. Access road maintenance could include cleaning ditches, moving and establishing berms, clearing and making functional drain inlets to culverts, culvert repair, clearing and establishing waterbars, and cleaning and repairing over-side drains. Prefabricated bridges or culverts may need to be installed to ensure safe access and reduce environmental impacts. If the bridge is needed for only a short duration, a portable bridge is assembled onsite and secured with a crane to span the crossing. If a longer term crossing is required, a culvert may be installed after PG&E obtains all appropriate permits and authorizations. Likewise, existing culverts may need to be repaired or replaced from time to time. Access road maintenance includes the repair, replacement and installation of storm water diversion devices on an as-needed basis.

Where PG&E cannot complete O&M activities from an existing workspace, construction crews may place a mat as a work area. Equipment is then driven or placed onto the mats, and work is conducted from that location. Workers place the mats in such a way to help protect the vegetation within the temporary workspace during the maintenance activity. Mats are removed once the O&M activity has been completed.

### *Natural Gas System Activities*

PG&E's natural gas system consists of a transmission system and a distribution system. The transmission system in the nine-county area comprises 16 primary gas transmission lines totaling approximately 1,820 miles of pipeline, and the distribution system consists of 19,350 miles of distribution pipelines.

### Fencing

Protective security fencing is sometimes installed around pipeline facilities to discourage vandalism. Fencing these areas requires digging holes to install fence posts using an auger. Chain-link fencing is then installed between the fence posts. Fence installation typically requires a disturbance area of approximately 50 feet by 50 feet for each location. A crew of three personnel usually performs the fence installation within a few days.

### Site-Specific Erosion Solutions

In some locations, scour and erosion within a waterway can result in pipe exposure. In these instances, site-specific solutions to the erosion problem (e.g., installing biodegradable jute netting, riprap, and rock fill) may be employed over the pipeline and within the waterway to protect the pipeline from potential damage. These erosion solutions are typically permanent to protect the exposed pipeline and prevent further erosion from occurring. The extent of the erosion solution will typically not be longer than 100 feet or wider than 50 feet on any stream in the RGP area. Installation will typically begin with preparing the site for installation of the erosion solution. This may involve clearing existing vegetation and minor recontouring in the area of existing erosion. Once prepared, the erosion solution will be delivered to the site on a truck and placed in the prepared area. The erosion solution will then be installed according to the manufacturer's specifications. PG&E installs erosion solutions at three to five locations per year. A crew of two to eight personnel is usually required over a period of approximately 2 weeks.

### Internal Pipeline Inspection

PG&E is required to confirm the integrity of its natural gas pipeline system in accordance with the Pipeline Safety Act. PG&E inspects the pipeline integrity by use of an internal inspection tool that identifies potential anomalies (e.g., pipe corrosion, cracks, or indentations). If an anomaly is found during the inspection of the pipeline, it is reviewed, inspected, and repaired as necessary. To evaluate the identified anomaly, a crew of two to four personnel is deployed to excavate a bell hole using a backhoe. The area of the exposed pipeline depends on the size and type of the anomaly found, as well as the current ground conditions and depth of the pipe. Once the pipeline is exposed, technicians measure and document the anomaly and a Pipeline Engineer determines the appropriate repair method.

Anomaly repairs may include welding a sleeve around the pipe. This process begins with sandblasting the section of pipe that will be sleeved and preparing the sleeve itself. Once prepared, the sleeve is wrapped around the anomaly, secured in place, and welded to the pipe. The sleeve and adjacent pipe are coated and the surrounding area is backfilled as appropriate. Sleeve repairs typically require a crew of four to six personnel and can take 1 to 2 days to complete. If the anomaly is particularly severe, the segment of pipe may have to be replaced. Internal pipeline inspection typically takes approximately 1 week to complete. PG&E estimates that disturbance associated with these inspection activities totals approximately 50 by 100 feet for each instance.

### Pipeline Recoating

PG&E coats natural gas pipelines to protect them from degradation and external corrosion. When a pipeline's coating has deteriorated to the point of requiring replacement, PG&E recoats the pipe with epoxy. To determine whether the coating has maintained its integrity, PG&E induces an electric current on the pipeline at the Electronic Test System Station and then measures for a loss of voltage. The integrity of pipeline coating may also be inspected visually on exposed areas, such as spans, valves, or stations. Once recoating is determined to be required, the pipeline to be recoated is excavated using a backhoe. In some instances, excavation and backfill may be required in wetlands or waterways. PG&E will only conduct pipeline recoating activities when wetlands and waterways are dry to avoid impacts to aquatic species and habitat. A crew of approximately four to six personnel removes the old coating by jetting, scraping, or sandblasting

and typically places plastic sheeting or tarps below the pipe to collect the residue. PG&E tests the residue to determine if it is hazardous and disposes of it in accordance with regulations. The surface of the pipe is then prepared for the new coating by running a self-contained grit- or shot-blasting machine over the exposed area. The pipeline continues to operate while a coating machine applies the coating. On average, an approximately 20-foot-wide work area is needed for this activity. The estimated annual temporary fill is approximately 440 square feet. The activity typically takes approximately 3 to 5 days to complete.

### Valve Recoating and Replacement

Valves regulate the flow of gas through the pipeline and enable crews to isolate portions of the pipeline. Occasionally, these valves malfunction or wear out. Depending on the condition of the valve, PG&E either recoats or replaces approximately five valves annually. Prior to replacing or installing valves, a portion of the gas line will need to be blown down (i.e., gas is evacuated to the atmosphere from the affected section of pipe through a blowdown stack). Equipment required for recoating valves typically includes a flatbed truck/trailer or dump truck with a trailer, a backhoe, a water truck, an excavator, a vacuum excavator, welding trucks, a trailer-mounted compressor, a truck-mounted crane, a side boom, a front-end loader, crew trucks, barricades, and safety fencing. Recoating is conducted by a crew of six to 13 personnel by sandblasting the valve over tarps, collecting the debris, and recoating the valve with a specialized epoxy that protects against corrosion. To coat the entire valve down to where it connects to the pipeline, the area around the valve must be excavated to expose the pipe and then backfilled once recoating is complete. In some cases, the existing valves are located in wetlands and waterways. PG&E will only conduct valve recoating and replacement activities when streambeds and waterways are dry to avoid impacts to aquatic species and habitat. Workspace dimensions can vary and are dependent on available space in the easement. In most cases, a workspace footprint for a valve replacement measures approximately 40 feet by 60 feet. The process generally takes 4 to 6 days to complete. Valve replacement involves excavation to access the existing valve and adjacent segment of pipeline, removal of the existing valve (and potentially a segment of the adjacent pipeline), installation of the new valve, and backfill of the excavated area. Equipment required for replacing or installing valves is generally the same as the equipment required for valve recoating as discussed previously. Each valve replacement typically takes 4 to 5 weeks to complete, and crews conduct maintenance within the existing facility footprint.

### Pipeline Cathodic Protection

Cathodic protection is a technique to control pipeline corrosion by making the pipeline the cathode of an electrochemical cell. As a pipeline's coating degrades over time, it requires increased cathodic protection to prevent corrosion. A cable rated for the expected current output connects the negative terminal of a rectifier to the pipeline. The cable is installed underground usually via open trench. A cathode protection expert adjusts the operating output of the rectifier to the optimum level after conducting various tests, including measurements of electrochemical potential. Pipe coatings commonly degrade faster in areas of high moisture content (e.g., locales with regular precipitation or irrigation) than in drier areas. Increased cathodic protection current accelerates the consumption of anode beds and decreases their effectiveness. Consequently, anode beds must be replaced periodically, and additional anodes may be needed.

The installation of a cathodic protection system requires a type of anode (e.g., horizontal anode bed, flex anode, deep well anode) to be installed parallel and adjacent to the pipeline. The

distance from the anode installation to the pipeline may range from several hundred feet to several miles. Depending on the type of anodes installed, the equipment required may include pickup trucks, a trencher, a welding truck, a flatbed truck/trailer or dump truck with a trailer, a backhoe, a lowboy trailer, a tractor cat-loader, and/or a water truck. The anode installation is placed in the trench parallel to the pipeline, and the excavations are backfilled and recontoured to their original conditions. The pipeline continues to operate during installation or replacement of the anodes. The installation of certain types of anode beds requires excavation. The installation of cathodic protection equipment requires a crew of six to ten personnel and typically takes 7 to 10 days to complete. PG&E undertakes many cathodic protection activities each year using the methods described previously. An approximately 100-foot by 10-foot work area is needed to install the cable, excavate the soil, and stockpile soil.

### Pipeline Lowering and Replacement

State and Federal code, as well as PG&E procedures dictate when pipeline segments need to be replaced. Public safety sometimes necessitates the replacement or abandonment of pipeline sections when they are damaged by construction projects, acts of nature, or aging and corrosion. The equipment typically required for pipeline segment replacement or abandonment includes a truck, bulldozer, excavator, frac tank, forklift, lowboy and trailer, sideboom, water truck, and a welding rig. Pipeline segment replacement begins with clearing and grading the right-of-way (ROW) and trenching and excavating the existing pipeline. A new trench is excavated for the new pipeline segment parallel and adjacent to the existing pipeline. PG&E typically places the new section of pipe as close to the abandoned pipeline as possible and modifies any existing easements by expanding the easement width to accommodate the new section of pipeline. For longer pipeline segment replacements, a welded and coated pipe is lifted and lowered into the trench by side boom tractors and excavators. Padded slings are used so the tractors can lower the pipe without damaging the pipe's protective coating. For shorter pipeline replacements, especially sections damaged by third parties or corrosion, replacements are typical within the same alignment.

Before the old pipeline is removed from service, it is blown down (i.e., gas is evacuated to the atmosphere from the affected section of pipe through a blowdown stack). The new pipeline segment is tested and X-rayed, and then tied in to the existing pipeline at the points where the old segment was removed. An existing pipeline is usually abandoned in place by first cleaning it, and then filling it with slurry before the pipeline is capped. Slurry is used if the pipeline crosses a waterbody or needs to be stabilized. If the old pipeline segment is removed instead of being abandoned, it is cut into smaller sections and transported to a facility where segments may be recycled or disposed of properly. All trenches are then backfilled. Backfilling the trench involves replacing and compacting the excavated subsoil into the trench and re-spreading the stockpiled topsoil, if appropriate, to return the surface to its original grade. The topsoil may be mounded slightly over the trench to accommodate any future settling of the trench backfill. Where possible, native material excavated from the pipeline trench is used to backfill the trench. If rock conditions are encountered during trench excavation, the trench bottom is first padded with a layer of imported rock-free sand.

The length of pipe affected varies, depending on the reason for replacement. The minimum length of pipe replaced is typically approximately 40 feet (for one joint of pipe), though up to 1 mile could be replaced during each replacement effort. A crew of 15 to 20 personnel is typically required for pipeline segment replacement and lowering projects. Two to 4 weeks are needed to

complete small replacements and approximately 24 weeks to complete large replacements. Trenching and soil excavation, soil stockpiling, staging, and construction vehicles typically disturb an approximately 100-foot-wide work area, which includes the 10-foot excavation area. However, if pipeline replacement takes place within an environmentally sensitive area, the width of the work area is typically narrowed to 40 to 60 feet in width depending on the terrain and site specific conditions to minimize impacts.

Pipeline lowering and replacement activities may require the installation of prefabricated bridges or culverts to ensure safe access and reduce environmental impacts in accordance with State and Federal regulations. If the bridge is needed for only a short duration, then a portable bridge is assembled on site and secured with a crane to span the crossing. If a longer-term crossing is required, a culvert is installed after PG&E obtains all appropriate permits from the regulatory agencies.

### Water Diversion Techniques

Pipeline crossings within water features that have flowing water require the implementation of water diversion techniques to minimize the potential for impacts to water quality and create a dry and safe work area. This requires a crew of two to three personnel installing a diversion structure (e.g., a dam or weir and a pump or headgate) to divert water through a temporary ditch or pipe to convey the water around the section of pipeline that requires O&M work. However, many of the water features in the Action Area are ephemeral, and work will most likely be conducted when the features are dry and diversion is not necessary. Upon completion of work on the pipeline segment, the water diversion structure is removed and the flow of the water feature is restored to its original state. Water diversion, including restoring flow of the water feature to its original state, typically takes 3 to 5 days to complete. Water diversion techniques temporarily disturb an approximately 10-foot-long and 20-foot-wide work area.

### Pipeline Access

Pipeline O&M activities may require routine access road maintenance, including blading to smooth over washouts, eroded areas, and washboard surfaces as needed. Access road maintenance could include cleaning ditches, moving and establishing berms, clearing and making functional drain inlets to culverts, culvert repair, clearing and establishing waterbars, and cleaning and repairing over-side drains. O&M may require the installation of prefabricated bridges or culverts to ensure safe access and reduce environmental impacts. If the bridge is needed for only a short duration, a portable bridge is assembled onsite and secured with a crane to span the crossing. If a longer term crossing required, a culvert is installed after PG&E obtains all appropriate permits and authorizations. Likewise, existing culverts may need to be repaired or replaced from time to time. Access road maintenance includes the repair, replacement, and installation of storm water diversion devices on an as-needed basis. Where PG&E cannot complete O&M activities from an existing workspace, construction crews may place a mat as a work area. Equipment is then driven or placed onto the mats, and work is conducted from that location. Workers place the mats in such a way to help protect the vegetation within the temporary workspace during the maintenance activity. Mats will be removed after the O&M activity has been completed.

### *Conservation Measures*

PG&E has developed general and species-specific conservation measures or AMMs to minimize or reduce the potential impacts to federally-listed species and their habitats that are located within the Action Area. Relevant AMMs were taken from the Bay Area O&M HCP and supplemented with additional species-specific measures for species that were not covered in the HCP. Please refer to the project BA and/or the PG&E HCP for standard best management practices, spill prevention plans, storm water pollution prevention plans, and other general conservation measures.

### Bay Area O&M HCP Measures

PG&E will apply the following Field Protocols (FP), Hot Zone (HZ) AMMs, and Habitat-Specific AMMs described in the Bay Area O&M HCP to avoid and minimize potential impacts at they pertain to federally-listed species addressed in this document:

- FP-02: Park vehicles and equipment on pavement, existing roads, or other disturbed or designated areas (barren, gravel, compacted dirt).
- FP-03: Use existing access and ROW roads. Minimize the development of new access and ROW roads, including clearing and blading for temporary vehicle access in areas of natural vegetation.
- FP-04: Locate off-road access routes and work sites to minimize impacts on plants, shrubs, and trees, small mammal burrows, and unique natural features (e.g., rock outcrops).
- FP-06: Minimize potential for species to seek refuge or shelter in pipes and culverts. Inspect pipes and culverts, of diameter wide enough to be entered by a species that could inhabit the area where pipes are stored, for wildlife species prior to moving pipes and culverts. Immediately contact a biologist if a special-status species is suspected or discovered.
- FP-07: Vehicle speeds on unpaved roads will not exceed 15 miles per hour.
- FP-08: Prohibit trash dumping, firearms, open fires (such as barbecues), hunting, and pets (except for safety in remote locations) at work sites.
- FP-10: Reduce activity footprint wherever possible and minimize the amount of time spent at a work location to reduce the potential for take of species.
- FP-11: Utilize standard erosion and sediment control best management practices (pursuant to the most current version of Permittee's *Stormwater Field Manual for Construction Best Management Practices*) to prevent construction site runoff into waterways.
- FP-12: Stockpile soil within established work area boundaries and locate stockpiles so as not to enter water bodies, stormwater inlets, other standing bodies of water. Cover stockpiled soil prior to precipitation events.

- FP-13: Fit open trenches or steep-walled holes with escape ramps of plywood boards or sloped earthen ramps at each end if left open overnight. Field crews will search open trenches or steep-walled holes the following morning prior to initiating daily activities to ensure wildlife are not trapped. If any wildlife are found, a qualified biologist will be notified and will relocate the species to adjacent habitat or the species will be allowed to naturally disperse, as determined by a biologist.
- FP-14: If an activity disturbs 0.1 acre or more of habitat for a special-status species in grasslands, the field crew will revegetate the area with a commercial seed mix.
- FP-15: Prohibit vehicular and equipment refueling 250 feet from the edge of vernal pools, and 100 feet from the edge of other wetlands, streams, or waterways when feasible. If refueling must be conducted closer to wetlands, construct a secondary containment area subject to review by an environmental field specialist and/or qualified biologist. Maintain spill prevention and cleanup equipment in refueling areas.
- FP-17: Directionally fell trees away from an exclusion zone, if an exclusion zone has been defined. If this is not possible, remove the tree in sections. Avoid damage to adjacent trees to the extent possible. Avoid removal of snags and conifers with basal hollows, crown deformities, and/or limbs over 6 inches in diameter.
- FP-18: Nests with eggs and/or chicks will be avoided: contact a biologist, land planner or the Avian Protection Program manager for further guidance.
- HZ-2: Ground-disturbing activities will not occur from the first significant rain (1 inch) during the wet season, October 15 - April 15, within 250 feet of the edge of vernal pools unless the field crews conduct the work from an established roadway. Access rock outcrops only on foot during all times of year. Ground-disturbing activities may occur during this period if a biologist implements measures to avoid the habitat and the impacts and mitigation are consistent with the HCP. Measures could include directing crews on access, use of erosion/sediment fencing, use of access mats, and other techniques to avoid direct or indirect effects. PG&E may seek guidance from the Service as to the suitability of additional measures to avoid or minimize take of this species.
- HZ-6: Limit activities to foot access only when working off of established roadways unless a biological monitor flags off-road access routes for equipment that minimize impacts on habitat and species. This includes the identification and avoidance of vernal pools and stock ponds. Activities that cannot avoid vernal pool impacts will be completed when pools are clearly dry.
- Wetland-1: Identify vernal pools and establish buffers. Maintain a buffer of 250 feet around vernal pools and vernal pool complexes when feasible. If maintaining the buffer is not possible because the areas are either in or adjacent to facilities, the field crew will implement other measures as prescribed by the land planner, biologist, or administrator to minimize impacts. These measures include flagging access, requiring foot access, restricting work until the dry season, requiring a



biological monitor during the activity, or excavating burrows in ROWs where trenching will occur. Activities must maintain the downstream hydrology to the vernal pool or complex.

Wetland-2: Identify wetlands, ponds, and riparian areas and establish buffers. Maintain a buffer of 50 feet around wetlands, ponds, and riparian areas when feasible. If maintaining the buffer is not possible because the areas are either in or adjacent to facilities, the field crew will implement other measures as prescribed by the land planner, biologist, or administrator to minimize impacts. These measures include flagging access, requiring foot access, restricting work until the dry season, requiring a biological monitor during the activity, or excavating burrows in ROWs where trenching will occur. Activities must maintain the downstream hydrology to the wetland, pond, or riparian area.

Plant-01: No herbicides will be used for vegetation management, pole clearing, or any other purpose within 100 feet of a Map Book Zone (MBZ) (except vegetation management's direct application to cut stumps when greater than 25 feet from a MBZ and in conformance with applicable pesticide regulations).

Plant-02: Heavy equipment shall remain on access roads or other previously disturbed areas unless otherwise prescribed by a land planner or biologist.

Plant-03: Stockpile separately the upper 4 inches of topsoil during excavations associated with covered activities. Stockpiles topsoil will be used to restore the disturbed ROW.

Plant-04: When activities greater than 0.1 acre in size within a MBZ will have direct impacts on special-status species, work with the crew to place flagging, fencing, or other physical exclusion barriers to minimize disturbances. If the work will directly impact special-status plant species, implement Plant-05, -06, -07, and -08 AMMs.

Plant-05: If a special-status plant species is present and it cannot be avoided, PG&E will salvage plant material (i.e., seeds, cuttings, whole plants) and prepare a restoration plan that details the handling, storage, propagation, or reintroduction to suitable and appropriate habitat subject to Service review and approval.

Plant-06: If a special-status annual plant species is present and it cannot be avoided, conduct activities after seeds have matured to the extent possible.

Plant-07: If a special-status perennial plant species is present and it cannot be avoided, conduct covered activities after seeds have matured to the extent possible. Minimize disturbance to the below-ground portions of the plants (e.g., roots, bulbs, tubers).

The following conservation measures or AMMS proposed by PG&E are specific to CLT and WSP for this document:

1. O&M activities within 600 feet of actively nesting CLT will not be conducted during the breeding season (March 1 through August 31). Work will occur within the limited operating period of September 1 through February 28 or 29 if CLT are nesting within 600 feet.
2. No O&M activities will be performed within 600 feet of an active WSP nest or brood during the WSP breeding season (March 1 through September 14). Work will occur within the limited operating period of September 15 through February 28 or 29 if WSP are nesting within 600 feet. Vehicles driving on levees and pedestrians walking on boardwalks or levees will remain at least 600 feet away from WSP nests and broods. If WSP chicks are present near any levee that will be accessed by vehicles (e.g., for construction, inspection, or access), vehicle use will be under the supervision of a qualified biologist to ensure that no chicks are present within the path of the vehicle.
3. Helicopter flight paths will avoid active CLT colonies and WSP nests. Helicopter landings will take place on existing levees or roads. No landings in tidal marshes are permitted.

The Following conservation measure or AMM proposed by PG&E are specific to the palmate-bracted bird's-beak and the soft bird's-beak for this document:

1. For the palmate-bracted bird's-beak and soft bird's-beak, PG&E will create Map Book Zones and implement Plant-04 to be consistent with the HCP.

### Compensatory Mitigation

PG&E is proposing to mitigate for permanent impacts to CLT and WSP habitat at a ratio of 3:1. PG&E will also provide compensatory mitigation for any permanent impacts to federally listed plant species at a ratio of 1:1. PG&E proposes to follow a similar mitigation process as outlined in the Bay Area O&M HCP for the federally-listed wildlife and plant species. This may include funding the acquisition, management, enhancement, and/or restoration of affected species' habitat. All proposed mitigation must be submitted to the Service for review and approval prior to implementation. PG&E will secure mitigation in advance of the work. As work is performed, the actual impacts to species' habitat will be tracked, and mitigation efforts will be adjusted accordingly to ensure that the appropriate amount of mitigation is provided. PG&E will report the annual mitigation acreage used to the applicable agencies and confirm that the remaining acreage is adequate for future mitigation.

Compensatory mitigation for all permanent impacts to wildlife habitat and federally-listed plant species will occur using one or a combination of the following options as deemed appropriate from the Service through a submittal, review and approval process: (1) Developing permittee-responsible mitigation sites; (2) purchasing credits from conservation banks; and/or; (3) contributing to habitat restoration and/or enhancement programs. Please refer to the BA and/or the PG&E HCP for details regarding the mitigation submittal, review, and approval process.

With this RGP specifically in mind, PG&E is in the process of developing sites that can provide compensatory mitigation for the impacts to species covered under this RGP. This includes potential sites that could be used for multiple terrestrial species, including the three plant species, at various Sonoma Land Trust projects within the Petaluma River and Sonoma Creek watersheds. All sites will be acquired in coordination with the Service. PG&E will receive credit for the mitigation following the development and recordation of the easement, equivalent conservation instrument, or ownership (County, State, or Federal land donation), establishment of an endowment or other financial mechanism for long-term funding, and development of a long-term management plan.

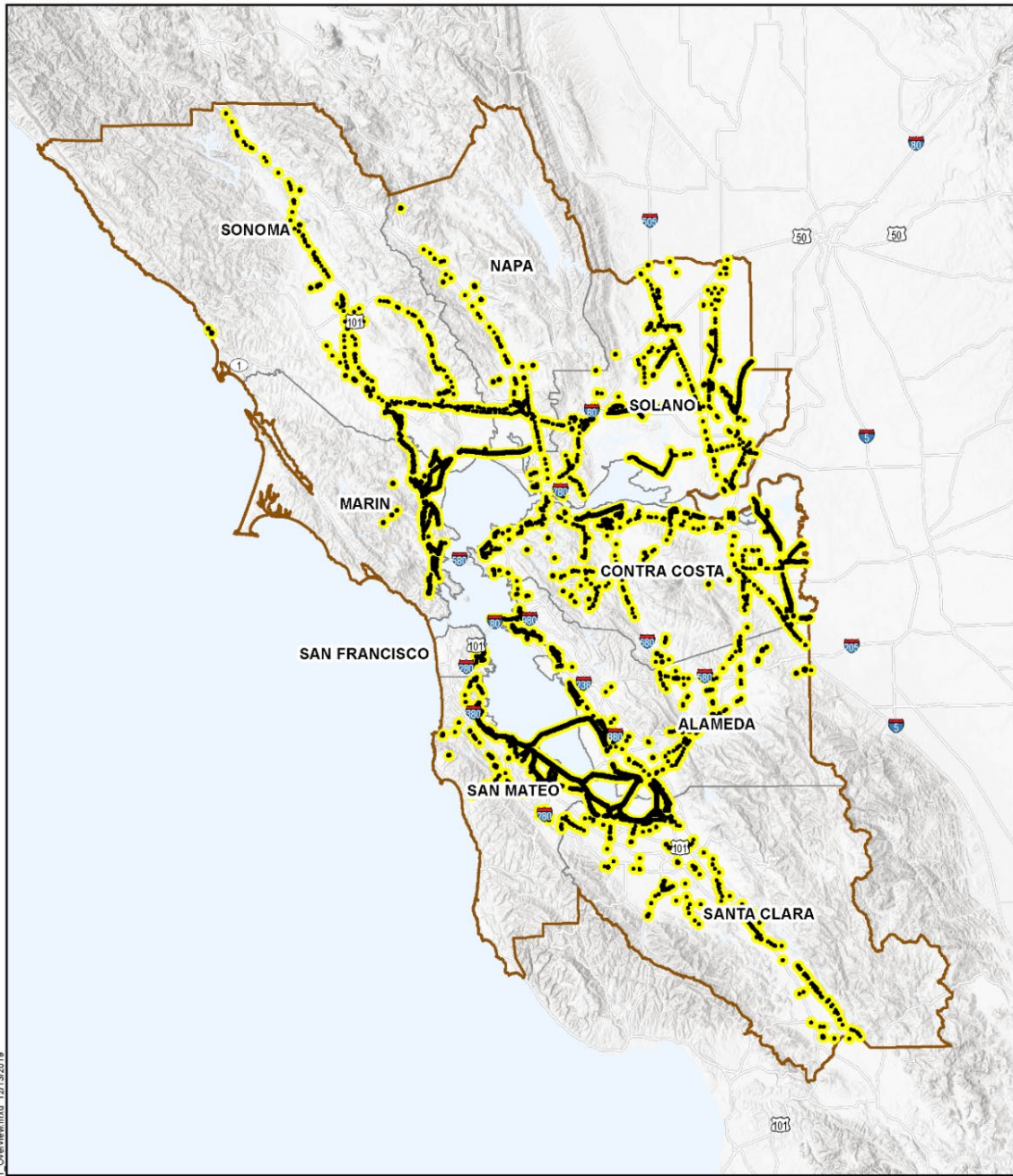
All conservation bank credits will be acquired in coordination with the Service. PG&E will receive credit for the site following the submittal of the bill of sale for the purchase of the credits.

All contributions to habitat restoration and/or enhancement programs will be coordinated with the Service. In cases where PG&E funds restoration efforts, mitigation credit will be conditionally approved upon funding and fully approved once the performance criteria for the restoration project are met.

### **Action Area**

The Action Area is defined as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action,” (50 Code of Federal Regulations [CFR] 402.02). For the purposes of the effects assessment, the Action Area is located within the nine Bay Area Counties of Alameda, Contra Costa, Marin, Napa, Santa Clara, San Francisco, San Mateo, Solano, and Sonoma, California. The Action Area is defined as the gas and electric structures that occur within waters and wetlands, plus an approximately 1,000-foot buffer where effects (e.g., nest disturbance, turbidity, unanticipated spills, etc.) could occur. PG&E does not anticipate that pipeline replacement or repair will occur within the San Francisco, San Pablo, or Suisan bays as part of the program. Therefore, pipelines within bay waters were excluded from the Action Area. The Action Area for the program is approximately 160,400 acres (250 square miles)(Figure 1.).

Figure 1. Action Area for the PG&E O&M PBO

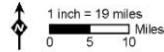


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Figure 1: Overview Map Regional General Permit for PG&E's Bay Area Operations and Maintenance Program

- Facilities within Waters of the U.S. in the Program Area
- ▭ Nine-county Area
- ▭ County Boundary
- ▬ Major Road
- ▭ Action Area

Note: Action Area is not to scale. Size increased for visibility.



### **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 range wide survival and recovery of the listed species. It relies on four components: (1) the *Status of the Species*, which describes the current range wide 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 includes all effects 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 listed species.

### **ANALYTICAL FRAMEWORK for the DESTRUCTION or ADVERSE MODIFICATION DETERMINATION**

Section 7(a)(2) of the Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to destroy or to adversely modify designated critical habitat. 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 range-wide 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**

#### *California Least Tern*

The California least tern is a subspecies of the least tern. It was federally listed in 1969 under the Endangered Species Preservation Act of 1966 which was implemented under the June 2, 1970, Proposed Rule, Part 17 - Conservation of Endangered Species and Other Fish or Wildlife (35 FR 8491)(Part 17). The CLT was formally added to the list of endangered species in the October 13, 1970, amendment to Part 17 under Appendix D United States List of Endangered Native Fish and Wildlife (35 FR 16047). The CLT was then subsequently considered an endangered species under the current Endangered Species Act of 1973 which repealed the Endangered Species Preservation Act of 1966. Critical habitat has not been designated for this species. The Service issued the *Revised California Least Tern Recovery Plan* on April 2, 1980 (Service 1980). A 5-year review was conducted in 2006 where it was recommended to be downlisted to threatened (Service 2006a). Another 5-year review was conducted in 2020 where no change of status was recommended (Service 2020) due to the decreasing trend in numbers, increasing age of some populations, sustained poor productivity over the last 10 years, and ongoing threats (e.g., predation, food availability). Please refer to the Service's July 7, 2020, 5-year review for the species' description, habitat preference, and life history.

#### *Western Snowy Plover*

The western snowy plover is a subspecies of snowy plover. The Pacific coast population of the WSP was federally listed as threatened in 1993 (58 FR 12864). The Pacific coast population is defined as those individuals that nest within 50 miles of the Pacific Ocean on the mainland coast, peninsulas, offshore islands, bays, estuaries, or rivers of the United States and Baja California, Mexico (58 FR 12864). The Pacific coast population of the western snowy plover breeds on the Pacific coast from southern Washington to southern Baja California, Mexico. Critical habitat for the species was designated on September 29, 2005, (70 FR 56970) and revised on June 19, 2012, to increase the size of the critical habitat (77 FR 36727). The Service issued the *Recovery Plan for the Pacific Coast Population of the Western Snowy Plover* on August 13, 2007 (Service 2007). A 5-year review was conducted in 2006 (Service 2006b) where no change in status was recommended. Another 5-year review was conducted in 2019 (Service 2019) where again no change in status was recommended. Please refer to the Service's August 13, 2007, *Recovery Plan for the Pacific Coast Population of the Western Snowy Plover* for the species' description, habitat preference, and life history.

*Palmate-bracted Bird's-beak*

Palmate-bracted bird's-beak is an annual herb in the Orobanchaceae (broomrape) family. It was listed as endangered on July 1, 1986 (51 FR 23765). Critical habitat has not been designated for this species. The Service issued the *Recovery Plan for Upland Species of the San Joaquin Valley, California* on September 30, 1998 (Service 1998) which covered several species including the palmate-bracted bird's-beak. A 5-year review was conducted in 2009 (Service 2009a) where no change in status was recommended. Please refer to the Service's September 30, 1998, *Recovery Plan for Upland Species of the San Joaquin Valley, California* for the species' description, habitat preference, and life history.

*Soft Bird's-beak*

Soft bird's-beak is an annual herb in the Orobanchaceae (broomrape) family. It was listed as endangered on November 20, 1997 (62 FR 61916). Critical habitat was designated for the species in 2007 (72 FR 18518). The Service issued the *Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California* on August 27, 2013 (Service 2013) which covered several species including the soft bird's-beak. A 5-year review was conducted in 2009 (Service 2009b) where no change in status was recommended. Please refer to the Service's August 27, 2013, *Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California* for the species' description, habitat preference, and life history.

*Status of Western Snowy Plover Critical Habitat*

The Service designated critical habitat for the Pacific Coast population of the western snowy plover in 2005 (70 FR 56969). The Service published a proposed revision to critical habitat on March 22, 2011 (76 FR 16046) and a final rule revising designating critical habitat on June 19, 2012 (77 FR 36268). In total, approximately 24,527 acres of critical habitat for the Pacific Coast population of the western snowy plover in Washington, Oregon, and California, fall within the boundaries of the critical habitat designation. Pursuant to the Act and its implementing regulations under 50 CFR 424.12, the Service is required to identify the physical or biological features essential to the conservation of western snowy plover in areas occupied at the time of listing, focusing on the features' PCEs. We consider PCEs to be the elements of physical or biological features that provide for a species' life history processes and are essential to the conservation of the species. Based on the best available information, the PCEs essential to the conservation of the western snowy plover are the following: sandy beaches, dune systems immediately inland of an active beach face, salt flats, mud flats, seasonally exposed gravel bars, artificial salt ponds and adjoining levees, and dredge spoil sites, with: (1) areas that are below heavily vegetated areas or developed areas and above the daily high tides; (2) shoreline habitat areas for feeding, with no or very sparse vegetation, that are between the annual low tide or low water flow and annual high tide or highwater flow, subject to inundation but not constantly under water, that support small invertebrates, such as crabs, worms, flies, beetles, spiders, sand hoppers, clams, and ostracods, that are essential food sources; (3) surf- or water-deposited organic debris, such as seaweed (including kelp and eelgrass) or driftwood located on open substrates that supports and attracts small invertebrates described in PCE 2 for food, and provides cover or shelter from predators and weather, and assists in avoidance of detection (crypsis) for nests, chicks, and incubating adults; and (4) minimal disturbance from the presence of humans, pets, vehicles, or human-attracted predators, which provide relatively undisturbed areas for individual and population growth and for normal behavior.

## **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*.

Due to the size of the Action Area, the *Environmental Baseline* will be described in general terms for each species addressed in this PBO. Habitat conditions for each species within the Action Area range from relatively undisturbed areas to areas in active and inactive agriculture to areas of extensive urbanization. PG&E's facilities, other than those that might be built as a result of minor new construction, pre-exist and are a baseline condition throughout the Action Area. Ongoing O&M activities that will be covered under this PBO are currently occurring on the landscape in roughly the same scope and frequency as was described in the PG&E's Bay Area O&M HCP. Thus, for establishing the *Environmental Baseline*, O&M activities described in this PBO, excluding minor new construction, are existing conditions with regard to PG&E facilities and ROWs within the Action Area.

### *California Least Tern*

Within the San Francisco Bay region, CLT have more recently nested at several known locations, including Alameda Point with the largest numbers, Vandenberg Air Force Base, PG&E's Pittsburg Power Plant, Eden Landing Ecological Reserve, and Hayward Regional Shoreline. Since 2009, CLT have established small nesting colonies at new locations in the northeast portion of the San Francisco Bay estuary, including in Suisun Bay at the Montezuma Wetlands and at Green Island within the Napa-Sonoma Marshes Wildlife Area.

The Action Area includes estuary/bay habitats; therefore, suitable nesting and foraging habitat is present in the Action Area. California least tern nesting and foraging habitat occurs in the vicinity of substations at Mallard Slough and Bair Island. Towers and boardwalks are located in or near occupied CLT foraging and nesting habitat on Bair Island, in Alviso ponds, near Mount Eden Creek in the Eden Landing Ecological Reserve ponds, and at Mallard Slough. Poles are also located in or near occupied foraging and nesting habitat on Bair Island and Alviso ponds. Gas facilities are located in or near CLT occupied foraging and potential nesting locations off Cordelia Slough, Bay Farm Island, and Bair Island.

### *Western Snowy Plover*

Within the San Francisco Bay region, WSP breeds primarily above the high tide line on coastal beaches, sand spits, beaches at creek and river mouths, salt pans at lagoons and estuaries, and river bars. The largest known coastal breeding population of this species is located in and around the San Francisco Bay. Due to human disturbance at coastal beaches, many WSP in the Bay Area nest in dry salt ponds or on large, open salt pan areas. The Action Area includes estuary/bay habitats; therefore, suitable nesting and foraging habitat is present in the Action Area. Potential and known nesting locations for WSP are in the vicinity of PG&E substations at Bair Island, Don



Edwards San Francisco Bay National Wildlife Refuge, Mount Eden Creek in the Eden Landing Ecological Reserve ponds, and the Ravenswood salt ponds. Boardwalks and towers are located in or near occupied foraging and nesting habitat in the San Francisco Bay, south of the San Mateo-Hayward Bridge. PG&E poles are also located in or near occupied foraging and nesting habitat at Don Edwards San Francisco Bay National Wildlife Refuge. PG&E gas facilities are located in occupied WSP habitat near the mouth of San Francisquito Creek.

#### *Palmate-bracted Bird's-beak*

Palmate-bracted bird's-beak is found in alkaline soils within chenopod scrub and valley and foothill grassland habitats. There are California Natural Diversity Database (CNDDDB) records for palmate-bracted bird's-beak within the City of Livermore in Alameda County at the Springtown Preserve and suitable habitat is present in the Action Area. A previous PG&E assessment for the Bay Area O&M HCP found that a distribution line crosses one occurrence approximately 0.5 west of N. Vasco Road and approximately 1 mile north of Interstate 580 in the City of Livermore, California, but there are no gas or electric facilities located in occupied habitat as represented in the CNDDDB occurrence. There is potential to encounter palmate-bracted bird's-beak in suitable habitats that have not been surveyed.

#### *Soft Bird's-beak*

Soft bird's-beak is found in coastal salt marshes and blooms from June through November. Designated critical habitat for soft bird's-beak occurs in the Action Area near Suisun City and in the vicinity of Joyce Island off Suisun Bay and in Benicia State Park off the Carquinez Strait in Solano County; in Napa County off the Napa River near the confluence with Carneros Creek; and in Point Pinole Regional Shoreline in Contra Costa County. CNDDDB records for soft bird's-beak are concentrated in the designated critical habitat for the species, but there are also records in Contra Costa County off Suisun Bay in marshes near the City of Concord and the community of Bay Point (CNDDDB 2021). The Action Area includes estuary and bay habitats; therefore, suitable habitat is present in the Action Area. Towers and boardwalks are located in marshes in the vicinities of Suisun City and Benicia State Park, and poles are located in Hastings Slough at the former Concord Naval Weapons Station. However, very few facilities are located within occupied habitat, and there are no substations in occupied habitat. Gas facilities are located in the marshes in the vicinity of Benicia State Park, but only a few facilities are located in occupied habitat. A previous PG&E assessment for the Bay Area O&M HCP found that electric distribution lines cross two occurrences of soft bird's-beak in Solano County. The first occurrence is located south of Interstate 780 in the Benicia State Park and the second occurrence is located south of Highway 12 and southwest of Suisun City. In addition, there is the potential to encounter soft bird's-beak in suitable habitats that have not been surveyed.

#### *Western Snowy Plover Designated Critical Habitat*

Three subunits occur in the Eden Landing Ecological Preserve. All three units were occupied at the time of listing and were documented as occupied in 2017 (CNDDDB 2021). Subunit CA 13A is approximately 237 acres and encompasses salt ponds designated as E11, E15B, and E16B. It is located just south of Highway 92 and the San Mateo Bridge and west of Union City in Alameda County. Approximately 228 acres are State owned and approximately 8 acres are privately owned. Essential features provided by the subunit include sparsely vegetated areas above daily high tides, such as salt pans, artificial salt ponds, and adjoining levees, for nesting and foraging.

Subunit CA 13B is approximately 171 acres and encompasses a salt pond designated as E14, just south of Eden Creek. This subunit is located west of Union City in Alameda County. The entire subunit is State owned. Essential features provided by the subunit include sparsely vegetated areas above daily high-tides, such as salt pans, artificial salt ponds and adjoining levees, for nesting and foraging. Subunit CA 13C, Eden Landing is approximately 609 acres and encompasses salt ponds designated as E6A and E6B. This subunit is located just north of Old Alameda Creek and west of Union City in Alameda County. Essential physical or biological features provided by the subunit include sparsely vegetated areas above daily high-tides, such as salt pans, artificial salt ponds, and adjoining levees, for nesting and foraging.

The Ravenswood Subunit CA 14 is approximately 89 acres and consists of the southwestern portion of salt pond SF2 located east of the City of East Palo Alto in San Mateo County near the western approach to the Dumbarton Bridge on the Don Edwards San Francisco Bay National Wildlife Refuge. This subunit was occupied at the time of listing and was documented as occupied in 2017 (CNDDDB 2021). The role of this critical habitat unit is to provide nesting and foraging habitat for the western snowy plover in South San Francisco Bay. Pond SF2 has undergone renovations intended to provide ponded areas, islands, and salt pan for several species of shorebirds, including western snowy plovers. The Ravenswood unit was drawn to encompass the salt pan area. This unit was occupied at the time of listing and is currently occupied. Essential physical or biological features provided by the unit include sparsely vegetated areas above daily high-tides, such as salt pans, artificial salt ponds and adjoining levees, for nesting and foraging.

The Warm Springs Subunit CA 15 is approximately 168 acres and encompasses the northeastern portion of salt evaporation ponds designated as A22 and A23 in the Warm Springs area of the South San Francisco Bay between the Cities of Fremont and Milpitas in Alameda County. This subunit was occupied at the time of listing and was documented as occupied in 2017 (CNDDDB 2021). The entire unit is federally owned. Essential physical or biological features provided by the unit include sparsely vegetated areas above daily high-tides, such as salt pans, artificial salt ponds, and adjoining levees, for nesting and foraging.

### **Effects of the Action**

*Effects of the Action* are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. *Effects of the Action* may occur later in time and may include consequences occurring outside the immediate area involved in the action.

PG&E's O&M Activities will be undertaken almost entirely on existing facilities within the Action Area. The effects of habitat loss resulting from individual O&M activities are expected to be small. Habitat disturbance is most often temporary in nature, and distributed throughout these species' ranges in the Action Area rather than condensed into one location, thereby minimizing the effects of implementation of individual activities. The expected permanent loss resulting from implementation of O&M activities over the term of this programmatic biological opinion (to coincide with the 30-year term of the PG&E Bay Area O&M HCP permit), in comparison to the habitat remaining to this species throughout its range, is small (less than 2 acres for each species over the approximate 26-year term). PG&E has committed to conserving habitat for each species, through the various measures described in the *Conservation Measures*. Individual species and critical habitat effects are described below.

*California Least Tern and Western Snowy Plover*

The proposed project will likely generate temporary noise and visual disturbance that will exceed ambient conditions in areas that may support CLT and WSP. Equipment noise, vibration, and visual disturbance may interfere with normal behaviors. These behaviors include feeding, sheltering, movement between refugia and foraging grounds, and other essential behaviors. Intolerable levels of disturbance that may force individuals to flush from cover or prevent them from seeking available cover could expose them to a predation risk or other dangers that otherwise would not occur. As O&M activities are typically discrete, CLT and WSP would likely be able to avoid the area of disturbance and would likely be able to find alternate suitable foraging opportunities in the surrounding areas.

Anthropogenic disturbance associated with the proposed action that could occur near known and potential CLT and WSP nesting locations could contribute to a lack of nest success, as well as deter the use of nearby foraging locations. For these reasons, PG&E will not perform any O&M activities while inside suitable CLT or WSP habitat during their respective nesting seasons. PG&E will also limit helicopter hovering and flying over known nesting locations during the nesting season for CLT and WSP.

Electric system O&M activities could result in the loss of suitable habitat used for both nesting and foraging in the vicinity of substations. PG&E anticipates that the proposed action will temporarily impact approximately 0.70 acre of suitable foraging and nesting habitat for CLT and approximately 0.70 acre of suitable foraging and nesting habitat for WSP on an annual basis. It is anticipated that the proposed action will permanently impact approximately 0.07 acre of potentially suitable foraging and nesting habitat for CLT and approximately 0.07 acre of potentially suitable foraging and nesting habitat for WSP on an annual basis. These impacts are anticipated to occur annually over the 26-year term of this PBO to coincide with the 30-year term of the PG&E O&M HCP set to expire October 2, 2047. This would equate to a total of approximately 18.2 acres of temporary impacts each and approximately 1.82 acres of permanent impacts each for the CLT and WSP. Impacts to nesting habitat are anticipated to be minimal. Annual construction will be relatively short in duration for most O&M activities. Disruption to foraging habitat will be temporary and are not anticipated to substantially reduce the overall availability of foraging habitat for the CLT or WSP. In addition, habitat disturbance will also be minimized by confining disturbance areas to the smallest practicable area. PG&E proposes to compensate for all permanent impacts to CLT and WSP habitat at a ratio of 3 to 1.

CLT and WSP prey species can also be affected if a hazardous material spill results in a decrease in the availability of fish and the benthic prey species for the fish due to immediate contamination and residual contamination after construction activities have ended. In addition, fish and benthic species can be exposed to hazardous contaminants that have settled in sediments during the installation and removal of cofferdams. Implementation of the general AMMs will minimize the risk of exposure to hazardous contaminants. As a result, the risk of exposure to contaminants that may affect prey species for CLT and WSP are expected to be prevented.

PG&E currently implements AMMs as part of the PG&E Bay Area O&M HCP for other federally listed species during O&M activities. PG&E proposes to minimize adverse effects to CLT, WSP, and their nesting and foraging habitats by implementing the Bay Area O&M HCP measures, which include parking vehicles and equipment on previously disturbed areas, using existing access and ROW roads, restrictions on boat docking, avoidance of helicopter use near

active nests, and not conducting O&M activities within suitable habitat for during their nesting season.

#### *Palmate-bracted Bird's-beak and Soft Bird's-beak*

Listed plants may be affected where the movement or parking of vehicles and/ or the placement of equipment and staging materials may damage or crush adult plants and seedlings. Ground disturbance such as blading and excavation can destroy or damage individual plants, destroy or bury seeds, and provide opportunities for colonization by invasive plants. Excavation and grading has the potential to alter soil properties, create conditions unsuitable for the growth of some species (for other species it may promote germination or seedling establishment), and can change surface drainage patterns. The roots of perennial species are susceptible to damage from soil compaction by equipment or staging materials. Additional effects could result from activities that cause erosion that degrades habitat, ground disturbance that facilitates the establishment of invasive plant species that compete with native vegetation, or accidental ignition of a fire that damages or kills individuals. Sidecast soil from excavation, spilled materials, and other substances (such as broadcast herbicides) could be carried by ditches or swales to nearby sensitive areas, causing physical or physiological damage to the plants there.

Habitat may be permanently lost during O&M activities when towers or poles are replaced or when foundations are expanded during tower repairs. Temporary impacts to federally-listed plants and/or their habitat may occur during the installation of fencing and site-specific erosion solutions, as well as during excavations related to pipeline inspection, recoating, cathodic protection, pipeline lowering and replacement, and water diversion techniques. PG&E proposes to implement the Bay Area O&M HCP measures which include measures for managing hazardous material, reducing the introduction of noxious weeds, reporting species encounters, and frac-out response. Habitat disturbance will also be restricted to the minimum area necessary to complete O&M activities and PG&E proposes to compensate for the loss of habitat for all O&M activities.

#### *Western Snowy Plover Designated Critical Habitat*

WSP critical habitat will be impacted by the activities from the PG&E Bay Area O&M Program. PG&E anticipates up to 0.04 acre of annual temporary impacts and 0.01 acre of annual permanent impacts to WSP critical habitat as a result of the proposed activities. All four of the PCEs for this critical habitat unit will be affected from the permanent loss of habitat by activities occurring in WSP critical habitat units CA 13A, CA13B, CA 13C, CA 14, and CA 15. In addition, the habitat could be temporarily impacted by potential spills during construction which could cause contamination of soil and water and detriment to invertebrate prey. The habitat could be impacted by project personnel using the temporary work areas and causing contouring of the soils and changes in sediments, rocks, and shells that could be used as nesting sites. PG&E will implement the AMMs to minimize impacts to WSP critical habitat, including BMPs for soil erosion and spill prevention and containment, as well as providing compensatory mitigation for impacts to WSP habitat at a 3:1 ratio.

### **Cumulative Effects**

*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 project are not considered in this section; they require separate consultation pursuant to section 7 of the Act. The Service is not aware of specific projects that might affect the CLT, WSP, palmate-bracted bird's-beak, or the soft bird's-beak in the Action Area that are currently under review by State, county, or local authorities.

Most lands included in the 160,400-acre Action Area are privately owned but within a ROW or easements deed with PG&E. Under the terms of these deeds, the landowner may use the ROW lands for any purpose which will not interfere with PG&E's use of the ROW. 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 ROW 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 ROWs, including cattle grazing, agricultural or urban development, 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. Although land-cover in a ROW area may stay in a natural condition, 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.

Continued human population growth in the 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 species covered in this biological opinion. 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 through the 26-year term of this PBO to coincide with the 30-year term of the PG&E Bay Area O&M HCP.

## **Conclusion**

After reviewing the current *Status of the Species*, the *Environmental Baseline*, the *Effects of the Action*, and the *Cumulative Effects*, it is the Service's biological opinion that the issuance of the RGP for PG&E's Bay Area O&M activities is not likely to jeopardize the continued existence of the CLT, WSP, palmate-bracted bird's-beak, or the soft bird's-beak. This is based on the current status of the federally-listed species' population range-wide, implementation of the *Conservation Measures* to minimize the adverse effects on individual of the species and their habitats during O&M activities, and the small scope and size of habitat impacts to localized areas for individual O&M activities.

After reviewing the current *Status of the Critical Habitat* for WSP critical habitat, the *Environmental Baseline* for the Action Area, the *Effects of the Action*, and the *Cumulative Effects*, it is the Service's biological opinion that the proposed project is not likely to result in destruction or adverse modification to WSP critical habitat. The small size of the temporary (approximately 0.04 acre annually) and permanent impacts (approximately 0.01 acre annually) will not diminish the value of critical habitat as a whole for the conservation of the WSP. This is anticipated to occur over the term of the PBO which coincides with the 30-year term of the PG&E O&M HCP set to expire October 2, 2047. This equates to a total of approximately 1.04 acres of temporary impacts and approximately 0.26 acre of permanent impacts over

approximately 26 years. The permanent impact (approximately 0.26 acre) represents 0.0002 % of the total area of the 5 subunits designated as critical habitat for the WSP. Therefore, the proposed project is not 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 WSP.

### **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 measures described below are non-discretionary, and must be undertaken by the Corps so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

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 or in the course of any violation of a State criminal trespass law.

#### **Amount or Extent of Take**

The Service anticipates that individual CLT and WSP will be subject to incidental take in the form of harm. All CLT and WSP will be subject to harm through the temporary (approximately 18.2 acres) and permanent (approximately 1.82 acres) modification of habitat, and harm through the use of vehicles and large equipment during construction activities that could interfere with

normal behaviors within suitable habitat in the Action Area. Take in the form of harm from interference of normal behaviors to individual CLT and WSP may be difficult to quantify due to seasonal fluctuations in their numbers, random environmental events, or additional environmental disturbances. The Service does not anticipate any take through physical injury of individuals or lethal take of CLT or WSP as a result of O&M activities. Conservation measures proposed by PG&E and described in the *Description of the Proposed Action* will reduce, but not eliminate, the potential for incidental taking of CLT and WSP. Upon implementation of the *Reasonable and Prudent Measures*, incidental take associated with the project will become exempt from the prohibitions described under section 9 of the Act.

### **Effect of the Take**

In the accompanying programmatic 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 following reasonable and prudent measures are necessary and appropriate to minimize the effects of the proposed project to the CLT and WSP:

1. The Corps shall require PG&E minimize effects to listed species from O&M activities.
2. The Corps shall require PG&E implement the *Conservation Measures* as described in the *Description of the Proposed Action*.

### **Term and Condition**

In order to be exempt from the prohibitions of section 9 of the Act, the Corps shall ensure that PG&E complies with the following term and condition, which implement the respective reasonable and prudent measures described above. This term and condition is non-discretionary.

1. Term and Condition 1 implements Reasonable and Prudent Measures 1 and 2:
  - a. PG&E shall educate and inform personnel involved in the project as to the *Conservation Measures* and *Term and Condition* in this PBO.
  - b. The Corps shall ensure PG&E complies with the *Reporting Requirements* below.

### **Reporting Requirements**

In order to monitor whether the amount or extent of incidental take anticipated from implementation of the project is approached or exceeded, the Corps through PG&E shall adhere to the following reporting requirements. Should this anticipated amount or extent of incidental take be exceeded, the Corps must reinitiate formal consultation as per 50 CFR 402.16.

1. The Service must be notified within 24 hours of the finding of any injured or dead listed species or any unanticipated damage to its habitat associated with the proposed project. Injured listed species shall be cared by a licensed veterinarian or other qualified person. Notification will be made to Jana Affonso, the Assistant Field Supervisor of the Endangered Species Division at: San Francisco Bay-Delta Fish and Wildlife Office, 650 Capitol Mall, Suite 8-300, Sacramento, California 95814 or by telephone at (916) 930-2664, and must include the date, time, and precise location of the individual/incident clearly indicated on a U.S. Geological Survey 7.5 minute quadrangle or other maps at a finer scale, as requested by the Service, and any other pertinent information. When an injured or dead individual of the listed species is found, the applicant through the Navy shall follow the steps outlined in the *Disposition of Individuals Taken* section below.
2. Sightings of any listed or sensitive animal species shall be reported to the Service and CNDDDB (<https://www.wildlife.ca.gov/Data/BIOS>).
3. PG&E shall maintain a full and accurate account of all temporary and permanent habitat loss throughout the term of this PBO.
4. PG&E shall submit an annual report of all temporary and permanent habitat loss from O&M activities and projects covered under this PBO to the Corps and the Bay-Delta Fish and Wildlife Office.

#### *Disposition of Individuals Taken*

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 instructions are received from the Service regarding the disposition of the dead specimen. The Service contact persons are Jana Affonso, the Assistant Field Supervisor of the Endangered Species Division at: San Francisco Bay-Delta Fish and Wildlife Office, 650 Capitol Mall, Suite 8-300, Sacramento, California 95814 or by telephone at (916) 930-2664.

### **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 recommends the following actions:

1. The Service recommends PG&E maintain current knowledge of San Francisco Bay Area species biology, ecology, and status to inform project design and species-specific *Conservation Measures*.



2. Encourage or require the use of appropriate California native species in restoration efforts.
3. Facilitate additional educational programs geared toward the importance and conservation of tidal marsh and seasonal wetlands.
4. Assist the Service with implementing other recovery actions identified within the most current recovery plans for CLT and WSP.
5. Encourage the participation in programs being developed by the Federal and State resource agencies to limit and reverse the spread of non-natives, such as *Spartina*, *Phragmites*, *Lepidium*, and other invasives within San Francisco Bay Area.

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

### **REINITIATION – CLOSING STATEMENT**

This concludes the Programmatic Formal Consultation for the Pacific Gas and Electric Company's (PG&E) Bay Area Operation and Maintenance (O&M) Program as provided in 50 CFR §402.16,

1. Reinitiation of consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and:
  - a. If the amount or extent of taking specified in the incidental take statement is exceeded;
  - b. 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;
  - c. 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
  - d. If a new species is listed or critical habitat designated that may be affected by the identified action.
2. An agency shall not be required to reinitiate consultation after the approval of a land management plan prepared pursuant to 43 U.S.C. 1712 or 16 U.S.C. 1604 upon listing of a new species or designation of new critical habitat if the land management plan has been adopted by the agency as of the date of listing or designation, provided that any authorized actions that may affect the newly listed species or designated critical habitat will be addressed through a separate action-specific consultation. This exception to reinitiation of consultation shall not apply to those land management plans prepared pursuant to 16 U.S.C. 1604 if:

- a. Fifteen years have passed since the date the agency adopted the land management plan prepared pursuant to 16 U.S.C. 1604; and
- b. Five years have passed since the enactment of Public Law 115-141 [March 23, 2018] or the date of the listing of a species or the designation of critical habitat, whichever is later.

Please address any questions or concerns regarding this response to Brian Hansen, Senior Fish and Wildlife Biologist, at [Brian\\_Hansen@fws.gov](mailto:Brian_Hansen@fws.gov) or (916) 930-5642 or Kim Squires, Section 7 Division Manager, at [Kim\\_Squires@fws.gov](mailto:Kim_Squires@fws.gov). Please refer to Service file number 08FBDT00-2020-F-0197 in any future correspondence regarding this project.

Sincerely,

Jana Affonso  
Acting Field Supervisor

## REFERENCES

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**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**

NATIONAL MARINE FISHERIES SERVICE  
West Coast Region  
777 Sonoma Avenue, Room 325  
Santa Rosa, California 95404-4731

April 6, 2023 Refer to NMFS No: WCRO-2021-02887

James Mazza  
Regulatory Division Chief  
Department of the Army  
San Francisco District, Corps of Engineers  
450 Golden Gate Avenue  
San Francisco, California 94102-3406

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Pacific Gas and Electric Company’s Bay Area Operation and Maintenance Program (Corps File No. 2018-00490S)

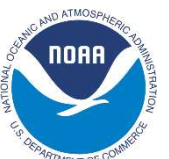
Dear Mr. Mazza:

Thank you for your letters of November 10, 2021, and April 4, 2023, requesting consultation with NOAA’s National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the Pacific Gas and Electric Company’s (PG&E) Bay Area Operation and Maintenance Program (O&M Program). PG&E has applied for a regional general permit (RGP) from the U.S. Army Corps of Engineers (Corps) pursuant to Section 404 of the Clean Water Act of 1972, as amended, 33 U.S.C. § 1344 et seq., and Section 10 of the Rivers and Harbors Act of 1899, as amended, 33 U.S.C. § 403 et seq. PG&E proposes to conduct routine maintenance activities on electrical and natural gas infrastructure in the nine-county San Francisco Bay Area.<sup>1</sup>

The enclosed biological opinion is based on our review of the information provided by PG&E and the Corps for O&M Program activities and describes our analysis of potential effects on threatened Central California Coast steelhead (*Oncorhynchus mykiss*), threatened California Central Valley steelhead (*O. mykiss*), endangered Sacramento River Winter-run Chinook salmon (*O. tshawytscha*), threatened Central Valley Spring-run Chinook salmon (*O. tshawytscha*), threatened Southern Distinct Population Segment of North American green sturgeon (*Acipenser medirostris*), and their designated critical habitats in accordance with section 7 of the ESA. In this biological opinion, NMFS concludes the proposed O&M Program activities are not likely to jeopardize the continued existence of these ESA-listed steelhead, salmon and green sturgeon, nor is it likely to adversely modify their critical habitat. However, NMFS anticipates take of these species will occur during Program activities and an incidental take statement is included with the enclosed biological opinion.

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<sup>1</sup> The nine Bay Area counties consist of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties.



NMFS has also found that the proposed O&M Program may affect, but is not likely to adversely affect threatened South-Central California Coast steelhead (*O. mykiss*), threatened California Coastal Chinook salmon (*O. tshawytscha*), endangered Central California Coast coho salmon (*O. kisutch*), and their designated critical habitat in accordance with section 7 of the ESA.

Thank you, also, for your request for consultation pursuant to the essential fish habitat (EFH) provisions in Section 305(b) of the Magnuson–Stevens Fishery Conservation and Management Act [16 U.S.C. 1855(b)] for this action. Based on NMFS' review, we concluded that the action would adversely affect EFH for species managed under the Pacific Coast Salmon, Pacific Coast Groundfish, and Coastal Pelagic Species Fishery Management Plans (FMP). Therefore, we have included the results of that review in Section 3 of the enclosed document.

Please contact Sara Azat at the California Coastal Office in Santa Rosa at [sara.azat@noaa.gov](mailto:sara.azat@noaa.gov) or 707-575-6067 if you have any questions concerning this consultation, or if you require additional information.

Sincerely,



Alecia Van Atta  
Assistant Regional Administrator  
California Coastal Office

Enclosure

cc: Greg Brown, Corps of Engineers, San Francisco, CA ([gregory.g.brown@usace.army.mil](mailto:gregory.g.brown@usace.army.mil))  
Matt Brown, PG&E, Fresno, CA ([mvb5@pge.com](mailto:mvb5@pge.com))  
Copy to E-file FRN 151422WCR2021SR00227

**Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson–Stevens  
Fishery Conservation and Management Act Essential Fish Habitat Response**


Pacific Gas and Electric Company Bay Area Operation and Maintenance Program  
NMFS Consultation Number: WCRO-2021-02887

Affected Species and NMFS’ Determinations:

<b>ESA-Listed Species</b>	<b>Status</b>	<b>Is Action Likely to Adversely Affect Species?</b>	<b>Is Action Likely to Jeopardize the Species?</b>	<b>Is Action Likely to Adversely Affect Critical Habitat?</b>	<b>Is Action Likely to Destroy or Adversely Modify Critical Habitat?</b>
Central California Coast Steelhead ( <i>Oncorhynchus mykiss</i> )	Threatened	Yes	No	Yes	No
California Central Valley Steelhead ( <i>O. mykiss</i> )	Threatened	Yes	No	Yes	No
Sacramento River Winter-run Chinook ( <i>O. tshawytscha</i> )	Endangered	Yes	No	Yes	No
Central Valley Spring-run Chinook ( <i>O. tshawytscha</i> )	Threatened	Yes	No	Yes	No
North American Green Sturgeon ( <i>Acipenser medirostris</i> )	Threatened	Yes	No	Yes	No
South-Central California Coast steelhead DPS ( <i>O. mykiss</i> )	Threatened	No	NA	No	NA
California Coastal Chinook ( <i>O. tshawytscha</i> )	Threatened	No	NA	No	NA
Central California Coast Coho Salmon ( <i>O. kisutch</i> )	Endangered	No	NA	No	NA

<b>Fishery Management Plan That Identifies EFH in the Project Area</b>	<b>Does Action Have an Adverse Effect on EFH?</b>	<b>Are EFH Conservation Recommendations Provided?</b>
Pacific Coast Salmon	Yes	Yes
Pacific Coast Groundfish	Yes	Yes
Coastal Pelagic Species	Yes	Yes

**Consultation Conducted By:** National Marine Fisheries Service, West Coast Region

**Issued By:**   
Alecia Van Atta  
Assistant Regional Administrator  
California Coastal Office

**Date:** April 4, 2023



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## 1. INTRODUCTION

This Introduction section provides information relevant to the other sections of this document and is incorporated by reference into Sections 2 and 3, below.

### 1.1. Background

NOAA's National Marine Fisheries Service (NMFS) prepared the biological opinion (opinion) and incidental take statement (ITS) portions of this document in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 *et seq.*), as amended, and implementing regulations at 50 CFR part 402.

We also completed an essential fish habitat (EFH) consultation on the proposed action, in accordance with section 305(b)(2) of the Magnuson–Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801 *et seq.*) and implementing regulations at 50 CFR part 600.

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available within two weeks at the NOAA Library Institutional Repository [<https://repository.library.noaa.gov/welcome>]. A complete record of this consultation is on file at California Coastal NMFS office.

### 1.2. Consultation History

In 2017, the Pacific Gas and Electric Company (PG&E) finalized a Habitat Conservation Plan and obtained an ESA Section 10(a)(1)(B) incidental take permit from the U.S. Fish and Wildlife Service (FWS) for the Bay Area Operation and Maintenance Program (O&M Program). The FWS Section 10(a)(1)(B) permit authorized the incidental take of several terrestrial species and fairy shrimp. In 2019, PG&E began preparing an application for a regional general permit (RGP) from the U.S. Army Corps of Engineers (Corps) pursuant to Section 404 of the Clean Water Act of 1972, as amended, 33 U.S.C. § 1344 *et seq.*, and Section 10 of the Rivers and Harbors Act of 1899, as amended, 33 U.S.C. § 403 *et seq.*, for O&M Program activities in waters of the U.S in the nine Bay Area counties, consisting of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties.

PG&E with the assistance of a consultant team, prepared a draft biological assessment which evaluated the effects of O&M Program activities on listed species under the jurisdiction of the NMFS. The January 2020 administrative draft of this biological assessment was submitted by PG&E to NMFS for review and comment.

On June 4, 2020, PG&E, their consultants, and NMFS met via teleconference to discuss the scope of activities proposed for inclusion in the RGP.

NMFS and PG&E had several conference calls between August and December 2020 to discuss Program activities, scope of the programmatic consultation, and conservation recommendations.

On February 1, 2021, NMFS leadership met with PG&E representatives to discuss O&M Program activities and information needs for the NMFS-Corps section 7 consultation.

On March 9, 2021, PG&E provided a revised draft of the biological assessment for NMFS review, and discussions between NMFS, the Corps, and PG&E representatives continued through March, April and May 2021 regarding the scope of the consultation. Based on the information provided in the draft biological assessment it was determined that proposed O&M Program work in freshwater streams occurs primarily, but not exclusively, in ephemeral waterways that are not occupied by listed anadromous fish. In addition, the generalized descriptions of O&M activities in freshwater streams presented in the March 2021 biological assessment did not provide sufficient information for NMFS to assess potential effects on listed fish in freshwater areas. Therefore, the Corps, NMFS, and PG&E agreed to focus the consultation on O&M activities associated with electrical infrastructure in tidal waters because these activities are routinely permitted by the Corps and potential effects on listed fish are well understood and predictable.

A revised draft biological assessment was provided to NMFS on June 18, 2021, and discussions continued between NMFS and PG&E to clarify the project description, scope of activities, and development of avoidance/minimization measures.

By letter dated November 10, 2021, the Corps requested formal consultation with NMFS for PG&E's O&M activities within tidal waters and tidal wetlands of San Francisco Bay. With the consultation request, the Corps provided a biological assessment and EFH Assessment, prepared by Insignia Environmental and titled *National Oceanic and Atmospheric Administration - National Marine Fisheries Service Biological Assessment for the Regional General Permit for Pacific Gas and Electric Company's Bay Area Operation and Maintenance Program, October 2021 (BA)*.

During February, March and April 2022, NMFS, the Corps, and PG&E representatives exchanged information regarding the project description. Specifically, NMFS requested additional details on tower replacement and eelgrass avoidance measures from PG&E.

During August and September 2022, NMFS, the Corps and PG&E representatives exchanged information regarding pile driving and the proposed mitigation program. A revised biological assessment was submitted on September 9, 2022, to NMFS and the Corps for review.

On September 29, 2022, the Corps transmitted to NMFS the final biological assessment for PG&E's O&M Program activities in tidal waters. Due to a minor error in Table 12 of the biological assessment, a revision was made by PG&E's consultant team on September 30, 2022. The final biological assessment was transmitted to NMFS on September 30, 2022 (September 2022 Biological Assessment).

A revised version of the September 2022 Biological Assessment's Technical Appendix A was provided by PG&E to NMFS on November 22, 2022.

During December 2022, NMFS determined that additional information and conservation measures were required to assess gas line crossing activities within freshwater streams. On December 12, 2022, PG&E representatives provided the geographic coordinates for 482 gas pipeline crossings in the nine Bay Area counties project area. Review by NMFS staff determined that approximately 110 of these crossings overlap with listed fish and critical habitat. The NMFS review of gas line crossing locations also revealed that three additional listed fish species (*i.e.*, threatened California Coastal Chinook salmon, endangered Central California Coast coho salmon, and threatened South-Central California Coast steelhead) may be affected by the O&M Program.

Between January and March 2023, NMFS and PG&E continued work together to identify gas line crossing sites that may affect listed anadromous fish and develop conservation measures for these freshwater work locations. On April 4, 2023, a supplemental biological assessment was transmitted to NMFS by the Corps for PG&E Bay Area O&M Program (March 2023 Supplemental Biological Assessment), and the Corps clarified that their request for formal consultation included all of the RGP's proposed activities in tidal waters and freshwater streams in the Bay Area. The Corps also requested on April 4, 2023, NMFS concurrence with the Corps' finding that the O&M Program would not adversely affect threatened California Coastal Chinook salmon, endangered Central California Coast coho salmon, threatened South-Central California Coast steelhead, and their designated critical habitat.

On July 5, 2022, the U.S. District Court for the Northern District of California issued an order vacating the 2019 regulations that were revised or added to 50 CFR part 402 in 2019 ("2019 Regulations," see 84 FR 44976, August 27, 2019) without making a finding on the merits. On September 21, 2022, the U.S. Court of Appeals for the Ninth Circuit granted a temporary stay of the district court's July 5 order. On November 14, 2022, the Northern District of California issued an order granting the government's request for voluntary remand without vacating the 2019 regulations. The District Court issued a slightly amended order two days later on November 16, 2022. As a result, the 2019 regulations remain in effect, and we are applying the 2019 regulations here. For purposes of this consultation and in an abundance of caution, we considered whether the substantive analysis and conclusions articulated in the biological opinion and incidental take statement would be any different under the pre-2019 regulations. We have determined that our analysis and conclusions would not be any different.

### **1.3. Proposed Federal Action**

Under the ESA, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (see 50 CFR 402.02). Under the MSA, "Federal action" means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal agency (see 50 CFR 600.910).

The Corps proposes to authorize PG&E to conduct routine O&M activities on natural gas and electric transmission distribution infrastructure within wetlands and non-wetland waters of the U.S. within the nine-county San Francisco Bay Area.<sup>2</sup> The Corps would issue the RGP pursuant

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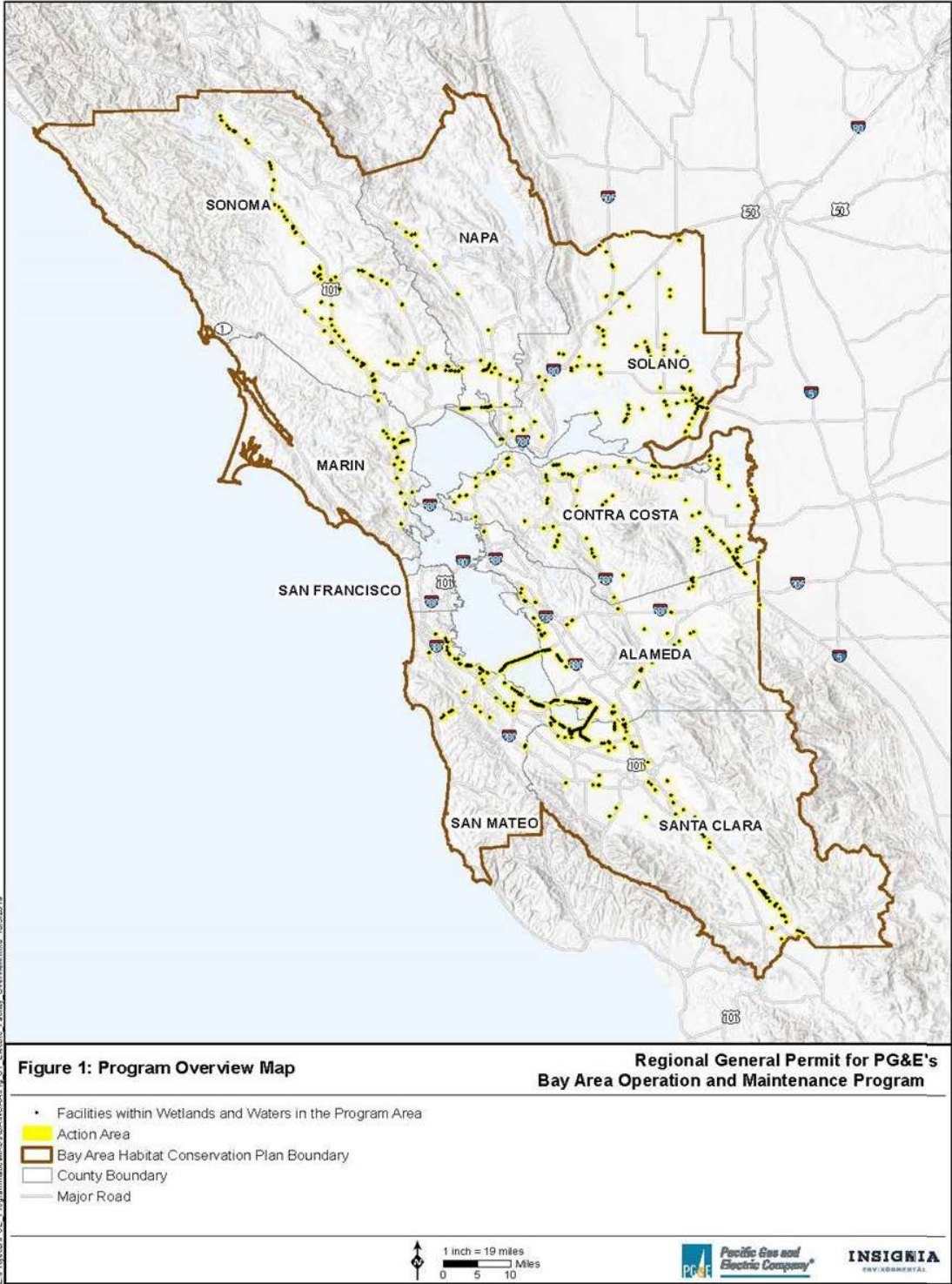
<sup>2</sup> The nine Bay Area counties consist of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties.

to Section 404 of the Clean Water Act of 1972, as amended, 33 U.S.C. § 1344 *et seq.* and Section 10 of the Rivers and Harbors Act of 1899, as amended, 33 U.S.C. § 403 *et seq.* The RGP would provide authorization for five (5) years and may be renewed for a total duration of up to 10 years.

PG&E’s O&M Program includes activities in terrestrial areas, tidal waters, and freshwater streams. Electrical infrastructure O&M activities will be performed in terrestrial areas and tidal waters (see Section 1.3.2). Natural gas line system O&M activities will be performed in terrestrial areas, tidal waters, and freshwater streams (see Section 1.3.3). Access road maintenance will be performed in terrestrial areas and freshwater streams (see Section 1.3.4). As described in Section 2 of this opinion, eight listed species of anadromous fish may be affected by PG&E’s O&M Program. Table 1 provides a summary of listed fish species affected by PG&E O&M activities. Figure 1 presents a map of the Bay Area and overview of PG&E’s O&M Program facilities associated with electrical towers and natural gas lines.

**Table 1. Categories of O&M Activities and Affected ESA-Listed Fish**

<b>PG&amp;E O&amp;M Activity</b>	<b>Area Work Conducted</b>	<b>ESA-Listed Fish Species Present</b>
Electrical Transmission Tower Repair and Replacements	Estuarine	Central California Coast Steelhead
		California Central Valley Steelhead
		Sacramento River Winter-run Chinook
		Central Valley Spring-Run Chinook
		Southern DPS Green Sturgeon
	Terrestrial	n/a
Natural Gas System Infrastructure Repair and Replacement	Estuarine	Central California Coast Steelhead
		California Central Valley Steelhead
		Sacramento River Winter-run Chinook
		Central Valley Spring-Run Chinook
		Southern DPS Green Sturgeon
	Stream Crossings	Central California Coast Steelhead
		South-Central California Coast Steelhead
		California Coastal Chinook
		Central California Coast Coho
	Terrestrial	n/a
Access Road Maintenance	Stream Crossings	Central California Coast Steelhead
		South-Central California Coast Steelhead
		California Coastal Chinook
		Central California Coast Coho
	Terrestrial	n/a



**Figure 1. Action Area and Overview of PG&E Bay Area O&M Program Facilities (Source: PG&E Bay Operations September 2022 Biological Assessment)**



### **1.3.1. RGP Implementation Procedures**

The RGP implementation process is described in Section 4 of the March 2023 Supplemental Biological Assessment. PG&E will prepare and submit to the Corps project-specific Pre-Construction Notification packages for each proposed O&M Program activity conducted under the RGP. The Pre-Construction Notification must include, among other things, a complete project description, location, construction timing, avoidance/minimization measures, and mitigation actions. The Corps will review each Pre-Construction Notification to confirm eligibility under the RGP and PG&E may not proceed until the Corps provides written approval.

For those activities that may affect NMFS listed fish and/or critical habitat, the Corps or PG&E will provide copies of Pre-Construction Notification packages to NMFS for review. The Corps with input from NMFS will confirm that all Program limits, avoidance/minimization measures, and mitigation requirements developed for this programmatic consultation and required by the RGP are included. For proposed O&M Program actions that do not meet all the requirements of the RGP or this programmatic consultation, the Corps would initiate and complete individual ESA/EFH consultations with NMFS prior to authorizing these activities.

### **1.3.2. Electrical Infrastructure O&M Activities**

PG&E proposes routine maintenance on electrical infrastructure in the Bay Area to maintain safety and operability. The electrical transmission system in the Bay Area consists of approximately 4,430 miles of transmission lines. Bulk transmission lines (230 kV and 500 kV) are supported on steel-lattice towers or steel poles. Power lines with a 60 kV, 70 kV, or 115 kV capacity are most often supported by wood poles, but steel poles, tubular steel poles, and lattice towers are also used in certain areas. The distribution system includes primary and secondary distribution lines that deliver electricity and distribution transformers that reduce voltage from distribution to utilization (i.e., residential or commercial) levels. Primary distribution lines carry three-phase AC power in the 2–50 kV range to street rail and bus systems as well as to industrial and commercial customers. Secondary distribution lines serve most residential customers with 120-/240-volt, single-phase, three-wire service, which provides electrical power for lighting and most appliances.

PG&E conducts patrols of its lines and associated facilities annually or on more frequent basis. Inspections of electrical tower footings and poles are performed to verify stability, structural integrity, and equipment condition (e.g., fuses, breakers, relays, cutouts, switches, transformers, paint). Footings and poles are accessed from existing roads or may require off-road travel, either in vehicles or on foot. Tower replacement or repair typically involves tower extensions or strengthening the foundations or superstructures of towers. Superstructures typically are strengthened by replacement, modification, or the addition of pieces of steel lattice, as determined by engineering analysis specific to each tower. To strengthen tower foundations, concrete from the existing footings is broken away to expose the steel reinforcements. A new replacement concrete footing, called a grade beam, is poured between reinforcements.

The majority of electrical infrastructure O&M activities will be conducted in terrestrial areas. No electrical infrastructure is located in freshwater streams; thus, no electrical tower or pole repair/replacement activities will be conducted in freshwater streams. Some electrical

infrastructure work will be performed by the O&M Program in tidal wetland and estuarine waters in Suisun Bay, Grizzly Bay, San Pablo Bay, and San Francisco Bay, collectively referred to as the San Francisco Bay in this opinion. Table 2 provides a summary of the proposed electrical tower repair and boardwalk activities in tidal areas that may affect listed fish and/or designated critical habitat, and includes the typical equipment used, activity duration, anticipated annual frequency, and average project footprint in fish habitat.

For the purposes of this consultation PG&E has categorized the proposed electrical infrastructure O&M activities in tidal areas as “high” or “low” impact (Table 3). Activities that are defined as high include pile driving or cofferdam installation, and may result in adverse impacts to listed fish species, critical habitat, or EFH. These activities require additional avoidance, minimization or mitigation measures (see Section 1.3.5 of this opinion). All high impact activities would be conducted during a limited operating period (LOP) between June 1 and November 30. Low impact activities would also be conducted between June 1 and November 30, but low impact activities may extend work until January 15, provided that these activities are initiated prior to November 30 of the previous year.

**Table 2. Summary of Activities in Tidal Waters**

Activity	Equipment	Duration of Each Project	Number in Tidal Habitat	Frequency	Average Footprint in Habitat
Tower Repair and Replacement	Barge, helicopter, rubber mats, metal sheet piles, plywood, concrete, vibratory hammer, impact hammer, and piles	7 to 35 days	121 facilities	17 towers per year	500 square feet
Boardwalk Repair and Replacement	Boat, barge, helicopter, generator and handheld equipment (including drills, chain saws, and circular saws)	60 days	50 miles	15 sections of various lengths per year	variable

**Table 3. Activity Type and Impact Level in Tidal Waters**

Activity	Impact Level
Tower Repair and Replacement without Pile Driving or Cofferdam Installation	Low
Tower Repair and Replacement with Pile Driving or Cofferdam Installation	High
Boardwalk Repair or Replacement	Low

### 1.3.2.1 Tower Replacement and Repair

Tower replacement and repair work includes work at the tower site and access to the construction tower site. Replacement refers to the removal of an existing tower and replacement

with a new tower. Tower repair includes the cleaning and repair of concrete tower caps, installation of fiberglass casings, and tower painting. PG&E may temporarily place a rubber mat at the base of each footing as a work area during O&M activities.

Access to towers may occur from existing boardwalks, a temporary section of boardwalk, or crews may utilize a barge as a work area. A helicopter or barge may be used to place construction materials on the boardwalk or barge, and then materials would be moved to the work site by hand. Most minor tower repairs would be conducted from existing boardwalks. A barge with a crane or helicopter would be used to repair or replace the upper portion of the tower, in areas where there are no existing boardwalks, and/or where construction of a temporary boardwalk is not feasible. Depending on the local conditions, the work barges may rest on the bottom of the bay at low tide.

Old tower footings may be abandoned in place or removed in association with tower foundation repairs and replacements (see Section 1.3.2.2). Footing removal would be assessed on a case-by-case basis depending on the impact of removing the footing, or whether the remaining footing would be a hazard to navigation. Cofferdams would be installed to conduct footing removals in tidal waters (see Section 1.3.2.6 of this opinion for additional information regarding cofferdams). Degraded wooden pilings would be removed by being cut at mudline level at low tide.

### **1.3.2.2 Tower Foundation Repair or Replacement**

Tower foundation repair or replacement work in subtidal and intertidal habitats would generally be performed with cofferdams. Cofferdams would be installed during low tide around a tower footing or around the entire tower to isolate the work area from the waters of San Francisco Bay (see Section 1.3.2.6 of this opinion for additional information regarding cofferdams). The cofferdam would keep the enclosed work area dry and minimizes the mobilization of sediment during construction activities.

To strengthen tower foundations, some concrete from the existing footings is removed to expose the steel (rebar) reinforcements. New pins are inserted, a new rebar cage is installed, and concrete forms are constructed. Concrete will be mixed off site and delivered to work sites via helicopter or barge. A form is constructed around the footing to hold the concrete during curing. The concrete is then poured, allowed to cure, and the form is removed. In some instances, grade beams, which hold pile caps together and strengthen tower foundations, are installed between adjacent foundations. This involves installing forms, pouring concrete, and removing the forms. Once the repair is complete, the cofferdam is removed by excavating around the outside and hoisting it from the workspace.

In instances where a complete replacement or new foundations are required, piles are first installed adjacent to the existing foundation (see Section 1.3.2.7 of this opinion for additional information regarding pile driving). Once piles are installed, a new tower foundation is created on the piles. When all replacement work is complete, the cofferdams are removed as described above.

A crew of six to 10 personnel is typically required for tower foundation repair or replacement, and work would occur over a period of 7 to 35 days to complete each tower. Access may occur

on existing roads where available. In-water access occurs through the use of boats and barges for towers within San Francisco Bay and tributaries/tidal sloughs that are large enough for barges to access.

### **1.3.2.3 Boardwalk Replacement or Repair**

PG&E has more than 50 miles of boardwalks that service their electrical transmission facilities in the vegetated marshes, mudflats, and open waters around the San Francisco Bay. The boardwalks typically extend from levees and provide access across marshes and salt ponds to electrical tower footings. Support equipment for replacement and repair of boardwalks include, but is not limited to, boats, barges, and helicopters. A 100-foot by 200-foot staging yard located on land is often also used to store materials. All boardwalk replacement and repair activities are completed manually and require the use of generators and handheld equipment, including, but not limited to drills, chain saws, and circular saws. A crew of three to five personnel conducts the repair or replacement activities and this work typically takes up to 60 days to complete. Crews typically work from existing installed sections of boardwalks, which minimizes the need for access below and around the boardwalk. However, in some instances, work is conducted from barges and/or from the mudflat (*i.e.*, unvegetated sediment) during low tide.

Based on the muddy, soft substrate that is commonly encountered during boardwalk replacement and repair activities, replacement pilings are typically pushed into the mud by using a steel bar for leverage. This method does not require hammering or striking that will result in vibratory or noise disturbance to aquatic species. Occasionally, small pilings may be hammered into place by hand using sledgehammers or similar tools when substrates and sediments require it. Piling installation via hammer or sledgehammer generally requires five to 10 strikes to install a single piling. Each 4-inch by 4-inch piling is made of plastic lumber. Degraded pilings that have been replaced will be removed as close to the mudline as possible by being cut at mudline level during low tide.

Replacement planking is transported along the boardwalk on special hand-dollies. Planking is then slid into place, drilled, and bolted. If the existing section of boardwalk is substantially degraded, crews perform the work within an approximately 10-foot radius around the boardwalk section being replaced. Handrails are then installed (or replaced), which are wood planks that are connected to the boardwalk with support beams.

### **1.3.2.4 Pole Reinforcement and Replacement**

Proposed pole reinforcement methods include attaching trusses to existing poles to provide additional support or the use of a polyvinyl chloride product to reinforce deteriorating wood poles. The most common method to restore ground-level strength to utility poles involves the installation of a single (or in some cases, a double) steel truss. The reinforced pole remains in place next to the installed truss. Composite fabric sheets may also be used for reinforcement of poles. Sheets are wrapped around the pole in layers and a resin material is applied to each layer. PG&E determines the type of reinforcement method after reviewing the results of an inspected line segment. This may require the installation of guy wires and anchors, by line truck auger, which could consist of a screw or a concrete structure. The work is generally performed by a crew of two to five personnel and takes 1 to 2 days to complete.

Pole replacement involves framing the new pole (i.e., crossarms, pins, insulators, grounds, bonding, markers, and any equipment are installed) on the ground adjacent to the existing pole prior to setting the replacement pole in the ground. To replace a pole, the line is typically de-energized. A line truck auger is used to drill a hole, the new pole is placed into the new hole, the void is backfilled and compacted, and 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. Pole and equipment replacement and repair would require an approximately 10-foot-long by 7-foot-wide work area. The work is generally performed by a crew of four to five personnel and is completed in one day for a distribution pole and up to three days for a transmission pole. Pole replacements conducted by the O&M Program will not be performed in tidal waters or freshwater streams.

#### **1.3.2.5 Line Reconductoring**

Line reconductoring involves the replacement of conductors (i.e., wires) once the wires begin to show wear or cannot handle the transmission load or if increased capacity is required. Work crews install replacement conductors by temporarily splicing them to the ends of the existing conductors and pulling them through travelers (i.e., pulleys) attached to the arms of the towers or pole cross-arms. Conductor replacement is performed with boom trucks, winches, and in some cases, a helicopter may be used.

Reconductoring typically is done in 2 to 3-mile sections with the use of temporary pull and tension sites (*i.e.*, pull sites). Several pieces of equipment are used at the pull sites, including tensioners (*i.e.*, rope trucks) to feed out the new conductor and adjust tension, conductor reels to receive the existing conductor as it is removed, and reels of new conductors. This work is generally conducted by a crew of three to eight personnel and potentially one helicopter crew over a period of 1 to 2 months. Although PG&E avoids locating pull sites above water, the geometry of the alignment, pole/tower placement, or topography may require that some pull sites are located on the water. On-water pull sites will be located on a work barge. Aside from utilizing a work barge, no in-water work is associated with line reconductoring activities.

#### **1.3.2.6 Cofferdam Construction in Tidal Waters**

As discussed above, cofferdams may be installed to perform tower repairs/replacements in tidal areas. Cofferdams would be constructed of 1.125-inch (approximately) plywood and support beams, or constructed using metal sheet piles. Plywood cofferdams would be installed by first clearing the mud, by hand, from the base of the footing and the plywood is pushed down to 3-foot depth (approximately). Metal sheet pile cofferdams would be installed using a vibratory hammer operated from a barge. Mud and sediments removed during construction would be reused on site, or bagged and taken to a landfill. Cofferdams would be installed and closed during low tide. Any water in the cofferdam would be pumped directly onto the adjacent land or into the adjacent water. Avoidance and minimization measures and best management practices for cofferdam installation and dewatering are provided in Section 1.3.5 below.

### **1.3.2.7 Pile Installation**

As discussed above, installation of piles may be required for tower repairs and replacements. Pile types include wood, steel, and concrete piles. Concrete piles would be cast in place using a hollow steel pile as the casing or form. Installations would occur by helical pile driving, vibratory hammer pile driving, and impact hammer pile driving. Helical pile driving is a relatively new method of pile installation where large piles are screwed into the soil instead of being driven with a hammer. The type of pile installation utilized at each site will be determined by the site characteristics (e.g., soil or substrate type) and/or the availability of pile type. Avoidance and minimization measures for pile driving include work windows, hammer cushions, and bubble curtains (see Section 1.3.5 below).

The majority of the pile-driving activities required for tower repair/replacements and foundation repairs/replacements will occur within muddy, fine materials, and soft habitat that range from clay (very fine) to silt to sand (relatively coarse). Additionally, approximately 92% of the tower foundations where pile driving will occur are located in water depths at or above mean lower low water (MLLW); approximately 7% are located in water depths between 0 and -15 feet MLLW; and less than 1% is located in water depths below -15 feet MLLW. A barge mounted vibratory or impact hammer, or a combination of the two, would be used to drive the piles. A helical pile driver or impact hammer may be utilized to install piles to their final depth. Piles would range from 16 to 72 inches in diameter. When an impact hammer is used, up to 2,000 strikes may occur per day.

When 24-inch diameter piles or smaller are used to repair foundations at a single tower, approximately 16 piles are installed and pile driving would last between 16 and 24 days. When 60-inch diameter piles are used to repair foundations at a single tower, four piles are installed and pile driving would typically take between 6 and 15 days. Installation of 72-inch piles would be similar to 60-inch diameter piles.

### **1.3.3. Natural Gas System O&M Activities**

PG&E acquires natural gas in open markets and moves it (by means of compression) through a series of compressor stations prior to use or storage. Gas is distributed to individual residential and business customers via smaller, lower-pressure distribution pipelines, transitioning from high-pressure lines to smaller, low-pressure lines via pressure regulators or gas pressure-limiting stations. In the Bay Area, PG&E owns and operates a compressor station and 1,820 miles of transmission pipelines, which convey natural gas to 19,350 miles of distribution lines.

Proposed PG&E natural gas line O&M activities will primarily occur in terrestrial areas; although gas line crossings at streams is common and a small number of gas lines are located in tidal wetlands or estuarine waters. Natural gas line O&M activities consist of site-specific erosion measures over pipelines, pipeline recoating, pipeline replacement, valve recoating, and valve replacement. These proposed activity types would occur in terrestrial areas and at waterway crossings throughout the nine counties of San Francisco Bay Area. Table 4 provides a summary of these activities. Table 5 presents the known streams with listed anadromous fish and/or designated critical habitat in the action area with PG&E gas line crossings. Although unlikely, there may be additional gas line locations on streams with listed anadromous fish or

critical habitat that were not identified by PG&E during consultation and are not listed in Table 5. During implementation of the RGP, PG&E’s pre-construction notifications for individual O&M activities will identify specific locations and specify whether or not listed anadromous fish or designated critical habitat may be present at work sites.

**Table 4. Summary of Natural Gas System O&M Activities in Streams with Listed Anadromous Fish**

<b>Activity</b>	<b>Description</b>	<b>Equipment</b>	<b>Duration</b>	<b>Expected Frequency</b>	<b>Footprint in Habitat</b>
Site-Specific Erosion Measures	Protection of gas lines at sites of scour and erosion through placement of biodegradable jute, riprap, and rock	Trucks, backhoe, and excavator	1 to 14 days	2 per year	Up to 500 square feet of permanent impact per project
Pipeline Recoating	Gas lines are recoated with epoxy.	Backhoe, sandblaster, plastic sheeting and tarps, and shot-blasting machine	3 to 5 days	2 per year	No new permanent impacts
Valve Recoating and Replacement	Gas valves are recoated with epoxy or replaced.	Trucks, backhoe, excavator, sandblasting, coating machine, and crane	4 to 6 days for recoating; 28 to 35 days for replacement	1 per year	Up to 200 square feet of permanent impact per project
Pipeline Replacement	Excavation of trench and pipe segments are replaced.	Truck, bulldozer, excavator, frac tank, sideboom, and welding rig	28 to 168 days	2 per year	Up to 2,500 square feet of permanent impact per project

**Table 5. Gas Crossing Streams with Listed Anadromous Fish and Critical Habitat<sup>3</sup>**

<b>Gas Crossing Number<sup>4</sup></b>	<b>Stream Name</b>	<b>Likely to Support Year-Round Flow<sup>5</sup></b>
14	Norton Slough	
15	West Slough	
16, 17	Russian River	YES
24	Tributary to Windsor Creek	
25, 27	Windsor Creek	
26	Mill Creek	
28	Cañon Creek	
29	Napa River	YES
79	Napa River	
30	Putah Creek	
33, 34, 35	South Fork Putah Creek	
38	Tributary to Santa Rosa Creek	
43, 44, 52, 53, 54	Santa Rosa Creek	
45, 46, 48	Tributary to Santa Rosa Creek	
73, 75, 78	Laguna de Santa Rosa	
99	Lindsey Slough	
112	Schell Creek	
113	Huichica Creek	
114	Unnamed Stream	
115	Unnamed Stream	
116, 117, 118, 119	Suscol Creek	
131	Adobe Creek	
132	Green Valley Creek	
135	Cordelia Slough	YES

<sup>3</sup> Additional gas line crossing locations with listed anadromous salmonids and/or designated critical habitat in the Bay Area O&M Program action area (see Figure 1) may be identified during implementation of the RGP.

<sup>4</sup> Reference number from March 2023 Supplemental Biological Assessment. Each reference number refers to a separate gas line crossing.

<sup>5</sup> NOAA-AMM-13 limits gas line O&M activities in streams with listed anadromous fish and/or designated critical habitat to periods when channels are naturally dry; O&M activities will not be performed in stream channels at these locations if streamflow is present.



<b>Gas Crossing Number<sup>4</sup></b>	<b>Stream Name</b>	<b>Likely to Support Year-Round Flow<sup>5</sup></b>
146	Schultz Slough	
149, 150	San Antonio Creek	
183	Sacramento River	YES
185, 186	Grizzly Island Tidal Slough	YES
197	Montezuma Slough	YES
203, 206	Novato Creek	
218, 223	Miller Creek	
226, 227	Taylor Slough - Jersey Island	YES
228	Gallinas Creek	
229, 230	Dutch Slough - Jersey Island	YES
238	Pinole Creek	
239	Pacheco Creek	YES
240	Arroyo del Hambre	
247	Alhambra Creek	
251	Rock Slough	YES
256, 257	Old River	YES
258, 259	Wildcat Creek	
261, 262	Alhambra Creek	
265, 266	Corte Madera Creek	
269, 270	Werner Dredger Cut	YES
338	Arroyo Las Positas	
350	Arroyo Valle	
352	Colma Creek	
360, 363, 364	Vallecitos Creek	
365	Alameda Creek	YES
371, 372, 376, 377	San Mateo Creek	YES
384, 385, 386	Tidal Slough Tributary to Lower Coyote Creek	YES
394, 395, 396,	Apanolio Creek	
387, 397, 399	Pilarcitos Creek	
402, 403	San Francisquito Creek	
404, 405, 415, 416	Coyote Creek	YES

<b>Gas Crossing Number<sup>4</sup></b>	<b>Stream Name</b>	<b>Likely to Support Year-Round Flow<sup>5</sup></b>
427, 428, 432, 437, 438, 443, 451	Coyote Creek	
413	Mountain View Slough	YES
414	Stevens Creek	YES
417, 419, 424	Guadalupe River	YES
445	Guadalupe River	
422, 423	Los Trancos Creek	
426	Upper Penitencia Creek	
441	Los Gatos Creek	

### 1.3.3.1 Site-Specific Erosion Measures at Gas Lines

In locations where scour and erosion within a waterway has exposed a gas pipeline, PG&E proposes to construct site-specific solutions to the erosion problem. Site-specific solutions would consist of placement of biodegradable jute netting, riprap, and rock fill over the exposed portions of the pipeline. These erosion solutions are designed to protect the exposed pipeline and prevent further erosion from occurring. The extent of the erosion solution will typically not be longer than 100 feet or wider than 50 feet on any stream in the program area. Installation will typically begin with preparing the site for installation of the erosion solution. This may involve clearing vegetation and minor recontouring in the area of existing erosion. Once prepared, the erosion solution will be delivered to the site on a truck and placed in the prepared area. The erosion solution will then be installed according to the manufacturer’s specifications. Erosion solutions may require geotechnical investigations to design and install.

For scour and erosion solution activities in waterways with listed anadromous fish and/or designated critical habitat (see Table 5), PG&E proposes measures to ensure activities do not degrade fish habitat, impair natural channel functions, or impede fish passage. Specifically, no hardscape will be installed within the streambed or banks at any project sites with listed anadromous fish and/or designated critical habitat. In streams with listed anadromous fish, PG&E will use non-hardscape solutions such as biodegradable jute netting, straw, hydroseeding, waddles, and native plants. In addition, site-specific erosion protection structures will not span more than 20 percent of the active channel width and will not exceed 500 square feet per site. Site-specific erosion measures will be designed to not constrict flow in the channel and not increase water velocities in the channel. Installation of scour and erosion protection will only be conducted when work sites are naturally dry; no dewatering or cofferdams will be utilized for this activity. If work activities impact riparian vegetation, sites will be revegetated with native plant species in a manner consistent with maintaining safety at PG&E’s infrastructure. A crew of two to eight personnel is usually required over a period of up to 14 days. PG&E expects to conduct two erosion protection projects per year in waterways with listed anadromous fish and/or designated critical habitat.

### **1.3.3.2 Pipeline Recoating**

When a natural gas line's coating has deteriorated, PG&E proposes to recoat pipelines with epoxy to protect them from degradation and external corrosion. Once recoating is determined to be required, the pipeline segment is excavated using a backhoe. The surface of the pipe is then prepared for the new coating by running a self-contained grit- or shot-blasting machine over the exposed area. The pipeline continues to operate while a coating machine applies the coating. Upon completion of the recoating, sediment excavated to expose the pipe will be replaced to cover the pipeline and the surface contoured to return the site to pre-construction conditions.

Recoating of pipelines may be conducted at stream crossings. As with site-specific erosion activities, pipeline recoating at stream crossings with listed anadromous fish/critical habitat (see Table 5) will only be performed when the site is naturally dry. No stream dewatering or cofferdams will be used to dewater work sites for recoating of pipelines. When recoating is completed, the trench will be backfilled with the previously excavated materials and the streambed/banks re-countered to pre-construction conditions. On average, an approximately 20-foot-wide work area is needed for this activity. No new permanent impacts are anticipated with this activity, as all work will be performed within the existing pipeline alignment. If work activities impact riparian vegetation, sites will be revegetated with native plant species in a manner consistent with maintaining safety at PG&E's infrastructure. A crew of approximately four to six personnel conducts this activity. Pipeline recoating typically takes 3 to 5 days to complete at stream crossings. PG&E expects to conduct two pipeline recoating projects per year in waterways with listed anadromous fish and/or designated critical habitat.

### **1.3.3.3 Valve Recoating and Replacement**

Proposed O&M Program activities include the recoating and replacement of valves on gas pipelines. Depending on the condition of the valve, PG&E either recoats or replaces the valves. Prior to replacing or installing valves, PG&E will isolate portions of the pipeline where work will be performed and excavation may be required to expose the valve. Once the valve has been exposed through excavation, recoating is conducted by sandblasting the valve over tarps, collecting the debris, and recoating the valve with a specialized epoxy that protects against corrosion. The recoating process generally takes 4 to 6 days to complete, and would be conducted by a crew of six to 13 personnel.

Valve replacement involves excavation of soils to access the existing valve and adjacent segment of pipeline, removal of the existing valve (and potentially a segment of the adjacent pipeline), installation of the new valve, and backfill of the excavated area. Valve recoating or replacement typically involves excavating an area 40 feet by 60 feet to access the valves. Each valve replacement typically takes 28 to 35 days to complete, and would be performed with the same equipment as recoating.

PG&E identified only two valves in the O&M Program area that are located within 100 feet of waterways supporting listed anadromous fish and/or critical habitat. If work is required at either of these valves, only one would be worked on per year. Valve recoating or replacement activities would not be performed in wetted areas of waterways with anadromous fish. Excavation of materials to expose valves located near waterways with listed anadromous fish would be

performed without disturbing the stream channel. If work activities impact riparian vegetation, sites will be revegetated with native plant species in a manner consistent with maintaining safety at PG&E's infrastructure.

#### **1.3.3.4 Gas Pressure Limiting Station Construction**

PG&E may install new pressure limiting stations on natural gas lines. Human population densities determine the class location of pipeline designations. A change in the class location designation may trigger the installation of a pressure limiting station. Pressure limiting stations lower the pressure of the gas in a line. A typical station encompasses a footprint of approximately 250 feet by 100 feet, including above ground pipe and valve structures, and a small control building surrounded by security fencing. Pressure limiting stations will not be located in tidal waters or freshwater streams.

#### **1.3.3.5 Pipeline Replacement**

Proposed O&M Program activities include the replacement of sections of natural gas lines. Some replacements may also include lowering the pipeline. The equipment typically required for pipeline segment replacement includes a truck, bulldozer, excavator, frac tank, forklift, lowboy and trailer, sideboom, water truck, and a welding rig. Pipeline segment replacement begins with clearing and grading the right-of-way, and trenching and excavating the existing pipeline. A new trench is excavated for the new pipeline segment parallel and adjacent to the existing pipeline. PG&E typically places the new section of pipe as close to the abandoned pipeline as possible and modifies any existing easements by expanding the easement width to accommodate the new section of pipeline.

The length of affected pipe varies, depending on the reason for replacement. The minimum length of pipe replaced is typically 40 feet. For longer pipeline segment replacements, a welded and coated pipe is lifted and lowered into the trench by sideboom tractors and excavators. Padded slings are used so the tractors can lower the pipe without damaging the pipe's protective coating. For shorter pipeline replacements, especially sections damaged by third parties or corrosion, replacements are typically within the same alignment. Old pipeline segments may be removed or abandoned in place.

Following the placement of the new pipeline segment and removal of any existing segments, all trenches are then backfilled. Backfilling the trench involves replacing and compacting the excavated subsoil into the trench and re-spreading the stockpiled topsoil, if appropriate, to return the surface to its original grade. Native material excavated from the pipeline trench is used to backfill the trench.

In most cases, pipeline replacements are not located in waters. However, there may be some segments within waters, including waters containing listed anadromous fish and their critical habitat. As described above for erosion measures and pipeline recoating, PG&E proposes to only perform pipeline replacements at stream crossings with listed anadromous fish/critical habitat (see Table 5) when the site is naturally dry. No stream dewatering or cofferdams will be used to dewater work sites for pipeline replacements. When the new pipe segment is installed, the trench will be backfilled with the previously excavated native materials and the streambed/banks re-

countered to pre-construction conditions. If work activities impact riparian vegetation, sites will be revegetated with native plant species in a manner consistent with maintaining safety at PG&E's infrastructure.

The O&M Program also proposes to ensure gas line crossing activities do not create any fish passage impediments for anadromous species. NOAABA-AMM-15 requires PG&E to evaluate all pipeline replacement and abandonment activities at sites with listed anadromous fish and/or critical habitat and confirm that the project design conforms with the most current NMFS guidelines for fish passage at stream crossings.

On average, trenching for pipeline replacement typically requires a 10-foot wide excavation area. A crew of approximately 15 to 20 personnel is required to conduct this activity. Approximately 14 to 28 days are required to complete small pipeline replacements. Although most pipeline replacement actions will occur within the existing pipeline footprint, there may be sites where minor adjustments to the alignment are required.

#### **1.3.4. Road Maintenance for Facility Access**

Access to PG&E's electrical infrastructure and gas line facilities requires routine maintenance of roads. Routine road maintenance activities for the O&M Program will include blading to smooth over washouts, eroded areas, and washboard surfaces as needed. Access road maintenance could also include cleaning ditches, moving and establishing berms, clearing and making functional drain inlets, clearing and establishing water bars, and cleaning and repairing over-side drains. Road maintenance activities will primarily be conducted in upland areas and outside of waterways with listed anadromous fish. However, the O&M Program may also repair/replace culverts on streams to ensure safe access to and from PG&E electrical infrastructure and natural gas line facilities. The location of these stream crossing activities could occur throughout the nine-county O&M Program area, including sites on streams with listed anadromous fish and/or critical habitat (See Table 5).

At some O&M project sites a temporary bridge may be installed on an existing roadway to cross a channel. Portable, prefabricated bridges will be used and remain in place for the duration of the O&M project, which can range from a few days to 24 weeks. Temporary bridges will be installed over a stream crossing as a clear-span structure (NOAABA-AMM-15). No bridge structural elements will extend into the channel and a crane would be used to place the bridge without disturbing the channel or waters of the stream. No new roads will be constructed in association with temporary bridges or culvert repairs/replacements.

Construction activities associated with culvert repair/replacement would not occur in flowing waters on streams with listed anadromous salmonids/critical habitat. PG&E proposes to only conduct culvert work at stream crossings when the work sites are naturally dry (NOAABA-AMM-13). No stream dewatering or cofferdams will be used to dewater work sites for road maintenance activities in streams with anadromous fish and/or critical habitat. In addition, PG&E will ensure that all culvert activities at sites with listed anadromous fish and/or critical habitat will be designed to meet the most current NMFS guidelines for fish passage at stream crossings (NOAABA-AMM-15). If work activities impact riparian vegetation, sites will be revegetated with native plant species in a manner consistent with maintaining safety at PG&E's

infrastructure (NOAABA-AMM-16). No more than two culvert repair/replacement or bridge crossing projects will occur per year on streams with listed anadromous fish and/or critical habitat. Each culvert replacement project may permanently affect up to 5,000 square feet of area.

### **1.3.5. Avoidance and Minimization Measures**

PG&E's proposed avoidance and minimization measures for the O&M Program are presented in the September 2022 Biological Assessment, Section 2.1 and Attachment A. Additional and revised avoidance and minimization measures are presented in the March 2023 Supplemental Biological Assessment, Section 4.

Measures presented below are a sub-set of the proposed measures and designed to address water quality, listed fish species, elevated underwater sound levels, and fish habitat. All proposed avoidance and minimization measures are presented in the September 2022 Biological Assessment and the March 2023 Supplemental Biological Assessment.

**BA-AMM-03: Annual Reporting.** PG&E will prepare and submit an annual report to the U.S. Fish and Wildlife Service (USFWS) and NOAA Fisheries by March 31 for O&M activities conducted during the previous calendar year. The annual report will include a brief description of each project (e.g., project type and location), as well as any listed species observed and designated critical habitat or sensitive habitat in which worked was conducted. In addition, specific detail regarding the status of the project construction (i.e., not constructed, under construction, or completed); date of project implementation and duration of construction; a listing of pile size, type, and installation methods; estimated length of boardwalks repaired or replaced, and materials used; mitigation information; and any underwater noise monitoring will be included in the annual report.

**WQ-AMM-01: Discharge from Construction.** Discharge of the following to surface waters, ground waters, or land will be prohibited:

- unset cement, concrete, grout or damaged concrete spoils;
- water that has contact uncured concrete or cement; or
- concrete related washout.

If concrete washout is necessary at a site, washout containment will be used to prevent any discharge. Wastewater will be delivered to and disposed of at a sanitary wastewater collection system/facility (with authorization from the facility's owner or operator) or a properly licensed disposal or reuse facility.

**WQ-AMM-02: Refueling Procedure.** Vehicular and equipment refueling within 250 feet from the edge of vernal pools, and 100 feet from the edge of other wetlands, streams, or waterways is prohibited. If refueling must be conducted closer to wetlands, a secondary containment area subject to review by an environmental field specialist and/or biologist will be constructed. Spill prevention and cleanup equipment will be maintained in refueling areas.

**BA Attachment A: Activity Specific Erosion and Sediment Control Plan.** PG&E will develop and implement an Activity-Specific Erosion and Sediment Control Plan (A-ESCP) for

all construction projects, and good-housekeeping best management practices (BMPs) are implemented throughout the year. PG&E's Good Housekeeping A-ESCP with standard BMPs is presented as Attachment A to the BA.

**WQ-AMM-03: In-Water Activities.** The duration of in-water activity will be limited to the minimum amount of time necessary to conduct O&M activities

**WQ-AMM-04: Staging and Storage Area.** Staging and storage areas for equipment, materials, fuels, lubricants, and solvents will be located away from wetlands and waters, as feasible, in areas where spoil or accidental spills cannot be washed into the water feature.

**NOAABA-AMM-01: Boat Access and Docking.** Every effort will be made to minimize disturbance to subtidal and wetland vegetation. During boat access, boats will be docked to existing facilities or landed in areas that minimize the potential impact to subtidal and wetland vegetation. Barges will be placed on mudflats in such a manner that subtidal and wetland vegetation is not disturbed. Work crews will be trained to avoid vegetated areas, and foot traffic will be confined to existing facilities, mudflats, and established work areas to minimize disturbance to vegetation.

**NOAABA-AMM-02: Dewatering in Tidal Waters.** All water pumps used during initial dewatering and fish relocation will follow the intake screen criteria identified in NOAA Fisheries' *Juvenile Fish Screen Criteria for Pump Intakes (1996)* See [https://media.fisheries.noaa.gov/dam-migration/fish\\_screen\\_criteria\\_for\\_pumped\\_water\\_intakes.pdf](https://media.fisheries.noaa.gov/dam-migration/fish_screen_criteria_for_pumped_water_intakes.pdf). Water remaining in the cofferdam will be pumped directly onto the adjacent land at low tide when feasible, and a qualified biological monitor will be present. If pumping water onto adjacent land is not feasible, water will be pumped into open water or mudflats directly adjacent to the cofferdam. Fish encountered during dewatering will be carefully relocated by a NOAA Fisheries and U.S. Fish and Wildlife Service-approved fisheries biologist to suitable habitat adjacent to work areas, per NOAABA-AMM-03. Dewatering activities will not be conducted within streams that support federally listed fish.

**NOAABA-AMM-03: Fish Salvage and Relocation in Isolated Tideland Pools and Cofferdam Dewatering in Tidal Waters.** An experienced fisheries biologist will be present to observe cofferdam dewatering activities whenever pumps are operating and monitor work in tidal waters that may hold salmonids in isolated pools. The agency-approved biologist will ensure that fish species do not become trapped against the cofferdam filter and any fish that were not swept out of the work area will be rescued. Efforts will be made to reduce collecting and handling stress, minimize the time that fish are held in buckets, and minimize handling stress during processing and release. Fish collection efforts will be conducted using sweep and block nets and will occur within the cofferdam area until multiple passes have been conducted and substantial depletion or absence of fish has been documented. Rescued fish will be released 100 feet away from the cofferdam, or at another location approved by NOAA Fisheries as soon as possible. Additional fish salvage and relocation procedures include the following:

- No employee or contractor will remove any fish, dead or alive, from the site for personal use. All efforts to reduce the time that live fish are out of the water will be made to

reduce the chances of fish injury or death during the fish rescue. All fish will be promptly returned to the water.

- Listed fish species will be processed first and released as soon as possible. All fish species will be recorded on data sheets, as well as the time and date that each individual was caught; location where the individual was caught; gear type used; water temperature; total number of individuals caught; and any other pertinent observations of the fish.
- After the fish rescue effort is completed, dewatering of the area will continue. The agency-approved biologist and/or fish rescue biologist will provide a worker education program in the event that additional fish may remain within the dewatering area. The biologist will return to the site to rescue additional fish if the workers observe them within the dewatering area.
- If any turtles or snakes are captured during fish rescue, they will be relocated to the fish release site(s).

Following dewatering and relocation of fish, further monitoring by an experienced fisheries biologist will no longer be required for the dewatered area, unless the integrity of the cofferdam seal is compromised and the work area becomes re-watered.

**NOAABA-AMM-04: Seasonal Avoidance in Estuary/Bay Waters for Low-Impact Activities.** In-water O&M activities that do not include impact hammer use and do not include cofferdam construction are considered “low-impact activities”. Low-impact activities within the San Francisco, San Pablo, Suisun, and Grizzly bays will occur during the limited operating period (LOP) (i.e., between June 1 and November 30) to the maximum extent possible in order to avoid Chinook salmon and steelhead migration.

If necessary, in-water O&M activities that do not involve impact pile driving or cofferdam installation will be allowed to occur between June 1 and January 15, provided the activities are initiated prior to November 30. No new O&M activities will be initiated outside of the LOP, and PG&E will finish the activity as soon as logistically possible based on site-specific construction conditions. PG&E will provide compensatory mitigation at an increased ratio for permanent impacts from O&M activities conducted after November 30. (see Section 6 -Compensatory Mitigation in the Project’s September 2022 Biological Assessment).

Pole reinforcement and repair above mean high water, as well as tower and/or boardwalk repair and replacement above mean high water, are not subject to this LOP, as PG&E expects potential effects to federally listed fish species will be minimal or will not occur.

**NOAABA-AMM-05: Seasonal Avoidance in Estuary/Bay Waters for High-Impact Activities.** In-water O&M activities that include impact hammer use and/or cofferdam construction are considered “high-impact activities”. High-impact activities within the San Francisco, San Pablo, Suisun, and Grizzly bays will be planned and scheduled to occur between June 1 and November 30. No impact pile driving will be initiated if it cannot reasonably be completed by November 30. If unforeseen circumstances prevent the completion of pile driving



by November 30, PG&E will request an extension from the Corps on a case-by-case basis to complete the pile driving that has already been initiated.

Pole reinforcement and repair above mean high water, as well as boardwalk repair and replacement, are not subject to this LOP, as PG&E expects potential effects to federally listed fish species will be minimal or will not occur.

**NOAABA-AMM-06: Soft Start.** Prolonged, soft-start procedures will be implemented when impact pile driving is required for piles greater than 20 inches in diameter in waters that provide habitat for federally listed anadromous fish species. Soft-starts will include pile driving at 40- to 60-percent reduced energy for at least 15 seconds, followed by a 1-minute waiting period. This procedure will be repeated at least two times before commencing full-energy impact pile driving.

**NOAABA-AMM-07: Eelgrass Bed Avoidance.** PG&E will avoid all eelgrass (*Zostera spp.*) beds. If any O&M activities must occur within eelgrass beds, PG&E will comply with NOAA Fisheries' California Eelgrass Mitigation Policy and Implementing Guidelines (NOAA Fisheries 2014a), including pre- and post-construction surveys to assess impacts to eelgrass.

**NOAABA-AMM-08: Installation of Piles.** PG&E will prioritize using a vibratory hammer to install piles, but when an impact hammer is necessary, only one hammer will be used at a time with no more than 2,000 strikes per day on piles within an individual work area. PG&E will also utilize sound attenuation devices during pile-driving (e.g., hammer cushions, bubble curtains, dewatered cofferdams, dewatered isolation casings, etc.). Air bubble curtains would be utilized for impact driving of piles larger than 12 inches in diameter unless the work site is dewatered by a cofferdam. In instances when impact driving is limited to periods of low tide and water depths are less than 4 inches for the entire duration of the pile driving, air bubble curtains are not required. In addition, pile-driving activities that require multiple days at the same location will occur at least 12 hours apart to avoid impacts to federally listed fish species.

**NOAABA-AMM-09: Installation of Cofferdams.** PG&E will prioritize using a vibratory hammer to install sheet pile cofferdams, but when an impact hammer is necessary, only one hammer will be used at a time with no more than 2,000 strikes per day on piles within an individual work area. PG&E will also utilize sound attenuation devices during pile-driving (e.g., hammer cushions, bubble curtains, dewatered cofferdams, dewatered isolation casings, etc.). In addition, pile-driving activities that require multiple days at the same location will occur at least 12 hours apart to avoid impacts to federally listed fish species. Cofferdams will be installed and closed during low tide.

**NOAABA-AMM-10: Hydroacoustic Monitoring.** PG&E will conduct hydroacoustic monitoring during the installation of all 72-inch piles when cofferdams are not utilized. PG&E will also conduct hydroacoustic monitoring during the installation of the first 60-inch pile at each discrete tower location when cofferdams are not used. If the sound pressure levels (SPLs) do not exceed 206 decibels (dB) peak and/or the daily accumulated sound exposure level (cSEL) does not exceed 187 dB during the monitoring (see Table 7 in the Project's September 2022 Biological Assessment) of the installation of the first 60-inch pile, PG&E may stop monitoring activities at that tower location. If SPLs or cSEL dB levels exceed limits established in Table 7 of the Project's September 2022 Biological Assessment for 60-inch piles, PG&E will take

additional measures to reduce the sound impacts below established sound impact limits. Monitoring will continue at these locations and will only stop when noise is recorded on a continuing basis (one full day or approximately 2,000 strikes) below the thresholds established in Table 7 of the September 2022 Biological Assessment. PG&E will continue to implement these measures for all remaining 60-inch piles at the locations where they were implemented. Hydroacoustic monitoring will only occur when water depth is 3 feet or greater at mean lower low water to allow for adequate depth for hydrophone placement. PG&E will report the results of the monitoring in their annual report using the NMFS Underwater Noise Monitoring Plan Template.

**NOAABA-AMM-11: Removal of Piles.** Pile removal will occur using either a vibratory hammer or direct pull method of extraction. A vibratory hammer/extraction must be attempted first unless it presents a greater risk of disturbance to sediments (*i.e.*, contaminants are present). The direct pull method will be utilized if it is more appropriate for the substrate type, pile length, and structural integrity of the piling.

**NOAABA-AMM-12: Removal of Cofferdams.** Cofferdam removal will occur using either a vibratory hammer or direct pull method of extraction. A vibratory hammer/extraction must be attempted first unless it presents a greater risk of disturbance to sediments. The direct pull method will be utilized if it is more appropriate for the substrate type, pile length, and structural integrity of the piling.

**NOAABA-AMM-13: In-Stream Work During Dry Conditions Only.** Activities performed in streams known to support or with the potential to support listed fisheries (having suitable habitat and connectivity to known fisheries streams) and streams designated as critical habitat will be conducted during naturally dry conditions. In addition, trenching and pipeline excavation activities will not be conducted within flowing streams that provide federally listed fish habitat.

**NOAABA-AMM-14: Hardscape Limitation.** No hardscape (*i.e.*, rock, concrete, or other hard structural material) will be installed within the bed or banks of any stream that is known to support listed fish or that has suitable habitat, including designated critical habitat, for listed fish as well as connectivity to known listed fisheries streams. Site-specific erosion protection structures will not span more than 20 percent of the active channel width and will not exceed 500 square feet per site. In no cases will site-specific erosion protection structures compromise or impede fish passage. Site-specific erosion measures will not constrict flow in the channel and not increase water velocities in the channel.

**NOAABA-AMM-15: Culvert Repair and/or Replacement, Temporary Bridges, and Pipeline Replacement and/or Abandonment to Accommodate Fish Passage.** Existing culverts that are repaired or replaced in streams supporting listed fish or that have suitable habitat to support listed fish and connectivity to known listed fisheries streams, and streams designated as critical habitat must meet standards for fish passage as identified in the current version of NOAA Fisheries' Guidelines for Salmonid Passage at Stream Crossings (See <https://www.fisheries.noaa.gov/west-coast/habitat-conservation/west-coast-fish-passage-guidelines>). PG&E will also ensure that prefabricated bridges are designed in a manner that avoids impacts to streams that support listed fish. If deemed necessary, PG&E will conduct a channel morphology assessment to ensure these standards can be met prior to execution of the

O&M activity. In addition, the use of rock will be minimized, and no more than 2 culvert repairs or replacement will occur in fish habitat per year.

In the event that a pipeline requires replacement or abandonment in place, the pipeline depth and specifications will be designed to meet the standards for fish passage identified in NOAA Fisheries’ Guidelines for Salmonid Passage at Stream Crossings. In addition, culvert repair and replacement, pipeline replacement, and pipeline abandonment activities will not be conducted within flowing streams that provide federally listed fish habitat and designated critical habitat. Work will only be conducted when project site conditions are naturally dry.

**1.3.6. Mitigation**

PG&E intends to provide compensatory mitigation for future impacts from O&M activities in advance by using an estimate of the projected impact (Table 6) and the following proposed mitigation ratios:

- For activities that are conducted within the LOP and result in permanent impacts, PG&E proposes to mitigate for those impacts at a 3-to-1 ratio.
- For activities that are conducted outside of the LOP, PG&E proposes to mitigate for permanent impacts at a ratio of 4-to-1.

Based on the estimated area of new or expanded tower footings placed in San Francisco Bay, PG&E has calculated compensatory mitigation for impacts to estuarine waters (Table 6). The 4-to-1 ratio was used to calculate the highest projected impact totals to provide a conservative estimate for the purpose of calculating initial compensatory mitigation requirements.

**Table 6. Projected Permanent Impacts and Compensatory Mitigation in Tidal Waters**

Listed Anadromous Fish Species	Approx. Permanent Impact (acres annually)	Projected Compensatory Mitigation with 4-to-1 Ratio (acres)	
		Annually	5 Years
Central Valley Spring-Run Chinook Salmon	<0.01	0.04	0.2
Sacramento River Winter-Run Chinook Salmon	<0.01	0.04	0.2
Central California Coast Steelhead	0.03	0.12	0.6
California Central Valley Steelhead	<0.01	0.04	0.2
Southern DPS of Green Sturgeon	0.02	0.08	0.4
<b>Total</b>	<b>0.08</b>	<b>0.32</b>	<b>1.6</b>

Based on the projected impacts and mitigation proposed, PG&E proposes to contribute \$600,000 in initial funding to one or more fish passage and/or fish habitat improvement projects within the San Francisco Bay, and/or freshwater salmonid migratory corridors within the greater San Francisco Bay Area. Should PG&E exceed its initial projected impact, it will contribute additional funding to habitat improvement projects at \$10 per square foot of additional compensatory mitigation required, and no less than 0.1 acre.

If the Corps renews the RGP for an additional 5-year period and PG&E has not fully allocated the projected compensatory mitigation credit<sup>6</sup>, the remaining credit will apply to the renewed RGP as an advanced credit. If additional compensatory mitigation associated with a 5-year renewal is needed, PG&E will provide additional funding at \$10.00 per square foot.

During the course of the program, PG&E will report actual annual impacts to fish and fish habitat over the life of the RGP. PG&E will provide annual updates to NOAA Fisheries showing actual impact acreages converted to compensatory mitigation required using appropriate ratios as outlined above, including a ledger showing debiting and allocation of credit achieved against projected mitigation.

NMFS considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would not.

## **2. ENDANGERED SPECIES ACT: BIOLOGICAL OPINION AND INCIDENTAL TAKE STATEMENT**

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat upon which they depend. As required by section 7(a)(2) of the ESA, each Federal agency must ensure that its actions are not likely to jeopardize the continued existence of endangered or threatened species or to adversely modify or destroy their designated critical habitat. Per the requirements of the ESA, Federal action agencies consult with NMFS, and section 7(b)(3) requires that, at the conclusion of consultation, NMFS provide an opinion stating how the agency's actions would affect listed species and their critical habitats. If incidental take is reasonably certain to occur, section 7(b)(4) requires NMFS to provide an ITS that specifies the impact of any incidental taking and includes reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

The Corps determined the proposed action is not likely to adversely affect threatened South-Central California Coast steelhead (*O. mykiss*), threatened California Coastal Chinook salmon (*O. tshawytscha*), endangered Central California Coast coho salmon (*O. kisutch*), and their designated critical habitat. Our concurrence is documented in the "Not Likely to Adversely Affect" Determinations section (Section 2.12 below).

### **2.1. Analytical Approach**

This biological opinion includes both a jeopardy analysis and an adverse modification analysis. The jeopardy analysis relies upon the regulatory definition of "jeopardize the continued existence of" a listed species, which is "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). Therefore, the jeopardy analysis considers both survival and recovery of the species.

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<sup>6</sup> PG&E has likely overestimated the amount of mitigation to ensure funding is available to accomplish it. If their actual impacts are less than estimated, PG&E will apply the remaining funds to their impacts in the following five years.

This biological opinion also relies on the regulatory definition of “destruction or adverse modification,” which “means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species” (50 CFR 402.02).

The designations of critical habitat for ESA listed steelhead, Chinook salmon, and green sturgeon use the term primary constituent element (PCE) or essential features. The 2016 final rule (81 FR 7414; February 11, 2016) that revised the critical habitat regulations (50 CFR 424.12) replaced this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a “destruction or adverse modification” analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this biological opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

We use the following approach to determine whether a proposed action is likely to jeopardize listed species or destroy or adversely modify critical habitat:

- Evaluate the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Evaluate the environmental baseline of the species and critical habitat.
- Evaluate the effects of the proposed action on species and their critical habitat using an exposure–response approach.
- Evaluate cumulative effects.
- In the integration and synthesis, add the effects of the action and cumulative effects to the environmental baseline, and, in light of the status of the species and critical habitat, analyze whether the proposed action is likely to: (1) directly or indirectly 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; or (2) directly or indirectly result in an alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.
- If necessary, suggest a reasonable and prudent alternative to the proposed action.

To conduct this assessment, NMFS examined an extensive amount of information from a variety of sources. Detailed background information on the biology and status of the listed species and critical habitat has been published in a number of documents including peer reviewed scientific journals, primary reference materials, and governmental and non-governmental reports. Additional information regarding the effects of the Program’s actions on the listed species, their anticipated response to these actions, and the environmental consequences of the actions as a whole was formulated from the aforementioned resources, and the following biological assessments:

PG&E. 2022. National Oceanic and Atmospheric Administration – National Marine Fisheries Service Biological Assessment for the Regional General Permit for Pacific Gas and Electric Company’s Bay Area Operation and Maintenance Program. September 2022.

Information taken directly from published, citable documents are referenced in the text and listed at the end of this document. A complete record of this consultation is on file at NMFS North-Central Coast Office in Santa Rosa, California (ARN #151422WCR2021SR00227).

## **2.2. Rangewide Status of the Species and Critical Habitat**

This opinion examines the status of each species that is likely to be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' "reproduction, numbers, or distribution" for the jeopardy analysis. The opinion also examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds and coastal and marine environments that make up the designated area, and discusses the function of the PBFs that are essential for the conservation of the species.

This biological opinion analyzes the effect of the proposed PG&E O&M Program activities in the San Francisco Bay on the following Federally-listed species (Distinct Population Segment [DPS] or Evolutionary Significant Unit [ESU]) and designated critical habitats:

### **Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) DPS**

Threatened (71 FR 834; January 5, 2006)

Critical habitat (70 FR 52488; September 2, 2005);

### **California Central Valley (CCV) steelhead (*O. mykiss*) DPS**

Threatened (71 FR 834; January 5, 2006)

Critical habitat (70 FR 52488; September 2, 2005);

### **Central Valley (CV) spring-run Chinook salmon (*O. tshawytscha*) ESU**

Threatened (70 FR 37160; June 28, 2005)

Critical habitat (70 FR 52488; September 2, 2005);

### **Sacramento River winter-run Chinook salmon (*O. tshawytscha*) ESU**

Endangered (70 FR 37160; June 28, 2005)

Critical habitat (58 FR 33212; June 16, 1993);

### **North American green sturgeon (*Acipenser medirostris*) Southern DPS**

Threatened (71 FR 17757; April 7, 2006)

Critical habitat (74 FR 52300; September 8, 2008).

#### **2.2.1. CCC Steelhead and CCV Steelhead**

Steelhead are anadromous forms of *Oncorhynchus mykiss*, spending some time in both freshwater and saltwater. Steelhead are iteroparous, or capable of spawning more than once

before death (Busby *et al.* 1996). Although one-time spawners are the great majority, Shapovalov and Taft (1954) reported that repeat spawners are relatively numerous (17.2 percent) in California streams. Steelhead young usually rear in freshwater for 1 to 3 years before migrating to the ocean as smolts, but rearing periods of up to 7 years have been reported. Migration to the ocean usually occurs in the spring. Steelhead may remain in the ocean for 1 to 5 years (2 to 3 years is most common) before returning to their natal streams to spawn (Busby *et al.* 1996).

Adult steelhead typically migrate from the ocean to freshwater between December and April, peaking in January and February (Fukushima and Lesh 1998). Adults returning to spawn may migrate several miles, hundreds of miles in some watersheds, to reach their natal streams. Although spawning typically occurs between January and May, the specific timing of spawning may vary a month or more among streams within a region, and within streams interannually. Spawning and smolt emigration may continue through June (Busby *et al.* 1996). Female steelhead dig a nest in the stream and then deposit their eggs. After fertilization by the male, the female covers the nest with a layer of gravel. Steelhead do not necessarily die after spawning and may return to the ocean, sometimes repeating their spawning migration one or more years. The embryos incubate within the nest. Hatching time varies from about three weeks to two months depending on water temperature. The young fish emerge from the nest about two to six weeks after hatching.

Steelhead fry rear in edgewater habitats and move gradually into pools and riffles as they grow larger. Cover is an important habitat component for juvenile steelhead, both as a velocity refuge and as a means of avoiding predation (Shirvell 1990, Meehan and Bjornn 1991). Steelhead, however, tend to use riffles and other habitats not strongly associated with cover during summer rearing more than other salmonids. Young steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles. Rearing steelhead juveniles prefer water temperatures of 7.2 to 14.4 degrees Celsius (°C) and have an upper lethal limit of 23.9°C (Barnhart 1986, Bjornn and Reiser 1991). However, they can survive in water up to 27°C with saturated dissolved oxygen conditions and a plentiful food supply. Fluctuating diurnal water temperatures also aid in survivability of salmonids (Busby *et al.* 1996). Juvenile steelhead emigrate episodically from natal streams during fall, winter, and spring high flows, to the ocean to continue rearing to maturity.

The distribution of steelhead in the ocean is not well known. Interannual variations in climate, abundance of key prey items (e.g. squid), and density dependent interactions with other salmonid species are key drivers of steelhead distribution and productivity in the marine environment (Atcheson *et al.* 2012; Atcheson *et al.* 2013). Available information indicates that steelhead originating from central California use a cool, stable, thermal habitat window (ranging between 8-14 degrees Celsius [°C]) in the marine environment characteristic of conditions in northern waters above the 40th parallel to the southern boundary of the Bering Sea (Hayes *et al.* 2012).

### **2.2.1.1 Status of CCC Steelhead**

CCC steelhead was listed as federally threatened in 1997 (62 FR 43937) and the listing was updated in 2006 (71 FR 834). This DPS includes all naturally spawned steelhead from the Russian River in Sonoma County to Aptos Creek in Santa Cruz County as well as the drainages

of San Francisco, Suisun, and San Pablo Bays eastward to Chipps Island at the confluence of the Sacramento and San Joaquin rivers. The DPS also includes two artificial propagation programs, the Don Clausen Fish Hatchery and the Kingfisher Flat Hatchery/Scott Creek (Monterey Bay Salmon and Trout Project) steelhead hatchery programs.

Historically, approximately 70 populations of steelhead existed in the CCC steelhead DPS (Spence *et al.* 2008, Spence *et al.* 2012). Many of these populations (about 37) were independent, or potentially independent, meaning they had a high likelihood of surviving for 100 years absent anthropogenic impacts (Bjorkstedt *et al.* 2005). The remaining populations were dependent upon immigration from nearby CCC steelhead DPS populations to ensure their viability (McElhaney *et al.* 2000, Bjorkstedt *et al.* 2005).

While historical and present data on abundance are limited, CCC steelhead numbers are substantially reduced from historical levels. A total of 94,000 adult steelhead were estimated to spawn in the rivers of this DPS in the mid-1960s, including 50,000 fish in the Russian River, which is considered the largest population within the DPS (Busby *et al.* 1996). Recent estimates for the Russian River are on the order of 7,000 adult fish returning to spawn (NMFS 2016a), however abundance estimates for smaller coastal streams in the DPS indicate low but stable levels with recent estimates for several streams (Lagunitas, Waddell, Scott, San Vicente, Pudding, and Caspar creeks) of individual run sizes of 500 fish or less (62 FR 43937). Some loss of genetic diversity has been documented and attributed to previous among-basin transfers of stock and local hatchery production in interior populations in the Russian River (Bjorkstedt *et al.* 2005). In San Francisco Bay streams, reduced population sizes and fragmented habitat condition has likely also depressed genetic diversity in these populations. Similar losses in genetic diversity in the Napa River may have resulted from out-of-basin and out-of-DPS releases of steelhead in the Napa basin in the 1970s and 1980s. These transfers included fish from the South Fork Eel River, San Lorenzo River, Mad River, Russian River, and the Sacramento River.

The scarcity of information on CCC steelhead abundance continues to make it difficult to assess whether conditions have changed appreciably since the previous status review assessment (Williams *et al.* 2016). The most recent status update concludes that steelhead in the CCC DPS remain "likely to become endangered in the foreseeable future", as new and additional information does not appear to suggest a change in extinction risk (NMFS 2016). NMFS concluded that the CCC steelhead DPS shall remain listed as threatened (81 FR 33468; May 26, 2016).

Recent monitoring efforts indicate steelhead still occur in all diversity strata of the DPS. However, hatchery-origin fish remain more prevalent than natural-origin fish in the Russian River, and an overall downward abundance trend was observed in one of the more robust populations, Scott Creek. Small-scale fish passage improvement and habitat restoration projects have improved habitat conditions locally; however, the DPS still faces threats throughout the region from both legacy habitat degradation and modification, as well as new urban growth, continued water diversions, and dams.

A final recovery plan for CCC steelhead was completed by NMFS in October 2016 (NMFS 2016b). The plan describes key threats, actions needed to achieve recovery, and measurable



criteria by which NMFS will determine when recovery has been reached. Recovery plan actions are primarily designed to restore ecological processes that support healthy steelhead populations, and address the various activities that harm these processes and threaten the species' survival. The recovery plan calls for a range of actions including the restoration of floodplains and channel structure, restoring riparian conditions, improving streamflows, restoring fish passage, protecting and restoring estuarine habitat, among other actions.

### **2.2.1.2 Status of CCV Steelhead**

CCV steelhead was listed as federally threatened in 1998 (63 FR 13347) and the listing was updated in 2006 (71 FR 834). This DPS includes all naturally spawned anadromous *O. mykiss* (steelhead) populations below natural and manmade impassable barriers in the Sacramento and San Joaquin rivers and their tributaries, excluding steelhead from San Francisco and San Pablo Bays and their tributaries. The DPS also includes two artificial propagation programs, the Coleman National Fish Hatchery and Feather River Hatchery steelhead hatchery programs.

CCV steelhead historically were well-distributed throughout the Sacramento and San Joaquin rivers (Busby *et al.* 1996). Although it appears CCV steelhead remain widely distributed in Sacramento River tributaries, the vast majority of historical spawning areas are currently above impassable dams. At present, all CCV steelhead are considered winter-run steelhead (McEwan and Jackson 1996), although there are indications that summer steelhead were present in the Sacramento River system prior to the commencement of large-scale dam construction in the 1940s (IEP 1999). McEwan and Jackson (1996) reported that wild steelhead stocks appear to be mostly confined to upper Sacramento River tributaries such as Antelope, Deer, and Mill creeks and the Yuba River. However, naturally spawning populations are also known to occur in Butte Creek, and the upper Sacramento mainstem, Feather, American, Mokelumne, and Stanislaus rivers (CALFED 2000). It is possible that other small populations of naturally spawning steelhead exist in Central Valley streams, but are undetected due to lack of sufficient monitoring and research programs; increases in fisheries monitoring efforts led to the discovery of steelhead populations in streams such as Auburn Ravine and Dry Creek (IEP 1999).

Small self-sustaining populations of CCV steelhead exist in the Stanislaus, Mokelumne, Calaveras, and other tributaries of the San Joaquin River (McEwan 2001). On the Stanislaus River, steelhead smolts have been captured in rotary screw traps at Caswell State Park and Oakdale each year since 1995 (Demko *et al.* 2000). Incidental catches and observations of steelhead juveniles also have occurred on the Tuolumne and Merced rivers during fall-run Chinook salmon monitoring activities, indicating that steelhead are widespread, if not abundant, throughout accessible streams and rivers in the Central Valley (Good *et al.* 2005).

Steelhead counts at the Red Bluff Diversion Dam (RBDD) declined from an average annual count of 11,187 adults for the ten-year period beginning in 1967, to an average annual count 2,202 adults in the 1990's (McEwan and Jackson 1996). Estimates of the adult steelhead population composition in the Sacramento River (natural origin versus hatchery origin) have also changed over this time period; through most of the 1950's, Hallock *et al.* (1961) estimated that 88 percent of returning adults were of natural origin, and this estimate declined to 10-30 percent in the 1990's (McEwan and Jackson 1996). Furthermore, the California Fish and Wildlife Plan estimated a total run size of about 40,000 adults for the entire Central Valley, including San

San Francisco Bay, in the early 1960s (CDFW 1965). In 1991-92, this run was probably less than 10,000 fish based on dam counts, hatchery returns and past spawning surveys (McEwan and Jackson 1996).

The 2016 status review (Williams *et al.* 2016) summarized that little had changed in the status of CCV steelhead since 2011 (Williams *et al.* 2011). While there are some increased returns to hatcheries in the Central Valley, the returns of wild fish and data on the wild population are still lacking. Most natural-origin CCV populations are very small, are not monitored, and may lack the resiliency to persist for protracted periods if subjected to additional stressors, particularly widespread stressors such as climate change. The genetic diversity of CCV steelhead has likely been impacted by low population sizes and high numbers of hatchery fish relative to natural-origin fish. The life-history diversity of the DPS is mostly unknown, as very few studies have been published on traits such as age structure, size at age, or growth rates in CCV steelhead.

In July 2014, NMFS released a final Recovery Plan for CCV steelhead (NMFS 2014). The Recovery Plan outlines actions to restore habitat, access, and improve water quality and quantity conditions in the Sacramento River to promote the recovery of listed salmonids. Key actions for the Recovery Plan include conducting landscape-scale restoration throughout the Delta, incorporating ecosystem restoration into Central Valley flood control plans that includes breaching and setting back levees, and restoring flows throughout the Sacramento and San Joaquin River basins and the Delta.

### **2.2.2. CV Spring-run and Sacramento River Winter-run Chinook Salmon**

Chinook salmon return to freshwater to spawn when they are 3 to 8 years old (Healey 1991). Runs are designated on the basis of adult migration timing; however, distinct runs also differ in the degree of maturation at the time of river entry, thermal regime and flow characteristics of their spawning site, and actual time of spawning (Myers *et al.* 1998). Both winter-run and spring-run Chinook salmon tend to enter freshwater as immature fish, migrate far upriver, and delay spawning for weeks or months. For comparison, fall-run Chinook salmon enter freshwater at an advanced stage of maturity, move rapidly to their spawning areas on the mainstem or lower tributaries of rivers, and spawn within a few days or weeks of freshwater entry (Healey 1991). Adult endangered Sacramento River winter-run Chinook salmon enter San Francisco Bay from November through June (Hallock and Fisher 1985), and delay spawning until spring or early summer. Adult threatened Central Valley spring-run Chinook salmon enter the Sacramento-San Joaquin Delta (Delta) beginning in January and enter natal streams from March to July (Myers *et al.* 1998). Central Valley spring-run Chinook salmon adults hold in freshwater over summer and spawn in the fall. Central Valley spring-run Chinook salmon juveniles typically spend a year or more in freshwater before migrating toward the ocean. Adequate instream flows and cool water temperatures are more critical for the survival of Central Valley spring-run Chinook salmon due to over summering by adults and/or juveniles.

Sacramento River winter-run Chinook salmon spawn primarily from mid-April to mid-August, peaking in May and June, in the Sacramento River reach between Keswick Dam and the RBDD. Central Valley spring-run Chinook salmon typically spawn between September and October depending on water temperatures. Chinook salmon generally spawn in waters with moderate gradient and gravel and cobble substrates. Eggs are deposited within the gravel where

incubation, hatching, and subsequent emergence take place. The upper preferred water temperature for spawning adult Chinook salmon is 13°C (Chambers 1956) to 14 °C (Reiser and Bjornn 1979). The length of time required for eggs to develop and hatch is dependent on water temperature, and quite variable.

Sacramento River winter-run Chinook salmon fry begin to emerge from the gravel in late June to early July and continue through October (Fisher 1994). Juvenile winter-run Chinook salmon spend 4 to 7 months in freshwater prior to migrating to the ocean as smolts. Central Valley spring-run Chinook salmon fry emerge from November to March and spend about 3 to 15 months in freshwater prior to migrating towards the ocean (Kjelson *et al.* 1982). Post-emergent fry seek out shallow, nearshore areas with slow current and good cover, and begin feeding on small terrestrial and aquatic insects and crustaceans. Chinook fry and parr may spend time rearing within riverine and/or estuarine habitats including natal tributaries, the Sacramento River, non-natal tributaries to the Sacramento River, and the Delta.

Within estuarine habitat, juvenile rearing Chinook salmon movements are generally dictated by tidal cycles, following the rising tide into shallow water habitats from the deeper main channels, and returning to the main channels when the tide recedes (Healey 1991; Levings 1982; Levy and Northcote 1982). Juvenile Chinook salmon forage in shallow areas with protective cover, such as intertidal and subtidal mudflats, marshes, channels and sloughs (Dunford 1975; McDonald 1960). As juvenile Chinook salmon increase in length, they tend to school in the surface waters of the main and secondary channels and sloughs, following the tides into shallow water habitats to feed (Allen and Hassler 1986). Kjelson *et al.* (1982) reported that juvenile Chinook salmon demonstrated a diel migration pattern, orienting themselves to nearshore cover and structure during the day, but moving into more open, offshore waters at night. The fish also distributed themselves vertically in relation to ambient light. Juvenile Sacramento River winter-run Chinook salmon migrate to the sea as smolts after only rearing in freshwater for 4 to 7 months, and occur in the Delta from October through early May (CDFW 2000). Most Central Valley spring-run Chinook salmon smolts are present in the Delta from mid-March through mid-May depending on flow conditions (CDFW 1998).

### **2.2.2.1 Status of Sacramento River Winter-run Chinook Salmon**

Sacramento River winter-run Chinook salmon was first listed as a threatened species in 1990 (55 FR 46515). In 1994, NMFS reclassified the ESU as an endangered species due to several factors, including: (1) the continued decline and increased variability of run sizes since its listing as a threatened species in 1989; (2) the expectation of weak returns in coming years as the result of two small year classes (1991 and 1993); and (3) continuing threats to the species (59 FR 440). NMFS issued a final listing determination on June 28, 2005 (70 FR 37160). The Sacramento River winter-run Chinook salmon ESU includes winter-run Chinook salmon spawning naturally in the Sacramento River and its tributaries, as well as two artificial propagation programs: winter-run Chinook salmon from the Livingston Stone National Fish Hatchery and winter-run Chinook in a captive broodstock program maintained at Livingston Stone National Fish Hatchery and the University of California Bodega Marine Laboratory.

The Sacramento River winter-run Chinook salmon ESU has been completely displaced from its historical spawning habitat by the construction of Shasta and Keswick dams. Approximately, 300

miles of tributary spawning habitat in the upper Sacramento River is now inaccessible to the ESU. Most components of the Sacramento River winter-run Chinook salmon life history (e.g., spawning, incubation, freshwater rearing) have been compromised by the habitat blockage in the upper Sacramento River. The only remaining spawning habitat in the upper Sacramento River is between Keswick Dam and RBDD. This habitat is artificially maintained by cool water releases from Shasta and Keswick Dams, and the spatial distribution of spawners in the upper Sacramento River is largely governed by the water year type and the ability of the Central Valley Project to manage water temperatures in this area.

Between the time Shasta Dam was built and the Sacramento River winter-run Chinook salmon were listed in 1990, major impacts to the population occurred from warm water releases from Shasta Dam, juvenile and adult passage constraints at the RBDD, water exports in the southern Delta, and entrainment at a large number of unscreened or poorly-screened water diversions. However, the naturally spawning component of this ESU has exhibited marked improvements in abundance and productivity in the 2000s (CDFW 2008). These increases in abundance are encouraging, relative to the years of critically low abundance of the 1980s and early 1990s; however, returns of several West Coast Chinook salmon and coho salmon stocks were lower than expected in 2007, and stocks remained low through 2009.

A captive broodstock artificial propagation program for Sacramento River winter-run Chinook salmon has operated since the early 1990s as part of recovery actions for this ESU. As many as 150,000 juvenile salmon have been released by this program, but in most cases the number of fish released was in the tens of thousands (Good *et al.* 2005).

According to the 2016 NMFS 5-year status review, the extinction risk of the winter-run Chinook salmon ESU has increased from moderate risk to high risk of extinction since the 2007 and 2010 assessments (NMFS 2016c). Based on the Lindley *et al.* (2007) criteria, the population is currently at high extinction risk. High extinction risk for the population was triggered by the hatchery influence criterion, with a mean of 66 percent hatchery origin spawners from 2016 through 2018. Several listing factors have contributed to the recent decline, including drought, poor ocean conditions, and hatchery influence.

In July 2014, NMFS released a final Recovery Plan for Sacramento River winter-run Chinook salmon (NMFS 2014). The Recovery Plan outlines actions to restore habitat, access, and improve water quality and quantity conditions in the Sacramento River to promote the recovery of listed salmonids.

#### **2.2.2.2 Status of CV Spring-run Chinook Salmon**

CV spring-run Chinook salmon was listed as a threatened species in 1999 (64 FR 50394) and the listing was updated in 2005 (70 FR 37160). The Central Valley spring-run Chinook ESU includes all naturally spawned populations of spring-run Chinook salmon in the Sacramento River and its tributaries in California, including the Feather River. The artificial propagation program at the Feather River Hatchery is also considered part of the ESU.

Historically, the predominant salmon run in the Central Valley was the spring-run Chinook salmon. Extensive construction of dams throughout the Sacramento-San Joaquin Basin has

reduced the Central Valley spring-run Chinook salmon run to only a small portion of its historical distribution. The Central Valley drainage as a whole is estimated to have supported Central Valley spring-run Chinook salmon runs as large as 600,000 fish between the late 1880s and 1940s (CDFW 1998). The ESU has been reduced to only three naturally-spawning populations that are free of hatchery influence from an estimated 17 historic populations. These three populations (spawning in three tributaries to the Sacramento River - Deer, Mill, and Butte creeks), are in close geographic proximity, increasing the ESU's vulnerability to disease or catastrophic events.

Central Valley spring-run Chinook salmon from the Feather River Hatchery (FRH) were included in the ESU because they are believed by NMFS to be the only population in the ESU that displays early run timing. This early run timing is considered by NMFS to represent an important evolutionary legacy of the spring-run populations that once spawned above Oroville Dam (70 FR 37160). The FRH population is closely related genetically to the natural Feather River population. The FRH's goal is to release five million spring-run Chinook salmon per year. Recent releases have ranged from about one-and-a-half to five million fish, with most releases below five million fish (Good *et al.* 2005).

According to the NMFS 5-year species status review (NMFS 2016d), the status of the CV spring-run Chinook salmon ESU, until 2015, has improved since the 2010 status review. The improved status is due to extensive restoration, and increases in spatial structure with historically extirpated populations (Battle and Clear creeks) trending in the positive direction. However, more recent declines of many of the dependent and independent populations, high pre-spawn and egg mortality during the 2012 to 2016 drought, uncertain juvenile survival during the drought are likely increasing the ESU's extinction risk. Escapement data show a continued overall decline in adult returns from 2014 through 2020 (CDFW 2021).

In July 2014, NMFS released a final Recovery Plan for CV spring-run Chinook salmon (NMFS 2014). The Recovery Plan outlines actions to restore habitat, access, and improve water quality and quantity conditions in the Sacramento River to promote the recovery of listed salmonids. Key actions for the Recovery Plan include conducting landscape-scale restoration throughout the Delta, incorporating ecosystem restoration into Central Valley flood control plans that includes breaching and setting back levees, and restoring flows throughout the Sacramento and San Joaquin River basins and the Delta.

### **2.2.3. North American Green Sturgeon**

The green sturgeon is an anadromous, long-lived, and bottom-oriented fish species in the family Acipenseridae. Sturgeon have skeletons composed mostly of cartilage and lack scales, instead possessing five rows of characteristic bony plates on their body called "scutes." On the underside of their flattened snouts are sensory barbels and a siphon-shaped, protrusible, toothless mouth. Large adults may exceed 2 meters in length and 100 kilograms in weight (Moyle 1976). Based on genetic analyses and spawning site fidelity, NMFS determined that North American green sturgeon are comprised of at least two DPSs: Northern DPS consisting of populations originating from coastal watersheds northward of and including the Eel River ("Northern DPS green sturgeon"), with spawning confirmed in the Klamath and Rogue river systems; and Southern DPS consisting of populations originating from coastal watersheds south of the Eel River

(“Southern DPS green sturgeon”), with spawning confirmed in the Sacramento River system (Adams *et al.* 2002).

Green sturgeon is the most marine-oriented species of sturgeon (Moyle 2002). Along the West Coast of North America, they range in nearshore waters from Mexico to the Bering Sea (Adams *et al.* 2002), with a general tendency to head north after their out-migration from freshwater (Lindley *et al.* 2011). While in the ocean, archival tagging indicates that green sturgeon occur in waters between 0- and 200-meters depth, but spend most of their time in waters between 20–80 meters and temperatures of 9.5–16.0°C (Nelson *et al.* 2010, Huff *et al.* 2011). Subadult and adult green sturgeon move between coastal waters and estuaries (Lindley *et al.* 2008, Lindley *et al.* 2011), but relatively little is known about how green sturgeon use these habitats. Lindley *et al.* (2011) report multiple rivers and estuaries are visited by aggregations of green sturgeon in summer months, and larger estuaries (e.g., San Francisco Bay) appear to be particularly important habitat. During the winter months, green sturgeon generally reside in the coastal ocean. Areas north of Vancouver Island are favored overwintering areas, with Queen Charlotte Sound and Hecate Strait likely destinations based on detections of acoustically-tagged green sturgeon (Lindley *et al.* 2008, Nelson *et al.* 2010).

Based on genetic analysis, Israel *et al.* (2009) reported that almost all green sturgeon collected in the San Francisco Bay system were Southern DPS. This is corroborated by tagging and tracking studies which found that no green sturgeon tagged in the Klamath or Rogue rivers (i.e., Northern DPS) have yet been detected in San Francisco Bay (Lindley *et al.* 2011). However, green sturgeon inhabiting coastal waters adjacent to San Francisco Bay include Northern DPS green sturgeon.

Adult Southern DPS green sturgeon enter the San Francisco Bay in later winter through early spring, and migrate upstream to spawn in the Sacramento River watershed from April through early July, with peaks in activity influenced by variations in water low and temperature (Heublein *et al.* 2009, Poytress *et al.* 2015, Miller *et al.* 2020). After hatching larvae migrate downstream and metamorphose into juveniles. Juveniles spend their first few years in the Sacramento-San Joaquin Delta (Delta) and San Francisco estuary before entering the marine environment as subadults. Juvenile green sturgeon collected at the State and Federal water export facilities in the southern Delta are generally between 200 mm and 400 mm total length (TL) (Adams *et al.* 2002) which suggests Southern DPS green sturgeon spend several months to a year rearing in freshwater before entering the Delta and San Francisco estuary. Subadult green sturgeon spend several years at sea before reaching reproductive maturity and returning to freshwater to spawn for the first time (Nakamoto *et al.* 1995). Post-spawn outmigration the San Francisco Bay is variable, with some individuals migrating to the ocean within 2-10 days and others remaining within the estuary for several months after leaving upstream spawning habitat (Heublein *et al.* 2009, Miller *et al.* 2020)

During the summer and fall, an unknown proportion of the population of non-spawning adults and subadults enter the San Francisco estuary from the ocean for periods ranging from a few days to 6 months (Lindley *et al.* 2011). Some fish are detected only near the Golden Gate, while others move as far inland as Rio Vista on the lower Sacramento River in the Delta. The

remainder of the population appear to enter bays and estuaries farther north from Humboldt Bay, California to Grays Harbor, Washington (Lindley *et al.* 2011).

Green sturgeon feed on benthic invertebrates and fish (Adams *et al.* 2002). Radtke (1966) analyzed stomach contents of juvenile green sturgeon captured in the Sacramento-San Joaquin Delta and found the majority of their diet was benthic invertebrates, such as mysid shrimp and amphipods (*Corophium spp*). Manual tracking of acoustically-tagged green sturgeon in the San Francisco Bay estuary indicates they are generally bottom-oriented, but make occasional forays to surface waters, perhaps to assist their movement (Kelly *et al.* 2007). Dumbauld *et al.* (2008) report green sturgeon utilize soft substrate in estuaries, presumably feeding on benthic invertebrates. Data from mapping surveys conducted in Willapa Bay, Washington, showed densities of “feeding pits” (depressions in the substrate believed to be formed when green sturgeon feed) were highest over shallow intertidal mud flats, while harder substrates (e.g., sand) had no pits (Moser *et al.* 2017). Within the San Francisco estuary, green sturgeon are encountered by recreational anglers and during sampling by the California Department of Fish and Wildlife (CDFW) in the shallow waters of San Pablo Bay.

### **2.2.3.1 Status of North American Green Sturgeon**

The Southern DPS of North American green sturgeon was listed as a federally threatened species in 2006 (71 FR 17757). The Southern DPS includes all spawning populations of green sturgeon south of the Eel River (exclusive), principally including the Sacramento River green sturgeon spawning population.

To date, little population-level data have been collected for green sturgeon. In particular, there are no published abundance estimates for either Northern DPS or Southern DPS green sturgeon in any of the natal rivers based on survey data. As a result, efforts to estimate green sturgeon population size have had to rely on sub-optimal data with known potential biases. Available abundance information comes mainly from four sources: 1) incidental captures in the CDFW white sturgeon monitoring program; 2) fish monitoring efforts associated with two diversion facilities on the upper Sacramento River; 3) fish salvage operations at the water export facilities on the Sacramento-San Joaquin Delta; and 4) dual frequency sonar identification in spawning areas of the upper Sacramento River. These data are insufficient in a variety of ways (short time series, non-target species, etc.) and do not support more than a qualitative evaluation of changes in green sturgeon abundance.

CDFW’s white sturgeon monitoring program incidentally captures Southern DPS green sturgeon. Trammel nets are used to capture white sturgeon and CDFW utilizes a multiple-census or Peterson mark-recapture method to estimate the size of subadult and adult sturgeon population (CDFW 2002). By comparing ratios of white sturgeon to green sturgeon captures, estimates of Southern DPS green sturgeon abundance can be calculated. Estimated abundance of green sturgeon between 1954 and 2001 ranged from 175 fish to more than 8,000 per year and averaged 1,509 fish per year. Unfortunately, there are many biases and errors associated with these data, and CDFW does not consider these estimates reliable. For larval and juvenile green sturgeon in the upper Sacramento River, information is available from salmon monitoring efforts at the RBDD and the Glenn-Colusa Irrigation District (GCID). Incidental capture of larval and juvenile green sturgeon at the RBDD and GCID have ranged between 0 and 2,068 green sturgeon per

year (Adams *et al.* 2002). Genetic data collected from these larval green sturgeon suggest that the number of adult green sturgeon spawning in the upper Sacramento River remained roughly constant between 2002 and 2006 in river reaches above Red Bluff (Israel and May 2010). In 2011, rotary screw traps operating in the Upper Sacramento River at RBDD captured 3,700 larval green sturgeon which represents the highest catch on record in 16 years of sampling (Poytress *et al.* 2011).

Juvenile green sturgeon are collected at water export facilities operated by the California Department of Water Resources (DWR) and the Federal Bureau of Reclamation (BOR) in the Sacramento-San Joaquin Delta. Fish collection records have been maintained by DWR from 1968 to present and by BOR from 1980 to present. The average number of Southern DPS green sturgeon taken per year at the DWR facility prior to 1986 was 732; from 1986 to 2001, the average per year was 47 (70 FR 17386). For the BOR facility, the average number prior to 1986 was 889; from 1986 to 2001 the average was 32 (70 FR 17386). Direct capture in the salvage operations at these facilities is a small component of the overall effect of water export facilities on Southern DPS green sturgeon; entrained juvenile green sturgeon are exposed to potential high levels of predation by non-native predators, disruption in migratory behavior, and poor habitat quality. Delta water exports have increased substantially since the 1970s and it is likely that this has contributed to negative trends in the abundance of migratory fish that utilize the Delta, including the Southern DPS green sturgeon.

A Southern DPS population estimate of 17,723 total individuals (95% confidence interval =12,614-22,482) was developed by Mora *et al.* (2018) through Dual Frequency Identification Sonar (DIDSON) surveys of aggregation sites conducted from 2010-2015 in the upper Sacramento River. The NMFS Southwest Fisheries Science Center has updated the total population estimate to 17,723 (Dudley 2021). The DIDSON surveys and modeling will eventually provide population trend data.

According to the NMFS (2021) 5-year status review and the 2018 final recovery plan (NMFS 2018), some threats to the species have recently been eliminated, such as take from commercial fisheries and removal of some passage barriers. However, the species viability continues to be constrained by factors such as a small population size, lack of multiple populations, and concentration of spawning sites into just a few locations. The species continues to face a moderate risk of extinction. A recent method has been developed to estimate the annual spawning run and population size in the upper Sacramento River so species can be evaluated relative to recovery criteria (Mora *et al.* 2018).

In August 2018, NMFS released a final Recovery Plan for the Southern DPS green sturgeon (NMFS 2018), which focuses on fish screening and passage projects, floodplain and river restoration, and riparian habitat protection in the Sacramento River Basin, the Delta, San Francisco Estuary, and nearshore coastal marine environment as strategies for recovery.

#### **2.2.4. Status of Critical Habitat**

In designating critical habitat, NMFS considers, among other things, the following requirements of the species: 1) space for individual and population growth, and for normal behavior; 2) food, water, air, light, minerals, or other nutritional or physiological requirements; 3) cover or shelter;



4) sites for breeding, reproduction, or rearing offspring; and, generally; and 5) habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of this species (50 CFR 424.12(b)). In addition to these factors, NMFS also focuses on PBFs within the designated area that are essential to the conservation of the species and that may require special management considerations or protection (81 FR 7214).

#### **2.2.4.1 Status of CCC Steelhead Critical Habitat**

Critical habitat was designated for CCC steelhead on September 2, 2005 (70 FR 52488) and includes the following CALWATER Hydrologic Units: Russian River, Bodega, Marin Coastal, San Mateo Coastal, Bay Bridge, Santa Clara, San Pablo, and Big Basin. The PBFs for CCC steelhead critical habitat include freshwater spawning sites, freshwater rearing sites, freshwater migration corridors, and estuarine areas.

The condition of CCC steelhead critical habitat, specifically its ability to provide for their conservation, has been degraded from conditions known to support viable salmonid populations. NMFS has determined that present depressed population conditions are, in part, the result of the following human-induced factors affecting critical habitat: logging; agricultural and mining activities; urbanization; stream channelization; dams; wetland loss; and water withdrawals, including unscreened diversions for irrigation. Impacts of concern include alteration of streambank and channel morphology, alteration of water temperatures, loss of spawning and rearing habitat, fragmentation of habitat, loss of downstream recruitment of spawning gravels and large woody debris, degradation of water quality, removal of riparian vegetation resulting in increased streambank erosion, loss of shade (higher water temperatures) and loss of nutrient inputs (Busby *et al.* 1996, NMFS 2016b). Water development has drastically altered natural hydrologic conditions in many of the streams in the DPS. Alteration of flows results in migration delays, loss of suitable habitat due to dewatering and blockage; stranding of fish from rapid flow fluctuations; entrainment of juveniles into poorly screened or unscreened diversions, and increased water temperatures harmful to salmonids.

#### **2.2.4.2 Status of CCV Steelhead Critical Habitat**

Critical habitat was designated for CCV steelhead on September 2, 2005 (70 FR 52488) and includes stream reaches of the Feather, Yuba and American rivers, Big Chico, Butte, Deer, Mill, Battle, Antelope, and Clear creeks, the Sacramento River, as well as portions of the northern Delta. The PBFs for CCV steelhead critical habitat include freshwater spawning sites, freshwater rearing sites, freshwater migration corridors, and estuarine areas.

Many of the PBFs of CCV steelhead critical habitat are degraded and provide limited high-quality habitat. Passage to historical spawning and juvenile rearing habitat has been largely reduced due to dam construction throughout the Central Valley. Levee construction has also degraded the freshwater rearing and migration habitat and estuarine areas as riparian vegetation has been removed, reducing habitat complexity and food resources and resulting in many other ecological effects. Additionally, due to reduced access to historical habitat, genetic introgression is occurring because natural-origin fish are interacting with hatchery-origin fish, providing the potential to reduce the long-term fitness and survival of this species.

Although the current conditions of CCV steelhead critical habitat are significantly degraded, the spawning habitat, migratory corridors, and rearing habitat that remain in the Sacramento-San Joaquin River watershed and the Delta are considered to have high intrinsic value for the conservation of the species as they are critical to ongoing recovery efforts.

#### **2.2.4.3 Status of Sacramento River Winter-run Chinook Salmon Critical Habitat**

Critical habitat was designated for the Sacramento River winter-run Chinook salmon on June 16, 1993 (58 FR 33212). Designated critical habitat for Sacramento River winter-run Chinook salmon includes the Sacramento River from Keswick Dam, Shasta County (River Mile 302) to Chipps Island (River Mile 0), all waters from Chipps Island westward to Carquinez Bridge, all waters of San Pablo Bay, and all water of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge).

PBFs for Sacramento River Winter-run Chinook and their associated essential features include:

1. Access from the Pacific Ocean to appropriate spawning areas in the upper Sacramento River.
2. The availability of clean gravel for spawning substrate.
3. Adequate river flows for successful spawning, incubation of eggs, fry development and emergence, and downstream transport of juveniles.
4. Water temperatures between 6 and 14°C for successful spawning, egg incubation, and fry development.
5. Habitat areas and adequate prey that are not contaminated.
6. Riparian areas that provide for successful juvenile development and survival.
7. Access downstream so that juveniles can migrate from the spawning grounds to San Francisco Bay and the Pacific Ocean (58 FR 33212).

Winter-run Chinook salmon critical habitat has been degraded from conditions known to support viable salmonid populations. It does not provide the full extent of conservation values necessary for the recovery of the species. In particular, adequate river flows and water temperatures have been impacted by human actions, substantially altering the historical river characteristics in which the Sacramento River winter-run Chinook salmon evolved. Depletion and storage of streamflow behind large dams on the Sacramento River and other tributary streams have drastically altered the natural hydrologic cycles of the Sacramento River and Delta. Alteration of flows results in migration delays, loss of suitable habitat due to dewatering and blockage, stranding of fish from rapid flow fluctuations, entrainment of juveniles into poorly screened or unscreened diversions, and increased water temperatures harmful to salmonids. Other impacts of concern include alteration of stream bank and channel morphology, loss of riparian vegetation, loss of spawning and rearing habitat, fragmentation of habitat, loss of downstream recruitment of spawning gravels, degradation of water quality, and loss of nutrient input.

#### **2.2.4.4 CV Spring-run Chinook Salmon Critical Habitat**

Critical habitat was designated for CV spring-run Chinook salmon on September 2, 2005 (70 FR 52488). The geographical range of designated critical habitat includes stream reaches of the Feather, Yuba, and American rivers; Big Chico, Butte, Deer, Mill, Battle, Antelope, and Clear

creeks; and the Sacramento River downstream to the Delta, as well as portions of the northern Delta (70 FR 52488; September 2, 2005). The PBFs for CV spring-run Chinook salmon critical habitat include freshwater spawning sites, freshwater migratory habitat, freshwater rearing sites, and estuarine habitat.

Currently, many of the PBFs of CV spring-run Chinook salmon critical habitat are degraded and provide limited high-quality habitat. Factors that lessen the quality of migratory corridors for juveniles include unscreened or inadequately screened diversions, altered flows in the Delta and mainstem Sacramento River, scarcity of complex in-river cover, in-river predation, degraded water quality, suboptimal water temperatures, and the lack of floodplain habitat. Although the current conditions of CV spring-run Chinook salmon critical habitat are significantly degraded, the spawning habitat, migratory corridors, and rearing habitat that remain are considered to have high intrinsic value for the conservation of the species.

#### **2.2.4.5 Status of North American Green Sturgeon Critical Habitat**

Critical habitat was designated for the Southern DPS of green sturgeon on October 9, 2009 (74 FR 52300) and includes coastal marine waters within 60 fathoms depth from Monterey Bay, California to Cape Flattery, Washington, including the Strait of Juan de Fuca to its United States boundary. Designated critical habitat also includes the Sacramento River, lower Feather River, lower Yuba River, Sacramento-San Joaquin Delta, Suisun Bay, San Pablo Bay, and San Francisco Bay in California.

PBFs of designated critical habitat in estuarine areas are food resources, water flow, water quality, mitigation corridor, depth, and sediment quality. In freshwater riverine systems, PBFs of green sturgeon critical habitat are food resources, substrate type or size, water flow, water quality, migratory corridor, depth, and sediment quality. In nearshore coastal marine areas, PBFs are migratory corridor, water quality, and food resources.

The current condition of critical habitat for the Southern DPS of green sturgeon is degraded over its historical conditions. It does not provide the full extent of conservation values necessary for the recovery of the species, particularly in the upstream riverine habitat of the Sacramento River. In the Sacramento River, migration corridor and water flow PBFs have been impacted by human actions, substantially altering the historical river characteristics in which the Southern DPS of green sturgeon evolved. In addition, the alterations to the Sacramento-San Joaquin River Delta may have a particularly strong impact on the survival and recruitment of juvenile green sturgeon due to their protracted rearing time in brackish and estuarine waters.

### **2.2.5. Additional Threats to Listed Species and Critical Habitat**

#### **2.2.5.1 Global Climate Change**

Another factor affecting the range wide status of CCC steelhead, CCV steelhead, winter-run Chinook salmon, CV spring-run Chinook salmon, Southern DPS green sturgeon, and aquatic habitat at large is climate change. Recent work by the NMFS Science Centers ranked the relative vulnerability of west-coast salmon and steelhead to climate change. In California, listed coho and

Chinook salmon are generally at greater risk (high to very high risk) than listed steelhead (moderate to high risk) (Crozier *et al.* 2019).

Impacts from global climate change are already occurring in California. For example, average annual air temperatures, heat extremes, and sea level increased in California over the last century (Kadir *et al.* 2013). Snowmelt from the Sierra Nevada has declined (Kadir *et al.* 2013). Listed salmon, steelhead and green sturgeon have likely already experienced some detrimental impacts from climate change through lower and more variable stream flows, warmer stream temperatures, and changes in ocean conditions. California experienced well below average precipitation during the 2012-2016 drought, as well as record high surface air temperatures in 2014 and 2015, and record low snowpack in 2015 (Williams *et al.* 2016). Paleoclimate reconstructions suggest the 2012-2016 drought was the most extreme in the past 500 to 1000 years (Williams *et al.* 2016 Williams *et al.* 2020, Williams *et al.* 2022). Anomalously high surface temperatures substantially amplified annual water deficits during 2012-2016. California entered another period of drought in 2020. These drought periods are now likely part of a larger drought event (Williams *et al.* 2022). This recent long-term drought, as well as the increased incidence and magnitude of wildfires in California, have likely been exacerbated by climate change (Williams *et al.* 2022, Diffenbaugh *et al.* 2015, Williams *et al.* 2019).

The threat to CCC steelhead, CCV steelhead, winter-run Chinook salmon, CV spring-run Chinook salmon and green sturgeon from global climate change is expected to increase in the future. Modeling of climate change impacts in California suggests that average summer air temperatures are expected to continue to increase (Lindley *et al.* 2007; Moser *et al.* 2012). Heat waves are expected to occur more often, and heat wave temperatures are likely to be higher (Hayhoe *et al.* 2004; Moser *et al.* 2012; Kadir *et al.* 2013). Total precipitation in California may decline and the magnitude and frequency of dry years may increase (Lindley *et al.* 2007; Schneider 2007; Moser *et al.* 2012). Similarly, wildfires are expected to increase in frequency and magnitude (Westerling *et al.* 2011; Moser *et al.* 2012). Increases in wide year-to-year variation in precipitation amounts (droughts and floods) are projected to occur (Swain *et al.* 2018). Estuarine productivity is likely to change based on changes in freshwater flows, nutrient cycling, and sediment amounts (Scavia *et al.* 2002; Ruggiero *et al.* 2010).

In marine environments, ecosystems and habitats important to juvenile and adult salmonids are likely to experience changes in temperatures, circulation, water chemistry, and food supplies (Brewer and Barry 2008; Feely 2004; Osgood 2008; Turley 2008; Abdul-Aziz *et al.* 2011; Doney *et al.* 2012). Some of these changes, including an increased incidence of marine heat waves, are likely already occurring, and are expected to increase (Frolicher, *et al.* 2018). In fall 2014, and again in 2019, a marine heatwave, known as “The Blob”, formed throughout the northeast Pacific Ocean, which greatly affected water temperature and upwelling from the Bering Sea off Alaska, south to the coastline of Mexico. The marine waters in this region of the ocean are utilized by salmonids for foraging as they mature (Beamish 2018). Although the implications of these events on salmonid populations are not fully understood, they are having considerable adverse consequences to the productivity of these ecosystems and presumably contributing to poor marine survival of salmonids.

### 2.2.5.2 Water Quality

Recently published work has identified stormwater from roadways as causing mortality of adult coho salmon in the wild (Scholz *et al.* 2011) and laboratory settings (McIntyre *et al.* 2018). Subsequent laboratory studies showed this mortality also occurred in juvenile coho salmon (Chow *et al.* 2019) as well as to juvenile steelhead and Chinook salmon (Brinkmann *et al.* 2022). These recent publications have identified a degradation product of tires (6PPD-quinone) as the causal factor in this mortality (Tian *et al.* 2022, Brinkmann *et al.* 2022, Tian *et al.* 2020; Peter *et al.* 2018). The parent compound (6PPD) is widely used by multiple tire manufacturers and the tire shreds/dust that produce the degradation product have been found to be ubiquitous where both rural and urban roadways drain into waterways (Feist *et al.* 2018, Sutton *et al.* 2019).

### 2.3. Action Area

“Action area” means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area for this consultation includes all areas that will be directly and indirectly affected by PG&E’s routine maintenance activities at electrical facilities, gas line facilities, and access roads within the nine-county San Francisco Bay Area.<sup>7</sup> Figure 1 displays the locations of PG&E facilities in the O&M Program action area. Although O&M Program activities can occur at any of the locations in Figure 1, most PG&E facilities associated with freshwater streams are located in urban or “developed” areas where instream habitat and natural channel function are impaired. In tidal waters and wetlands, PG&E’s electrical towers are primarily located adjacent to bridges and in wetland areas along the margin of the Bay.

### 2.4. Environmental Baseline

The “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 consultations, 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 (50 CFR 402.02).

San Francisco Bay is the largest estuary on the west coast of North American in terms of surface area and it is also one of the most urbanized. The human population within the San Francisco Bay Area is approximately eight million (2020 census). In the past 150 years, the diking and filling of tidal marshes has decreased the surface area of the San Francisco Bay by 37 percent, which has diminished tidal marsh habitat, increased pollutant loadings to the estuary, and degraded shoreline habitat. Most shoreline areas are dominated by docks, shipping wharves,

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<sup>7</sup> The nine Bay Area counties consist of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties.

marinas, and miles of rock riprap for erosion protection. Most tributary streams have lost habitat through channelization, riparian vegetation removal, and water development. Dams blocking anadromy are present on most streams and the associated reservoirs are used for water supply, aquifer recharge, and/or recreational activities.

#### **2.4.1. San Francisco Bay Estuary Description**

The Bay receives inputs from the Sacramento and San Joaquin rivers, Bay Area tributary streams, stormwater runoff, and wastewater from municipal and industrial sources that vary in volume depending on the location and seasonal weather patterns. The freshwater outflow pattern is seasonal with the highest outflow occurring in the winter and spring. Local watersheds adjacent to the Bay contribute approximately 56 percent of the sediment delivered to the Bay, with the Delta and coastal sources contributing the remaining sediment supply (Barnard *et al.* 2013). Current and wave patterns in the estuarine portion of the action area are largely generated by the tides interacting with the bottom and shoreline configurations.

Central Bay, Suisun Bay, San Pablo Bay, and the South Bay all have shallow areas with mud to sand bottom, and deeper channels with mainly sand bottom. The mean water depth of the Central Bay is approximately 40 feet while the South Bay, San Pablo Bay and Suisun Bay have mean depths of 16 feet or less. Most of the Bay floor is comprised of sand and mud, overlying metamorphic and sedimentary bedrock. Bottom sediments are mud-dominated in shallower, low tidal energy areas. Sand is prevalent in deeper high tidal energy areas, such as the deeper portions of Central Bay and Suisun Bay, particularly within the main tidal channels where large waveforms are present along the Bay floor (Barnard *et al.* 2013). Both wind and tidal currents are strong in many parts of the estuary. The Carquinez Strait and Golden Gate are relatively narrow sections where tidal currents are particularly strong. Wind-driven waves throughout the estuary are particularly common during the summer and these waves re-suspend sediments and increase local turbidity. Salinity varies from freshwater values in Suisun Bay to oceanic values at the Golden Gate.

#### **2.4.2. Bay Area Watersheds Description**

Freshwater streams in action area (Table 5) drain to either San Francisco Bay or drain directly to the Pacific Ocean. The watersheds that drain to San Francisco Bay contain highly developed urban areas. Dams in upper watershed areas have been constructed for water development. Lower bayside reaches are typically characterized by hardened channels that have been re-aligned for flood control as they pass through heavily urbanized areas. However, some upper watershed areas remain relatively undeveloped and are protected in regional and State parks.

Over 90% of the annual freshwater that discharges into the San Francisco Bay comes from the Sacramento and San Joaquin rivers that combined, drain the Central Valley. The approximately 66 smaller watersheds that drain into the San Francisco Estuary contribute the remaining 10% of freshwater runoff (Leidy *et al.* 2017). Parallel-trending coastal and interior coastal mountains and hills surrounding the Bay are oriented along a general northwest to southeast axis. The largest watersheds draining to San Francisco Bay are Napa River (426 square miles) and Alameda Creek (700 square miles) (Leidy *et al.* 2017).

The action area also includes portions of the Russian River and the Pajaro River watersheds. The Russian River watershed encompasses approximately 1,500 square miles of forests, agricultural lands, and urban areas within Sonoma and Mendocino counties. About 95% of the watershed is in private ownership. The Russian River is about 110 miles long and flows from its headwaters near Redwood and Potter Valleys to the Pacific Ocean at the town of Jenner on the Sonoma Coast.

The Pajaro River watershed is approximately 1,300 square miles and it includes agricultural lands, natural areas, and urban development in Santa Clara, Santa Cruz, San Benito, and Monterey counties. The Pajaro River watershed's rivers, tributaries, and creeks ultimately drain into Monterey Bay.

The topography of the action area is extremely varied, with elevations ranging from sea level to 4,265 feet atop of Mount Hamilton in the Diablo Range. Overall, the climate of the action area is characterized by dry, mild summers and moist, cool winters. Temperatures are strongly influenced by the San Francisco Bay, the Pacific Ocean, and the various Bay Area mountain ranges, which results in a variety of microclimates. Coastside is generally mountainous and experiences a marine climate, characterized by cool, foggy summers and relatively wet winters. The Bayside features a flatter topography, and is generally warmer and sunnier than coastal areas.

### **2.4.3. Status of Listed Species and Critical Habitat in the Action Area**

#### **2.4.3.1 Status of Listed Anadromous Salmonids in the Estuarine Portion of the Action Area**

The San Francisco Bay portion of the action area is used primarily as a migration corridor by listed CCC steelhead, CCV steelhead, CV spring-run Chinook salmon, and Sacramento River winter-run Chinook salmon. Adult salmonids migrate from the Pacific Ocean through the San Francisco Bay as they seek the upstream spawning grounds of their natal streams. Adult CCV steelhead migration through the Bay typically begins in fall and winter (McEwan and Jackson 1996). Adult CCC steelhead typically migrate through San Francisco Bay to their natal streams from December through April. Adult Sacramento River winter-run Chinook migrate through San Francisco Bay between December and May. Adult Central Valley spring-run Chinook salmon enter the Bay from the ocean for their upstream migration between February and April.

Juvenile (smolt) salmonids migrate from their natal streams through San Francisco Bay to the ocean. Emigration timing is highly variable among Sacramento River winter-run Chinook, CV spring-run Chinook, CCC steelhead and CCV steelhead smolts, but peak migrations downstream typically occur through the estuary during the late winter and spring months. To assess juvenile salmonid outmigration behavior and timing, a series of studies were performed from 2006 through 2010 with Central Valley late fall-run Chinook salmon and CCV steelhead smolts. Smolt-sized juveniles originating from Coleman National Fish Hatchery were tagged with acoustic transmitters and released in the Sacramento River to monitor their downstream movement to ocean-entry at the Golden Gate. Results showed that smolts generally transited the Bay rapidly in 2 to 4 days, yet also made repeated upstream movements, coinciding with incoming tidal flows (Hearn *et al.* 2013). Most Chinook and steelhead smolts were detected by

acoustic receivers located over deep, channelized portions of the Bay (Hearn *et al* 2013). Smolts detected at nearshore, shallow sites such as marinas, or up tributaries generally returned to the main channel to finish their migration (Hearn *et al.* 2013).

During the course of their downstream migration, juvenile listed salmon and steelhead may utilize estuarine waters for seasonal rearing, but available information suggests that fish are actively migrating and currently they do not reside for extended periods in San Francisco Bay (Hearn *et al.* 2010). Historically, the tidal marshes of the Bay provided a highly productive estuarine environment for juvenile anadromous salmonids. However, loss of habitat, changes in prey communities, and water-flow alterations and reductions have degraded habitat and likely limit the ability of the Bay to support juvenile rearing. MacFarlane and Norton (2002) found that fall-run Chinook experienced little growth, depleted condition, and no accumulation of lipid energy reserves during the relatively limited time the fish spent transiting the 40-mile length of the estuary. Sandstrom *et al.* (2013) found that CCC steelhead smolts emigrated more rapidly through the Bay than the Napa River and the ocean.

In contrast to demersal fish that are associated with the channel bottom, salmonids are pelagic fish and, as such, primarily occupy the water column and near surface when over deeper waters (Mari-Gold Environmental and Novo Aquatic Sciences 2009). Within the action area, listed salmon and steelhead are thought to typically display a preferential use of the middle and upper water column. Studies by Kjelson *et al.* (1982) in the Sacramento-San Joaquin Delta concluded juvenile Chinook salmon appear to prefer shallow water habitats near the shore and the upper portion of the water column (less than 10 feet deep).

#### **2.4.3.2 Status of Listed Anadromous Salmonids in the Freshwater Portion of the Action Area**

Adult listed Central Valley anadromous salmonids (CCV steelhead, CV Spring-run Chinook salmon, and Sacramento River winter-run Chinook salmon) migrate through the estuary and into the Sacramento River to spawn in the upper Sacramento River and its tributaries. Following emergence from redds, fry and juvenile rearing occurs in freshwater reaches in the upper Sacramento River watershed. These spawning and rearing sites in the upper Sacramento River watershed are outside of this project's action area and the O&M Program is not expected affect the spawning and freshwater rearing habitats of listed Central Valley anadromous salmonids.

For CCC steelhead, freshwater streams in the action area support migration, spawning, and rearing. Small populations of CCC steelhead occur in several Bay tributary streams including Arroyo Corte Madera del Presido, Corte Madera Creek, Napa River, Sonoma Creek, Petaluma River, Novato Creek, Pinole Creek, Coyote Creek, Guadalupe River, San Mateo Creek, San Francisquito Creek, and Stevens Creek (NMFS 2016b). North of San Francisco Bay, CCC steelhead are present in the Russian River Watershed. However, Coyote Valley Dam and Warm Springs Dam block access to upstream anadromous fish habitat, alter sediment transport dynamics, and degrade water flow and temperature within the Russian River portion of the action area. CCC steelhead are also present in the coastal streams that flow directly to the Pacific Ocean in Sonoma, Marin, and San Mateo counties. Although CCC steelhead are widely distributed throughout streams in the action area, abundance levels are far below recovery targets.



### 2.4.3.3 Status of Green Sturgeon in the Action Area

Green sturgeon are iteroparous, and adults pass through the San Francisco Bay during spawning, and post-spawning migrations. Pre-spawn green sturgeon enter the Bay between late February and early May, as they migrate to spawning grounds in the Sacramento River (Heublein *et al.* 2009, Miller *et al.* 2020). Post-spawning adults may be present in the Bay after spawning in the Sacramento River in the spring and early summer for months prior to emigrating into the ocean. Juvenile green sturgeon move into the Delta and San Francisco Bay early in their juvenile life history, where they may remain for 2-3 years before migrating to the ocean (Allen and Cech 2007; Kelly *et al.* 2007). Sub-adult and non-spawning adult green sturgeon utilize both ocean and estuarine environments for rearing and foraging. Due to these life-history characteristics, juvenile, sub-adult and adult green sturgeon may be present in San Francisco Bay year-round (Miller *et al.* 2020).

Although relatively little is known about green sturgeon distribution and abundance in the Bay, telemetry studies have been useful to understand habitat use during by juvenile, sub-adult and adult individuals. Chapman *et al.* (2019) conducted telemetry studies from 2009 to 2012 with 106 acoustic receivers deployed from the Benicia Bridge (Carquinez Strait) to the Port of Oakland to evaluate areas affected by dredging within the estuary. These results indicated that green sturgeon were present at designated dredge material placement sites and detected throughout the year (Chapman *et al.* 2019). Kelly *et al.* (2007) tracked green sturgeon movements in the Bay and found that sub-adults typically remain in shallower depths (less than 30 feet) and show no preference for temperature, salinity, dissolved oxygen, or light levels. Observations also suggest that there are two main types of movements of sub-adult green sturgeon in the estuary: directional and non-directional (Kelly *et al.* 2007). Kelly *et al.* (2020) recently described how two tagged green sturgeon utilized selective tidal transport to move throughout San Pablo Bay – swimming with the current near the surface in deeper high-current areas, and swam along the bottom in shallow areas with little current. This behavior is thought to maximize swimming efficiency and conserve energy.

Green sturgeon are encountered by recreational anglers and during sampling by CDFW in the shallow waters of San Pablo Bay. These fish are likely foraging on benthic prey and fish commonly found in soft-bottom habitats (ghost shrimp, crab, crangonid shrimp, and thalassinid shrimp) (Dumbauld *et al.* 2008). The CDFW surveys are used to estimate sturgeon (white and green) abundance, relative abundance, harvest rate, and survival rate in San Francisco Bay and the delta. Data from 2012 and 2013 show that green sturgeon abundance is low in Suisun and San Pablo bays relative to white sturgeon abundance. Green sturgeon make up approximately two to five percent of the total reported sturgeon caught in the greater Bay and lower delta. Green sturgeon catches were highest in Suisun Bay and San Pablo Bay, with very few green sturgeon reported in Central San Francisco Bay. However, this may be due to variances in fishing efforts in different locations in the Bay. Nonetheless, based on the available data, NMFS believes the overall abundance of green sturgeon in the action area is low. Freshwater habitats utilized by green sturgeon for spawning are located in the upper Sacramento River basin and are outside the action area of this project.

#### **2.4.3.4 Status and Factors Affecting CCC Steelhead Critical Habitat in the Action Area**

San Francisco Bay from the Golden Gate Bridge to the eastern end of Carquinez Strait (excludes Suisun Bay) is designated as critical habitat for CCC steelhead. Several freshwater streams within the action area are also designated as critical habitat for CCC steelhead. The PBFs of critical habitat for CCC steelhead in the estuarine portion of the action area have been degraded due to altered and diminished freshwater inflow, shoreline development, shoreline stabilization, non-native invasive species, discharge and accumulation of contaminants, loss of tidal wetlands, and periodic dredging for navigation. In the freshwater portion of the action area, PBFs of critical habitat for CCC steelhead are degraded by barriers that block migration, altered stream hydrology, loss of gravel and large wood in channels, bank stabilization, and modifications for flood control through urbanized areas. Urban and rural development in and adjacent to streams has substantially diminished habitat complexity, natural productivity, and ecological integrity in streams throughout the action area.

#### **2.4.3.5 Status and Factors Affecting Winter-run Chinook Salmon Critical Habitat in the Action Area**

Critical habitat for Sacramento River winter-run Chinook salmon includes the portion of the action area located in Suisun Bay, San Pablo and Central San Francisco Bay north of the San Francisco-Oakland Bay Bridge. Features of designated critical habitat for winter-run Chinook salmon in the action area essential for their conservation are habitat areas and adequate prey that are uncontaminated. These PBFs of designated critical habitat within the action area are degraded and limited. Habitat degradation in the action area is primarily due to altered and diminished freshwater inflow, shoreline development, shoreline stabilization, non-native invasive species, discharge and accumulation of contaminants, loss of tidal wetlands, and periodic dredging for navigation.

#### **2.4.3.6 Status and Factors Affecting Green Sturgeon Critical Habitat in the Action Area**

The San Francisco Bay portion of the action area is designated critical habitat for Southern DPS green sturgeon. PBFs for green sturgeon in estuarine areas include food resources, water flow, water quality, migratory corridor, water depth, and sediment quality. These PBFs for green sturgeon critical habitat in the action area are degraded. Habitat degradation is primarily due to altered and diminished freshwater inflow, shoreline development, shoreline stabilization, non-native invasive species, discharge and accumulation of contaminants, loss of tidal wetlands, and periodic dredging for navigation.

#### **2.4.4. Climate Change in the Action Area**

As described above in the Status of the Species and Critical Habitat section of this opinion (Section 2.2.5.1), climate change poses a threat to salmonid and sturgeon populations in central California. In the San Francisco Bay region, warm temperatures generally occur in July and August, but with climate change these events will likely begin in June and could continue through September (Cayan *et al.* 2012). Climate simulation models indicate the San Francisco region will maintain its Mediterranean climate regime for the 21<sup>st</sup> century; however, these models predict a high degree of variability in annual precipitation through at least 2050, leaving

the region susceptible to drought (Cayan *et al.* 2012). These models of future precipitation suggest that, during the second half of the 21<sup>st</sup> century in this region, most years will be drier than the historical annual average (1950-1999). As noted above in Section (2.2.5.1), California's recent long-term drought, as well as the increased incidence and magnitude of wildfires, have likely been exacerbated by climate change (Williams *et al.* 2022, Diffenbaugh *et al.* 2015, Williams *et al.* 2019).

#### **2.4.5. Previous Section 7 Consultation in the Action Area**

Numerous previous consultations pursuant to Section 7 of the ESA have occurred in the action area for a wide range of projects, including prior repairs at PG&E electrical infrastructure. For the majority of these projects, NMFS determined that they were not likely to adversely affect listed salmonids, green sturgeon or designated critical habitat. For the smaller number of projects with potential adverse effects on listed salmonids, green sturgeon, and/or designated critical habitat, NMFS determined that they were not likely to jeopardize the continued existence of listed fish nor adversely modify critical habitat. These formal consultations, where the proposed actions were likely to adversely affect ESA-listed fish species or their designated critical habitat, resulted in opinions containing RPMs to minimize the impacts of incidental take of listed fish species.

One complex formal consultation is the Long-Term Management Strategy (LTMS) for the Placement of Dredged Material in the San Francisco Bay Region. Similar to the proposed Program, the action area includes a large spatial area that overlaps with several ESA-listed fish species and their critical habitat. The LTMS Program also includes conditions for avoiding the migratory periods of listed salmonids to minimize impacts. The biological opinion for the LTMS Program was issued by NMFS to the Corps and the Environmental Protection Agency on July 9, 2015, and concluded the program of routine maintenance dredging in San Francisco Bay was not likely to jeopardize the continued existence of listed fish, or result in the destruction or adverse modification of designated critical habitat.

Research and enhancement projects resulting from NMFS' Section 10(a)(1)(A) research and enhancement permits and section 4(d) limits or exceptions could potentially occur in the action area. Salmonid and sturgeon monitoring approved under these programs includes juvenile and adult net surveys and tagging studies. In general, these activities are closely monitored and require measures to minimize take during the research activities.

#### **2.5. Effects of the Action**

Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action (see 50 CFR 402.02). A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 CFR 402.17). In our analysis, which describes the effects of the proposed action, we considered the factors set forth in 50 CFR 402.17(a) and (b).

The Corps proposes to issue an RGP that will authorize routine O&M activities on PG&E's natural gas and electrical transmission infrastructure throughout nine counties in the San Francisco Bay Area. Additionally, PG&E proposes to conduct maintenance on roads that provide access to these facilities and road maintenance will include the repair and replacement of culverts at stream crossings. O&M activities at electrical towers that would affect listed anadromous fish and designated critical habitat are located in tidal wetlands and tidal waters of San Francisco Bay. Gas line O&M and road maintenance activities are located in areas upland of San Francisco Bay and would affect freshwater streams with listed anadromous fish and designated critical habitat. The effects of PG&E's proposed O&M Program are presented below by activity type.

### **2.5.1. Effects of O&M Activities at Electrical Infrastructure**

PG&E proposes routine maintenance the electrical transmission system in the Bay Area which consists of primary and secondary distribution lines that deliver electricity to customers. Electrical transmission lines are supported by steel-lattice towers, steel poles, and wooden poles. The majority of PG&E's electrical infrastructure in the Bay Area is located in terrestrial areas. No electrical infrastructure is located in freshwater streams. Measures proposed by PG&E in terrestrial areas are expected to prevent the discharge of contaminants and avoid disturbance of soils that could enter waterways with listed anadromous fish. Thus, electrical tower and pole repairs/replacements in terrestrial areas are anticipated to have no effect on listed anadromous fish or designated critical habitat, and this activity is not discussed further in this opinion. Similarly, no in-water work is required for line reconducting between poles and towers in terrestrial areas; thus, no effect on listed anadromous fish or designated critical habitat is anticipated with line reconducting in terrestrial areas.

As described in Section 1.3.2 above, PG&E has categorized proposed activities at electrical transmission facilities as either "low impact" and "high impact". Proposed activities and their impact level categories are presented in Table 3. High impact activities would be conducted during the LOP (June 1 to November 30) when fewer listed species are likely to occur within the action area. Low impact activities would also be conducted between June 1 and November 30, but low impact activities may extend work until January 15, provided that these activities are initiated prior to November 30.

All electrical infrastructure work activities to be conducted under this RGP that will affect listed anadromous fish are located in tidally-influenced areas in San Francisco Bay; thus, the effects analysis presented in this section applies to the San Francisco Bay estuarine portion of the action area. All four listed anadromous salmonid species addressed in this opinion (CCC steelhead, CCV steelhead, CV spring-run Chinook salmon, and Sacramento River winter-run Chinook salmon) occur in San Francisco Bay during the winter and spring months. The Southern DPS of green sturgeon occur in San Francisco Bay year-round. Additionally, all of San Francisco Bay is designated critical habitat for the Southern DPS of green sturgeon and portions of the Bay are designated as critical habitat for Sacramento River winter-run Chinook and CCC steelhead. See Section 2.4.3 of this opinion for additional information regarding the status of listed species and critical habitat in the estuarine portion of the action area.

### **2.5.1.1 Cofferdam Installation and Dewatering**

Many O&M Program activities at electrical towers will require dewatering of the work site to facilitate construction. Specifically, tower foundation repairs and replacements can require the installation of a cofferdam to isolate the work area from tidal waters. Placement of a cofferdam has the potential to entrap listed fish during the final stages of installation when the area within the cofferdam is closed off.

PG&E proposes to scheduled cofferdam installation and closure activities during periods of low tide to minimize the amount of water and fish contained within the cofferdam. At most sites, low tide conditions will result in the site being naturally dewatered and there is little risk of fish entrapment when the cofferdam is closed at these shallow water locations. PG&E reports that 92% of the electrical tower foundations in San Francisco Bay are located in water depths at or above MLLW. At sites where water remains within the cofferdams following closure, pumps with fish screens will be deployed. As the area within the cofferdam is dewatered, fish collection will be performed with seines, hand nets, dipnets, and traps. Captured fish will be relocated to suitable aquatic habitat areas outside of the work area in adjacent estuarine waters.

Listed fish that avoid capture during dewatering activities and remain within the cofferdam are likely to be killed by stranding or contact with construction equipment. However, few fish are likely to avoid capture due to the limited amount of hiding cover within each work area. Listed anadromous salmonids are unlikely to be present in the estuary during the period when cofferdams are installed (i.e., June 1 to November 30). Thus, NMFS expects that the entrapment of listed salmon or steelhead in a cofferdam to be improbable. Green sturgeon in the estuary are generally larger than 16 inches in length and should be relatively easy to locate if entrapped within a cofferdam. Fish collections overseen by a qualified biologist are expected to effectively capture and relocate any green sturgeon that may be entrapped within a dewatered cofferdam (see Section 2.5.1.2 below).

Another manner by which fish may be harmed or killed during dewatering activities is to be entrained into the pumps used for dewatering. NMFS expects that entrainment or impingement of listed fish at dewatering pumps will be improbable because PG&E will place screens which meet NMFS intake screen criteria for anadromous salmonids on all water pumps.

Benthic (*i.e.*, substrate dwelling) aquatic macroinvertebrates (*i.e.*, prey of listed fish species) within the Program site will be killed or their abundance reduced when benthic habitat is dewatered within a cofferdam. However, effects to aquatic macroinvertebrates resulting from dewatering will be temporary because construction activities will be relatively short-lived (*i.e.*, not to exceed 35 days at an electrical tower). However, larger scale effects to the benthic community are expected from Program activities and are discussed in Section 2.5.1.6 of this opinion.

### **2.5.1.2 Fish Handling**

During dewatering of areas internal to cofferdam sites, PG&E proposes to capture and relocate fish away from work sites to avoid mortality and minimize the possible stranding of fish within cofferdams. Fish will be captured by seines, hand nets, dip nets, and traps, then transported and

released to nearby suitable habitat. As presented above, listed anadromous salmonids are unlikely to be captured due to the timing of cofferdam installations. However, green sturgeon are present in the estuary year-round and may be entrapped as a cofferdam is closed. Data to precisely quantify the number of green sturgeon that will be collected and relocated from cofferdams is not available, but is expected to be low due to the relatively small number of green sturgeon within the estuary, their wide distribution throughout the estuary, and they are likely to respond behaviorally to construction activities by swimming away from active work sites.

Fish relocation activities pose a risk of injury or mortality to rearing juvenile fish. Any fish collecting gear, whether passive (Hubert 1996) or active (Hayes *et al.* 1996) has some associated risk to fish, including stress, disease transmission, injury, or death. The amount of unintentional injury and mortality attributable to fish capture varies widely depending on the method used, the ambient conditions, and the expertise and experience of the field crew. Potential stress, injury, and mortality of captured and handled green sturgeon during fish relocation will be lessened by the use of qualified biologists. Despite protective measures, NMFS expects the capture, handling and transport of fish will result in stress and potentially injury of a small number of green sturgeon individuals.

Information regarding the mortality of green sturgeon associated with capture and handling is available from annual reports submitted by researchers operating under ESA section 10(a)(1)(A) permits and Exemption 1 of the Southern DPS green sturgeon 4(d) rule. These reports indicate mortalities of green sturgeon associated with handling are very low. The June 2, 2022, NMFS biological opinion for evaluation of research programs submitted for consideration under the ESA's section 4(d) Rule summarized ten years of annual reporting by sturgeon researchers (NMFS 2022). Compilation of these reports showed no mortalities of adult green sturgeon in the ten-year period extending from 2011-2020. Mortalities of juvenile green sturgeon were limited to one event in 2016 where 77 juvenile green sturgeon were captured and 10 were killed unintentionally. All other researchers reported zero mortalities associated with the capture of juvenile green sturgeon in the 10-year period from 2011-2020 (NMFS 2022). Based on this information, it is anticipated that the collection and relocation of adult and juvenile green sturgeon during PG&E's relocation of fish from dewatered cofferdams will result in no mortalities absent an unintentional accident; although stress and sublethal injury will temporarily affect individuals. Recovery of handled individuals is expected to be rapid following relocation in waters adjacent to work sites.

### **2.5.1.3 Underwater Sound**

Elevated levels of underwater sound levels are expected during pile driving in tidal waters. Sheet piles will be installed for cofferdam construction and steel piles installed for tower repairs/replacements. PG&E has proposed prioritizing the use of vibratory hammers, but may also utilize helical pile drivers and impact hammers to install piles.

Fish may be injured or killed when exposed to impulsive sound sources such as those associated with pile driving of steel piles by impact hammers. Pathologies of fish associated with very high sound level exposure and drastic changes in pressure are collectively known as barotraumas. These include hemorrhage and rupture of blood vessels and internal organs, including the swim bladder and kidneys. Death can be instantaneous, occur within minutes after exposure, or occur

several days later. Fish can also die when exposed to lower, continuous sound pressure levels if exposed for longer periods of time. Hastings (1995) found death rates of 50 percent and 56 percent for gouramis (*Trichogaster* sp.) when exposed for two hours or less to continuous sound at 192 decibels (dB) root-mean-square pressure (RMS) (re: 1 micropascal [ $\mu\text{Pa}$ ]) at 400 Hertz (Hz) and 198 dB (re: 1 [ $\mu\text{Pa}$ ]) at 150 Hz, respectively, and 25 percent for goldfish (*Carassius auratus*) when exposed to sounds of 204 dB (re: 1  $\mu\text{Pa}$ ) at 250 Hz. Hastings (1995) also reported that acoustic “stunning” a potentially lethal effect resulting in a physiological shutdown of body functions, immobilized gourami within eight to thirty minutes of exposure to these sound levels.

Hearing loss in fishes can occur from exposure to high intensity sounds, which can over-stimulate the auditory system of fishes and may result in temporary threshold shifts. A temporary threshold shift is considered a non-injurious temporary reduction in hearing sensitivity. Physical injury may also occur for fish exposed to high levels or continuous sound, manifested as a loss of hair cells, located on the epithelium of the inner ear (Hastings and Popper 2005). These hair cells are capable of sustaining injury or damage that may result in a temporary decrease in hearing sensitivity. However, this type of noise-induced hearing loss in fishes is generally considered recoverable, as fish possess the ability to regenerate damaged hair cells (Lombarte *et al.* 1993, Smith *et al.* 2006). Permanent hearing loss has not been documented in fish. Even if threshold shifts in hearing do not occur, loud sounds can mask the ability of fish to hear their environment. This effect from loud sound exposure is referred to as acoustic or auditory masking. Masking generally results from an unwanted or unimportant sound impeding a fish’s ability to hear sounds of interest, such as sounds made by prey or predators.

Underwater sound exposures have also been shown to alter the behavior of fishes (see review by Hastings and Popper 2005). The observed behavioral changes include startle responses and increases in stress hormones. Exposure to pile driving sound pressure levels may also result in “agitation” of fishes indicated by a change in swimming behavior detected by Shin (1995) or “alarm” detected by Fewtrell (2003). Other potential changes include reduced predator awareness and reduced feeding. The potential for adverse behavioral effects will depend on a number of factors, including the sensitivity to sound, the type and duration of the sound, as well as life stages of fish that are present in the areas affected by underwater sound produced during pile driving. A fish that exhibits a startle response to a sudden loud sound may not necessarily be injured, but it is exhibiting behavior that suggests it perceives a stimulus indicating potential danger in its immediate environment. However, fish do not exhibit a startle response every time they experience a strong hydroacoustic stimulus.

In order to assess the potential effects to fish exposed to pile driving sound, a coalition of federal and state resource and transportation agencies along the West Coast, the Fisheries Hydroacoustic Working Group (FHWG), used data from a variety of sound sources and species to establish interim acoustic criteria for the onset of injury to fishes from impact pile driving exposure (FHWG 2008). Most historical research has used peak pressure to evaluate the effects on fishes from underwater sound. Current research, however, suggests that sound exposure level (SEL), a measure of the total sound energy expressed as the time-integrated, sound pressure squared, is also a relevant metric for evaluating the effects of sound on fishes. An advantage of the SEL metric is that the acoustic energy can be accumulated across multiple events and expressed as the cumulative SEL (cSEL). Therefore, a dual metric criteria was established by the FHWG and

includes a threshold for peak pressure (206 dB) and cSEL (187 dB for fishes 2 grams or larger and 183 dB for fishes smaller than 2 grams). Injury would be expected if either threshold is exceeded. There is uncertainty as to the behavioral response of fish to underwater sound produced when driving piles in or near water. Until new information indicates otherwise, NMFS believes a 150 dB RMS threshold for behavioral responses for green sturgeon and listed salmonids is appropriate.

Different types of piles (e.g., wood, steel, concrete) and different drivers (e.g., impact, vibratory, helical) result in wide range of underwater sound levels. Impact hammers produce the highest elevated underwater sound levels, particularly when used in combination with steel piles. Vibratory hammers produce less sound than impact hammers and are often employed as a measure to reduce the sound generated by pile driving, and in turn, the potential for adverse effects on fish (Buehler *et al.* 2015). Based on the results of hydroacoustic monitoring conducted in San Francisco Bay (Molnar *et al.* 2020), use of vibratory hammers is not expected to produce sound levels that exceed the dual metric criteria described above. Similarly, the use of helical pile driving is not expected to produce sound levels that will exceed the dual metric criteria because this method of installation screws piles into the substrate instead of being driven with a hammer. Sheet piles for cofferdam construction will only be installed by vibratory hammer.

#### **2.5.1.4 Pile Driving in Tidal Waters**

As described in Section 1.3.2 of this opinion, high impact activities, such as the use of an impact hammer or dewatering, would be scheduled to occur between June 1 and November 30 to avoid overlap with the primary migratory periods for listed steelhead and salmon in San Francisco Bay. However, unforeseen circumstances may lead to the Program continuing and completing some activities after November 30. Listed salmon and steelhead are generally not present in the Bay until the winter and spring months; thus, PG&E Program activities that continue after November 30 will exposed listed anadromous salmonids to elevated levels of underwater sound. However, O&M Program activities may only extend a maximum of six additional weeks after November 30 because all work must be completed each year by January 15. Green sturgeon, both juveniles and adults, will occur in the action area year-round and would potentially be exposed to the effects of pile driving throughout the year.

For the purposes of this analysis we have used the maximum distances peak SPLs and cSELs could travel as a reasonable worst-case scenario. The highest sound levels associated with the Program's construction activities will occur during the driving of the 60-inch and 72-inch steel pipe piles with an impact hammer, and thus, impact the largest area. During implementation of the Program, tower repairs and replacements could occur at as many as 17 sites per year, and PG&E will utilize piles as large as 72-inches in diameter. Therefore, our analysis assumes that the largest and loudest piles (60-inch and 72-inch) will be used at up to 17 sites per year. In the project's biological assessment, PG&E examined hydroacoustic monitoring results for similar sized piles and in similar conditions presented in the Technical Guidance for the Assessment of Hydroacoustic Effects of Pile Driving on Fish (Molnar *et al.* 2020).

To estimate the peak SPL and cSEL that will occur during pile driving at PG&E tower foundation repair/replacement sites, NMFS used proxy sound levels contained in the NMFS Optional Multi-Species Pile Driving Calculator, Version 1.2-Multi-Species 2022



([https://media.fisheries.noaa.gov/2022-08/BLANK%20Multi-Species%28AUGUST%202022%29PUBLIC OPR1.xlsx](https://media.fisheries.noaa.gov/2022-08/BLANK%20Multi-Species%28AUGUST%202022%29PUBLIC%20OPR1.xlsx)). Most of the proxy values presented in the NMFS Optional Multi-Species Pile Driving Calculator were obtained from Molnar *et al.* (2020). We used this calculator because it provides a conservative and consistent method for estimating sound pressure levels at distance from pile driving, and is appropriate for projecting underwater sound levels at multiple locations throughout the San Francisco Bay

Calculator results are presented in Table 7 and show estimates of distance from a pile to peak SPLs and cSELs (*i.e.*, NMFS dual metric criteria) during impact hammer pile driving of steel piles ranging from 16 inches to 72 inches in diameter. Proxy values were selected from pile driving projects with the same pile type/size and similar water depths. The underwater sound estimates in Table 7 also incorporate sound attenuation by use of an air bubble curtain or cofferdam. Air bubble curtains are constructed by the placement of one or more horizontal concentric rings of perforated tubing around the pile. Air is pumped through the tubes and into the rings to emit a curtain of bubbles that encapsulate the pile. To optimize the sound attenuation capability of the curtain, the amount of bubbles and thickness of the curtain are maximized by adjusting the flow of compressed air delivered to the perforated tubing. If a cofferdam is used, dewatering of the area around the pile will attenuate sound propagation during pile driving. Therefore, the sound level estimates presented in Table 7 include 5 dB of sound attenuation. It should be noted that hydroacoustic monitoring of individual projects have reported sound attenuation levels from bubble curtains as high as 20 dB (Molnar *et al.*, 2020); however, the implementation of bubble curtains and the corresponding attenuation are not consistent. Cofferdams are thought to provide as great, if not greater, attenuation than bubble curtains; however, some acoustic monitoring has provided mixed results. Due to these inconsistencies, no more than 5 dB attenuation is recommended by Molnar *et al.* (2020) when estimating the sound attenuation benefits of air bubble curtains and cofferdams.

**Table 7. Projected Impact Hammer Sound Levels with Steel Piles\***

Steel Pile Size	Distance (ft) to 206 dB peak	Distance (ft) to 187 dB accumulated SEL/day	Distance (ft) to 150 dB RMS
16-inch	0	30	243
20-inch	20	446	4,458
24-inch	10	552	7,065
36-inch	20	827	7,065
60-inch	30	1,778	15,226
72-inch	30	1,309	15,226

\*5 dB reduction assumed for sound attenuation with use of air bubble curtains or cofferdams. All examples in water depths  $\leq$  17 feet and calculations are for 2,000 strikes/day.

The calculator utilized by NMFS predicts SPLs from a pile driven with an impact hammer during O&M Program activities could exceed the 206 dB peak single strike threshold for a distance of up to 30 feet. At this close range, several factors make it unlikely that listed salmonids or green sturgeon will be adjacent to a pile during driving with an impact hammer. If a cofferdam is deployed, PG&E will use plywood or metal sheets to dewater the work site and fish

will not have access to the area immediately surrounding the pile. If a bubble curtain is used, placement of the curtain will occupy about 5-10 feet of the radial distance outward from the pile. Activation of the air bubble curtain prior to the initiation of pile driving is expected to startle fish adjacent to the pile and likely result in a flight response. Although most fish are likely to perceive these construction activities as a stimulus indicating potential danger in its immediate environment, not all fish may flee the area. Thus, there remains a distance up to 30 feet from a pile where peak sound levels are expected to exceed 206 dB and a small number of listed fish in this area are expected to be injured or killed by barotrauma.

In addition to peak sound levels exceeding 206 dB, cSEL is expected to result in injury or mortality of listed fish and cSEL will extend for a significantly greater distance from the pile. In general, the larger the pile diameter, the greater the distance and larger the area impacted by underwater sound levels during driving with an impact hammer. Information available to estimate cSEL for this Program indicates the greatest distance will occur during the driving of 60-inch piles (Table 7). The calculator predicts the extent of SPLs above a cSEL of 187 dB would extend up to a radial distance of approximately 1,778 feet from a 60-inch pile, and encompass the active working area under and around each pile location. For 72-inch piles, cSEL of 187 dB is projected to extend to a distance of 1,309 feet. For the purposes of this analysis, the zone of potential injury or mortality to listed fish is associated with a cSEL equal to or greater than 187 dB and is defined as the area in which fish could experience a range of barotraumas, including the damage to the inner ear, eyes, blood, nervous system, kidney, and liver. These injuries have the potential to result in the mortality of an individual fish either immediately or later in time.

Based on the foraging behavior and movements of green sturgeon within San Francisco Bay, some individuals are expected to be exposed to elevated sound levels during pile driving activities at PG&E electrical tower work sites in the San Francisco, San Pablo and Suisun bays. Similarly, if the Program needs to complete work with an impact hammer outside of the LOP, then listed salmonids would also be subjected to elevated sound levels. NMFS estimates that only a very small number of threatened Southern DPS green sturgeon would likely be injured or killed by the proposed pile driving because few individuals are likely to be exposed to a cSEL of 187 dB or greater. To incur injury or mortality, an individual fish would need to remain continuously within the zone of cSEL (see Table 7) for an extended period of time during pile driving. Thomas *et al.* (2022) examine the movement patterns of juvenile green sturgeon in San Francisco Bay and concluded that there are multiple behavioral movement patterns and a broad use of regional habitats. With this widespread distribution of green sturgeon throughout the Bay, pile driving activities by the O&M Program may expose sturgeon to the impacts of pile driving at any of the electrical tower work sites.

Similarly, NMFS estimates that a very small number of listed salmonids are likely to be injured or killed by high cSEL during the driving of steel piles, because this high impact activity would generally not occur when migrating salmonids are present in San Francisco Bay. Pile driving that occurs after November 30 will overlap with the adult upstream migration periods of Sacramento River winter-run Chinook salmon, CCV steelhead and CCC steelhead. However, adult upstream migrating Chinook and steelhead rapidly pass through the Bay on their way to their natal spawning streams. Adults salmonids in the Bay also make little use of shallow and nearshore

habitats where most pile driving will occur, and therefore, will be exposed to injurious levels of underwater sound in very small numbers. Juvenile and smolt listed anadromous salmonids are more likely to use nearshore habitats in the Bay for rearing and foraging, but the work window will prohibit pile driving activities from occurring after January 15 when juvenile and smolt salmonids are most likely to be present in the Bay.

Within the zone of cSEL of 187 dB (e.g., up to a maximum of 1,778 feet with a 60-inch pile being driven), most exposed listed fish are unlikely to remain in the same location to experience the full duration of a pile driving event due to tidal currents and behavioral movements. However, a few listed fish individuals could remain stationary long enough to be exposed to levels which cause injury or mortality. Although no data are available to quantify the risk of exposure to the cSEL threshold of 187 dB, some listed salmonids and sturgeon are expected to be injured or killed due to the large number of PG&E facilities throughout the action area that may be repaired or replaced during the 10-year duration of the proposed O&M Program.

PG&E also proposes to utilize vibratory hammers and helical pile driving. Vibratory hammers use counter-rotating eccentric weights to transmit vertical vibrations into the pile, causing the sediment surrounding the pile to liquefy and allow the pile to penetrate the substrate. The vibratory hammer produces sound energy that is spread out over time and is generally 10 to 20 dB lower than impact pile driving (Molnar *et al.* 2020). Based on the results of hydroacoustic monitoring of vibratory hammer pile installations (Molnar *et al.* 2020), the sound levels generated by vibratory hammer use over the course of this Program will be considerably below the injury and mortality thresholds for both single strike and cSEL. Helical pile driving involves turning, or screwing, large piles into the substrate instead of using a hammer. This is a relatively new technology and sound levels associated with this method are expected to be less than those associated with pile driving hammers (Byrne and Houlsby (2015)). Effects associated with vibratory hammers and helical pile driving during O&M Program activities are expected to be temporary behavioral effects that are discussed below.

Beyond the zone of potential injury or mortality, sound levels are projected to exceed 150 dB RMS to a maximum distance of 15,226 feet during the impact driving of 60-inch and 72-inch steel piles. Fish may demonstrate temporary abnormal behavior within this zone during pile driving indicative of stress or exhibit a startle response. A fish that exhibits a startle response may not be injured, but display behavior that suggests it perceives a stimulus indicating potential danger in its immediate environment. The behavioral impact zone is approximately 16,000 acres for the 60-inch and 72-inch diameter piles.

If listed fish enter or transit the behavior impact zones described above during pile driving, there could be behavioral reactions. Fish may leave the area or avoid the area due to the elevated underwater sound levels. As noted above, many fish species demonstrate an avoidance reaction in the near-field (Dolat 1997). While behavioral impacts of ESA-listed fish during pile driving have not been specifically studied, NMFS anticipates that listed fish species, like other fish studied, will exhibit startle and avoidance behavioral reactions by swimming away from the work site. If elevated SPLs during pile driving result in a level of disturbance that causes salmonids and green sturgeon to leave or avoid the zone of behavioral impacts, foraging and migrating could be interrupted. Assuming the worst-case scenario, elevated sound levels could

render the behavioral impact zone unusable by listed fish during the hours when pile driving operations are underway.

For the Program's use of an impact hammer to install steel piles, no more than 2,000 strikes would be applied per day at each work site. As described above in Section 2.4, the action area provides soft bottom, sub-tidal foraging habitat for green sturgeon and juvenile listed salmonids forage within the upper portion of the water column. This temporal loss of foraging area will affect green sturgeon. Individuals could be displaced from preferred forage areas until each day's pile driving activities have concluded.

Similar to foraging behavior, the zone of behavioral impacts during pile driving may affect the migration of adult salmonids and green sturgeon. In particular, impact hammer pile driving at electrical tower sites within narrow channels or confined sloughs could create a zone of behavioral impacts that spans the channel width, and cause delays and disruption of migration movements. Based on the location of PG&E's electrical towers in San Francisco Bay (Figure 1), the zone of behavioral impacts during pile driving could span the width of Mare Island Strait and the lower Napa River. Migrating listed fish attempting to pass through the zone of behavioral effects during the period of 60- and 72-inch pile driving may temporarily stop migrating or shift their migration path.

If a behavioral response results in a delay/shift in migration or movement away from foraging areas, the duration of these behavioral effects is expected to be short because the Program will only use one impact hammer at a time with no more than 2,000 strikes per day. Depending on the site and type of pile, an impact hammer typically strikes the pile at a rate of once every 1.5 to 2 seconds (Molnar *et al.* 2020). Thus, pile driving events and the associated elevated underwater sound levels will be brief. These short temporary delays/detours to migration and displacement from foraging areas within the zone of behavioral impacts are not expected to result in adverse effects because fish are expected to safely return to these areas and continue migration movements when pile driving ceases. Additionally, high ambient levels of underwater sound in San Francisco Bay are likely to mask the noise of pile driving in the zone of behavioral influence as presented below.

In San Francisco Bay, ambient sound levels are reported to range from 120-155 dB peak (Strategic Environmental Consulting, Inc. 2004, as reported in Molnar *et al.* 2020). Thus, ambient sound levels in the action area are likely similar at times to the 150 dB RMS levels anticipated to occur inside the zone of behavioral effects during pile driving. With this level of ambient sound in the environmental setting of San Francisco Bay, elevated sound levels due to this Program's activities within the zone of behavioral effects may be hard to distinguish from other anthropogenic sources of sound, such as commercial vessels and recreational boats. Thus, elevated sound levels of 150 dB RMS originating from the installation of steel piles by this Program may not result in an avoidance response by listed fish. If there are behavioral responses, the effects of 150 dB RMS will be short term and the temporary delays to migration or displacement from a foraging area are expected to be negligible on listed fish. Based on the above, the temporary behavioral effects described above during pile driving are not expected to result in adverse effects to green sturgeon and listed anadromous salmonids.

Program O&M activities may also install wooden piles to repair or replace electrical infrastructure in the action area. Wooden piles are typically installed with a drop hammer and a cushion block is used between the hammer and the pile. Hydroacoustic monitoring of wooden pile installations have occurred in San Francisco Bay and results reported in Molnar *et al.* (2020). Monitoring results indicated that underwater SPLs from wood piles installed with an impact hammer do not reach the dual metric criteria for fish injury or mortality. Peak sound levels at 33 feet from the pile were generally in the range of 170 to 180 dB, and RMS levels generally ranged from 160 to 170 dB. Therefore, installation of wood piles by the Program are not expected to result in the injury or mortality of listed fish; however, elevated underwater sound levels during the installation of wooden piles will disturb listed fish and result in the disturbance effects described above for steel piles.

PG&E also proposes to use concrete piles at some locations for Program activities. Concrete piles would be cast in place using a hollow steel pile as the casing or form. Thus, installation of a concrete pile would always be preceded by the driving of a hollow steel pile and the effects of steel pile installation are described above. Filling of the hollow steel pile with concrete may affect water quality and potential effects of concrete use by the Program are presented below in Section 2.5.1.5 of this opinion.

#### **2.5.1.5 Line Reconductoring in Tidal Waters**

To perform line reconductoring between electrical towers in tidal waters, the O&M Program may use barges and/or helicopters. Work crews install replacement conductors by temporarily splicing them to the ends of the existing conductors and pulling them through travelers (i.e., pulleys) attached to the arms of the towers or pole cross-arms. Reconductoring typically is conducted in 2 to 3-mile sections and on-water pull sites will be located on work barges. Aside from utilizing a work barge, no in-water work is associated with line reconductoring activities.

During line reconductoring activities in shallow water areas, barges will utilize periods of high tide to minimize contact with the bottom of San Francisco Bay, as the barges must navigate along the transmission line in a manner that allows crews to work from the barge platform. When the barges are not in use, they will be docked at existing marina/dock facilities or landed in areas that avoid disturbance of submerged aquatic vegetation and wetland vegetation (NOAABA-AMM-01). For these reasons, disturbance of the substrate by work barges during line reconductoring is expected to be minimal. Benthic habitat disturbance by barges and other O&M activities is discussed further in Section 2.5.1.7 below. Because barges move slowly when working or relocating to and from work sites, any fish swimming near the surface that encounter a barge would be able to easily avoid the barge. Thus, NMFS believes it improbable that any listed fish would be struck by a barge. Any changes in habitat caused by shading from the barge on the water's surface would be minimal and temporary.

Use of helicopters during line reconductoring will result in elevated levels of sound in the air above the water surface. The extent of transmission of this sound to areas underwater is unknown but may be detected by listed fish in Bay waters. As discussed above in Section 2.5.1.3, sound exposures have been shown to alter the behavior of fishes (see review by Hastings and Popper 2005). Observed behavioral changes include startle responses and increases in stress hormones. With high levels of ambient sound in San Francisco Bay (reported to range from 120-155 dB

peak [Strategic Environmental Consulting, Inc. 2004, as reported in Molnar et al. 2020]), any elevated underwater sound levels due to operation of helicopters during line reconductoring are expected to have negligible effects on the behavior of listed salmonids and green sturgeon. If there are behavioral responses, the effects are anticipated to be short term and temporary.

### **2.5.1.6 Water Quality**

Water quality in the estuarine portion of the action area may be degraded at electrical infrastructure work sites during the Program's construction activities. Disturbance of soft bottom sediments during the removal of existing piles and installation of new piles, and the construction of cofferdams is expected to result in temporary increased levels of turbidity. Additionally, water quality may be degraded through the suspension of sediment-associated contaminants in the water column. Program activities also include the use of concrete at tower foundations and to construct concrete piles.

Water quality in the freshwater portion of the action area may be affected by the O&M Program's access road maintenance activities. The effects of routine road maintenance activities on water quality are presented in Section 2.5.3 below.

#### *Turbidity and Suspended Sediment*

High concentrations of suspended sediment can disrupt normal feeding behavior (Cordone and Kelley 1961, Bjornn *et al.* 1977, Berg and Northcote 1985, Benfield and Minello 1996), reduce growth rates (Crouse *et al.* 1981, Nightingale and Simenstad 2001), and increase plasma cortisol levels (Servizi and Martens 1992). High and prolonged turbidity concentrations can reduce dissolved oxygen in the water column, result in reduced respiratory functions, reduce tolerance to diseases, and can also cause fish mortality (Sigler *et al.* 1984, Berg and Northcote 1985, Gregory and Northcote 1993, Velagic 1995, Waters 1995). Even small pulses of turbid water can cause salmonids to disperse from established territories (Waters 1995), which can displace fish into less suitable habitat and/or increase competition and predation, thus decreasing chances of survival.

As piles are driven and removed from the Bay substrate by the Program, fine-grain sediments such as clay and silt material will be disturbed and generate increased levels of turbidity in the adjacent water column. Sheet piles and plywood installed for the construction of temporary cofferdams will also disturb the Bay floor and distribute sediment into the water column. The extent of turbidity plumes resulting from Program construction will depend on the substrate, tide, currents, and wind conditions during these activities.

Based on observations of similar pile and cofferdam activities in the San Francisco Bay, increased levels of suspended sediment and turbidity during this Program's construction activities are anticipated to be minor, localized, and short-term. With strong tidal currents in the majority of the action area, any elevated levels of suspended sediment or turbidity are anticipated to rapidly return to background levels after work ceases. In areas with lower rates of tidal exchange, elevated levels of suspended sediments and turbidity will be detectable for two or three tidal cycles prior to returning to ambient levels.

Based on the anticipated extent and levels of turbidity associated with construction activities by the Program, the effects are not expected to result in harm or injury, or behavioral responses that impair migration, foraging, or make listed fish more susceptible to predation. If fish temporarily relocate from areas of increased turbidity, habitat of similar value is available in the surrounding waters adjacent to the PG&E work sites in the action area. Adjacent habitat areas also provide adequate carrying capacity to support individual fish that are temporarily displaced during in-water construction activities that cause increases in turbidity and suspended sediment. For these reasons, the potential effects on listed fish species of minor and localized areas of elevated turbidity and suspended sediment associated with this Program's construction activities are expected to be negligible.

### Contaminants

As described above in the Environmental Baseline, water and sediment quality within the action area are affected by stormwater runoff, industrial activities, and other urban influences. Dillon and Moore (1990) reported that major pollutant sources for the San Francisco Bay include the freshwater flow from the Sacramento-San Joaquin River systems, over 50 waste treatment plants, and about 200 industries which are permitted to discharge directly into the Bay (citing Luoma and Phillips 1988). Tire shreds/dust that produce a degradation product (6PPD-quinone) have been found to be ubiquitous where urban roadways drain into waterways (Feist *et al.* 2018, Sutton *et al.* 2019). Environmental contaminants discharged into aqueous systems tend to associate with particulate material in the water column and with consolidated bedded sediments. However, since the U.S. Environmental Protection Agency started the National Pollutant Discharge Elimination System in 1972, water quality in San Francisco Bay has improved considerably.

During the installation and removal of piles and cofferdams, bottom sediments will be suspended and contaminants may be released to the water column. However, based on the types of activities conducted by the Program, the short duration of activities at each work site, and equipment to be used, the suspended plumes of sediment and potential contaminants released during construction are expected to be localized and short-term. Any minor and localized elevations in contaminants which might result from those suspended plumes are expected to be quickly diluted by tidal circulation to levels that are negligible for ESA-listed fish species.

Equipment refueling, fluid leakage, equipment maintenance, and construction activities near open waters pose some risk of contamination of aquatic habitat and subsequent injury or death to listed fish. Oils and similar substances from construction equipment can contain a wide variety of polycyclic aromatic hydrocarbons (PAH) and metals. Both can result in adverse impacts to fish. The Program will have in place spill and prevention measures designed to avoid contamination from equipment refueling, leakage, maintenance or other activities. NMFS anticipates the Program's proposed measures to prevent contamination will adequately protect water quality and avoid adverse effects by contaminants on listed fish.

### Use of Concrete

The repair or replacement of tower foundations will involve the pouring and curing of concrete, which can result in increased pH levels in adjacent waters. Exposure to variations in pH in the aquatic environment can result in impacts to fish in the form of gill damage, disruption of

sodium balance, ammonia excretion or in some cases the increased toxicity of other elements in the aquatic environment (McLeay and Associates 1983, Baekken 2014, Foldvik *et al.* 2022). As described in Section 1.3.5, the release of uncured concrete into the water would not be allowed during repair or replacement of electrical infrastructure. All concrete will be contained within forms, for at least 24 hours, to prevent wet concrete from leaching into the aquatic environment. With implementation of the Program's proposed avoid and minimization measures, the risk of increased pH and subsequent impacts to fish and other aquatic organisms in the estuary would be avoided.

### **2.5.1.7 Benthic Habitat**

Disturbance of benthic habitat by PG&E O&M activities has the potential to affect foraging and prey availability for listed fish. Green sturgeon forage throughout the estuarine portion of the action area on demersal fish and benthic invertebrates. Radtke (1966) analyzed stomach contents of juvenile green sturgeon captured in the Sacramento-San Joaquin Delta and found the majority of their diet was benthic invertebrates, such as mysid shrimp and amphipods (*Corophium* spp). In San Francisco Bay, green sturgeon are known to forage in shallow tidal flats dominated by burrowing shrimp and other benthic prey (Dumbauld *et al.* 2008).

For Chinook salmon and steelhead, research indicates salmonid juveniles that use the estuary for rearing appear to prefer shallow water habitats near the shore and the upper portion of the water column (less than 10 feet deep) (Kjelson *et al.* 1982). In the action area of this project, salmonid juveniles have been observed rapidly migrating to the ocean (MacFarlane and Norton 2002), but some juvenile Chinook and steelhead are likely to forage during their migration through San Francisco Bay and feed upon prey items nearshore and in the upper water column. Prey organisms in the upper water column are unlikely to be affected by the Program's activities that disturb benthic habitats. Although benthic disturbance near the shoreline and in tidal marshes have the potential to impact prey of juvenile salmonids in the estuary.

Several proposed O&M Program activities are likely to disturb benthic habitats and the associated community of benthic organisms. The Program's installation and removal of cofferdams and pilings are expected to injure and kill benthic invertebrates that are directly in the footprint of these activities. Cofferdams will temporarily close-off areas and benthic habitat within the enclosures will be disturbed. Work barges that rest on the substrate during low tide will disturb benthic habitat; however, disturbance of the substrate by barges is expected to be minimal and barges in shallow areas will be placed to avoid disturbance of submerged aquatic vegetation and wetland vegetation (NOAABA-AMM-01). Permanent loss of benthic habitat will result from fill associated with new and expanded tower foundations and boardwalks. However, in some instances the installation of these structures will include removal of older, existing structures and there may be little change in the total area of infrastructure on the bay floor. Placement of mats on the substrate during work activities will temporarily cover areas that contain burrowing benthic invertebrates.

At individual work sites the extent of impacts to the benthic community is expected to be small areas immediately surrounding each tower repair/replacement project; although the area affected will be larger if a cofferdam is constructed. PG&E estimates the average footprint of impact at each site is limited to 500 square feet; however, due to the large number of facilities, the



Program's biological assessment estimates proposed activities will annually result in temporary impacts of up to 0.58 acre of habitat (PG&E 2022). Permanent impacts associated with the repositioning/relocation of tower footings and foundations are anticipated to be approximately 0.08 acre of surface area annually (Table 6).

For aquatic benthic invertebrates injured and lost to construction disturbance, sites are expected to be re-colonized within a few months from adjacent undisturbed areas. Although as many as 17 sites may have work performed in a single year, the sites are dispersed throughout a large geographic area and impacts are primarily temporary. NMFS does not expect this temporary loss of benthic prey in the action area will prevent sturgeon and listed salmonids from finding suitable forage at the quantities and quality necessary for normal behavior (e.g., maintenance, growth, reproduction). Permanent loss of benthic habitat where foundations and/or tower footings are relocated is also not expected to adversely affect prey availability and foraging by listed fish because the area impacted is low (approximately 0.08 acre per year), and in some instances abandoned electrical infrastructure will be removed.

To mitigate for permanent impacts to habitat, PG&E intends to contribute funds that will be used for projects to improve fish passage and/or fish habitat within San Francisco Bay and freshwater migratory corridors within the greater San Francisco Bay Area. These mitigation projects would obtain approval from the Corps through separate permits and their effects are not considered in this opinion because they will be addressed in future consultations pursuant to section 7 of the ESA.

#### **2.5.1.8 Effects of O&M Activities at Electrical Infrastructure on Critical Habitat**

As described in Section 2.5.1 of this opinion, the O&M Program includes maintenance of electrical transmission lines that are supported by steel-lattice towers, steel poles, and wooden poles. The majority of PG&E's electrical infrastructure in the Bay Area is located in terrestrial areas. No electrical infrastructure is located in freshwater streams and no electrical infrastructure maintenance activities would be conducted in streams. Measures proposed by PG&E in terrestrial areas during work on electrical towers and poles are expected to prevent the degradation of water quality in streams designated as critical habitat for listed anadromous fish. Thus, electrical tower and pole repairs/replacements in terrestrial areas are anticipated to have no effect on designated critical habitat.

Electrical infrastructure O&M activities authorized by this RGP that will affect critical habitat for listed anadromous fish are located in tidally-influenced areas in San Francisco Bay. The San Francisco Bay estuarine portion of the action area is designated as critical habitat for Southern DPS green sturgeon, Sacramento River winter-run Chinook salmon, and CCC steelhead (see Section 2.4.3 of this opinion). Program activities are expected to temporarily alter water quality and impact benthic habitat at work sites in designated critical habitat.

#### **Water Quality**

The effects of Program construction activities on water quality are discussed above in Section 2.5.1.5 of this opinion and also apply to designated critical habitat in the action area. As described above, the effects of the proposed Program will result in increased levels of turbidity

and the suspension of sediment-associated contaminants. The impacts on water quality from turbidity and contaminants are not expected to degrade PBFs of ESA-listed fish species because the level of potential contaminants and turbidity is low, and both turbidity and contaminant-laden sediments are expected to be further dispersed (levels reduced) by tides and currents in the action area. The effects of the degradation product (6PPD-quinone) associated with tire shreds are unlikely to be exacerbated by O&M Program activities. Thus, effects of degraded water quality on designated critical habitat are expected to be short-term, minor, and localized.

### *Benthic Community*

The effects of Program activities on benthic habitat are discussed above in Section 2.5.1.6 of this opinion. The Program's installation and removal of cofferdams and pilings are expected to injure and kill benthic invertebrates which could degrade the PBFs of critical habitat associated with foraging. In areas where benthic habitat disturbance is temporary, benthic invertebrates are expected to re-colonize work sites within a few months. Permanent impacts associated with the relocation or expansion of electrical tower foundations would result in the loss of benthic habitat and are estimated to be up to 0.08 acres annually. This permanent habitat loss will be dispersed throughout a large geographic area and sites are non-contiguous. For the reasons presented above and in Section 2.5.1.6 of this opinion, the small disconnected areas of permanent benthic habitat loss by the 10-year program will degrade PBFs of designated critical habitat for the Southern DPS green sturgeon, Sacramento River winter-run Chinook salmon, and CCC steelhead, but not significantly compromise the value of foraging habitat in this large geographic area.

### **2.5.2. Effects of O&M Activities at Natural Gas Infrastructure**

Natural gas infrastructure O&M work activities to be conducted under this RGP that will affect listed anadromous fish are primarily located in the channels of freshwater streams upland from San Francisco Bay, but a small number of gas lines are located in tidal wetlands or estuarine waters (see Table 5 for waterways with gas line crossings). Of the five listed anadromous fish species addressed in this opinion, only CCC steelhead and their designated critical habitat occur in the freshwater portion of the action area. Gas line activities in tidal areas affect CCC steelhead and will also affect CCV steelhead, Sacramento River winter-run Chinook, CV spring-run Chinook, and Southern DPS green sturgeon.

Natural gas line O&M activities consist of site-specific erosion measures over pipelines, pipeline recoating, pipeline replacement, valve recoating, and valve replacement. These activities will affect listed anadromous fish and/or designated critical habitat at gas line crossings in freshwater channels and in tidal wetland areas. PG&E's pre-construction notifications for individual O&M activities will identify specific locations and specify whether or not listed anadromous fish or designated critical habitat may be present at gas line crossing work sites.

The proposed O&M activities associated with gas line infrastructure generally involve the excavation of materials to expose the gas line or valve, performing the recoating or replacement work (valve or pipeline), and then replacing the excavated materials to re-bury the pipeline. For site-specific erosion protection, biodegradable jute netting and other non-hardscape materials will be placed on exposed sections of pipeline in the stream channel to prevent further erosion. PG&E proposes to limit O&M activities associated with gas line crossings at waterways with

listed anadromous fish to periods when the work sites are naturally dry (see NOAABA-AMM-13). By restricting gas line maintenance to sites that are naturally dry, no dewatering with cofferdams will be required, and the potential adverse effects associated with excavation and trenching in wetted areas will be avoided.

Some gas line crossing sites included in Table 5 are located on waterways that do not seasonally dewater during the dry season and these locations are specified on the table as “likely to support year-round flow”. At these sites, traditional excavating and trenching methods will not be conducted and PG&E will develop alternative methods for repairing or replacing gas lines. The RGP will not authorize in-water work at these pipeline crossing sites. With PG&E only employing methods that avoid work in channels at crossings with year-round flow, no effects to listed anadromous salmonids and green sturgeon are anticipated at these sites with year-round flow.

#### Effects on Fish

In tidal wetlands, work on gas line infrastructure would only be performed at sites that are located in high marsh areas. Some high marsh areas would be inducted at extreme high tides, but O&M Program work activities would be scheduled to avoid extreme tide events and be completed without effecting tidal waters. Similarly, on freshwater streams O&M activities on gas lines would be scheduled for the dry season when work sites are naturally dry. No dewatering would be performed to conduct these O&M activities. Under all water year conditions, O&M activities would be scheduled to ensure work is performed when anadromous salmonid streams contain no flowing water at work sites. At gas line valves, excavation of soils to expose valves located near waterways with listed anadromous fish would be performed without disturbing the stream or tidal channel. If work activities impact riparian vegetation, sites will be revegetated with native plant species in a manner consistent with maintaining safety at PG&E’s infrastructure.

By avoiding periods when work sites may be inducted by high tides and only working in stream channels that contain no flowing water, no listed fish will be present during work activities on natural gas infrastructure. Construction activities are expected to proceed with no immediate effects on listed fish and no discharge of construction debris into waters with listed fish because no water will be present. O&M activities would be completed before the return of tidal inundation in estuarine areas and prior to the return of fall/winter surface flow in freshwater streams. Thus, no impacts to listed fish would occur during construction activities on gas line infrastructure.

#### Water Quality

Post-construction, minor turbidity will occur in waters at work sites when the site is re-watered during the following wet season with rainfall or during extreme high tide events in tidal wetlands; however, PG&E’s use of erosion control measures and plantings of native vegetation are expected to minimize the mobilization of sediments from areas disturbed by construction activities. The resulting increase in turbidity levels in the waterways is expected to be minor and rapidly dissipate to ambient levels. For these reasons, the effects of O&M activities at gas line infrastructure on listed anadromous fish from changes in water quality in the action area are expected to be negligible.

### Channel Form and Function

Site-specific erosion solutions on gas line crossings in waterways with listed anadromous fish could contribute to the long-term preclusion of natural fluvial and geomorphic processes. For example, in most low gradient streams the channel will naturally “meander”, eroding laterally to dissipate its hydraulic energy while creating a sinuous longitudinal course. Stream meandering efficiently regulates the erosive forces by lengthening the channel and reducing stream gradient, thus controlling the ability of the stream to entrain and transport available sediment. Meandering streams also create and maintain both the hydraulic and physical components of instream habitat used by fish and other aquatic species. Specific to salmon and steelhead, a meandering, unconstrained stream channel sorts and deposits gravel and other substrate necessary for optimal food production and spawning success, maintains a healthy and diverse riparian corridor that supplies large woody debris to the channel, and inundates adjacent floodplain habitat during appropriate winter/spring flows (Spence *et al.* 1996).

Proposed site-specific erosion solutions at gas line crossings could result in small-scale permanent alteration of channel morphology by altering the physical land/water interface (i.e. streambank) that provides shelter, food, and other ecosystem benefits to aquatic species, including juvenile salmonids. Channel hydraulics could also be affected at erosion solution sites if the channel width is reduced. Channel constrictions, particularly with hardscape, can increase water velocities and cause corresponding increases in shear stress and degradation along stream banks (Simon and Johnson 1999).

For erosion protection actions authorized by this RGP in waterways with listed anadromous fish, PG&E would not utilize hardscape materials. Erosion protection projects would not span more than 20 percent of the active channel width and not exceed 500 square feet per site. Materials, such as jute netting, straw waddles, native plants and hydroseeding will be placed in the channel in a manner that avoids the constriction of flow and will not increase water velocities (NOAABA-AMM-14). These limits on the extent of erosion protection actions will avoid channelization and impairment of natural channel processes. These measures will also ensure fish passage and bedload transport persist in the channel. No significant effects to channel morphology and hydraulic conditions are anticipated by the O&M Program’s erosion protection actions on freshwater stream and tidally influenced areas because hardscape will not be used and no erosion protection will be placed in at least 80 percent of the active channel width. Stream channels and tidal sloughs at and adjacent to work sites are anticipated to continue to maintain existing features that provide complex rearing, feeding, spawning, and shelter habitat. Based on the proposed measures and limits for erosion protection activities at gas line crossings, this O&M Program element is expected to have minimal impacts on natural channel functions and habitat condition for anadromous fish in streams throughout the action area.

### Riparian Vegetation

O&M Program activities at gas line crossings will result in the removal or disturbance of existing riparian vegetation. Riparian vegetation helps maintain suitable stream habitat conditions for anadromous salmonids. Riparian zones and aquatic vegetation serve important functions in stream ecosystems, such as providing shade (Poole and Berman 2001), sediment storage and filtering (Cooper *et al.* 1987, Mitsch and Gosselink 2000), nutrient inputs (Murphy and Meehan

1991), water quality improvements (Mitsch and Gosselink 2000), channel and streambank stability (Platts 1991), habitat heterogeneity (Bryant 1983, Lisle 1986, Shirvell 1990), and refugia (Bustard and Narver 1975, Wesche *et al.* 1987, Murphy and Meehan 1991). Riparian vegetation disturbance and removal can degrade these ecosystem functions and impair stream habitat. Riparian canopy is considered a primary driver of stream temperature (Poole and Berman 2001). Removal of riparian vegetation increases stream exposure to solar radiation, leading to increases in stream temperature.

Under this RGP, instream and streamside riparian vegetation will be removed from channels to facilitate maintenance activities at PG&E infrastructure. A reduced amount of riparian vegetation often leads to reduced amount of cover used by salmonids (Bisson *et al.* 1988; Bjornn and Reiser 1991) and increases in stream temperature. The effects of riparian disturbance by PG&E O&M activities are expected to be minor because the area of impact at individual work sites is relatively small and sites will be re-vegetated post-construction with appropriate native species (NOAABA-AMM-16). Furthermore, the small number of projects on streams each year (two erosion protection; two pipeline re-coatings, two pipeline replacements, and one valve recoating/replacement) are distributed throughout all the streams in the nine-county action area. This wide distribution will limit the aggregate impacts on riparian zones and no adverse effects to stream ecosystem function are anticipated over the 10-year period of this RGP. Reseeding and revegetating disturbed areas following construction will reduce impacts to largely short-term periods. Disturbed areas are expected to regain lost shading and ecosystem function within a few years following construction.

In tidally-influence areas, the O&M Program's measure to revegetate areas subject to riparian vegetation impacts applies (NOAABA-AMM-16). Regarding eelgrass, beds of this seagrass occur throughout San Francisco Bay. Eelgrass beds are comprised of dense grass-like shoots that provide year-round fish habitat in soft sediments of the lower intertidal and shallow subtidal areas, providing three-dimensional structure in sandy or muddy soft bottom habitat, adding to fish forage and rearing habitat. The O&M Program proposes to avoid activities in all eelgrass beds and will comply with the NOAA Fisheries' California Eelgrass Mitigation Policy and Implementing Guidelines (NOAA Fisheries 2014), when activities are located adjacent to eelgrass (NOAABA-AMM-07). These measures in tidal areas are expected to reduce impacts to riparian vegetation to short-term periods and avoid impacts to eelgrass.

### Critical Habitat

Proposed maintenance at gas line crossings has the potential to affect critical habitat through impacts to water quality, impacts to riparian vegetation, impair natural channel processes, and reduce habitat complexity. As discussed above, work will only be performed in dry channels and effects to water quality will be limited to minor increases in turbidity when project sites are re-watered during the following wet season with rainfall. Riparian vegetation will also be impacted by construction activities; however, PG&E will replant work sites with appropriate native species post-construction to mitigate for impacts to riparian vegetation. In tidal areas, work activities will not be performed within eelgrass beds. Site-specific erosion solutions also have the potential to impact designated critical habitat by reducing instream features that provides shelter, food, and other ecosystem benefits to aquatic habitat. For erosion solutions installed by PG&E under this RGP, projects will not include hardscape in streams with CCC steelhead critical

habitat and will not exceed more than 20 percent of the active channel width. Additionally, erosion solutions will not exceed a project footprint area of 500 square feet on streams with listed anadromous salmonids. These measures are expected to largely avoid adverse effects to instream habitat and natural channel functions because no hardscape will be used and work sites are small. Fish passage will be unaffected because erosion solutions materials will be placed in the channel in a manner that does not constrict flow and will not increase water velocities. Based on the above, the effects of O&M projects at natural gas line crossings conducted by PG&E under this RGP are expected to be negligible on designated critical habitat for CCC steelhead.

### **2.5.2.1 Gas Pressure Limiting Station Construction**

In addition to the gas line O&M activities presented above, PG&E proposes to install new pressure limiting stations on natural gas lines. A typical pressure limiting station is constructed within a footprint of approximately 250 feet by 100 feet and all stations are placed in upland areas. Pressure limiting stations will not be located in tidal waters or freshwater streams. The O&M Program has proposed sufficient measures during construction activities to prevent the discharge of contaminants and disturbed sediments from entering waterways with listed anadromous fish and designated critical habitat. Accordingly, proposed O&M Program activities associated with construction of pressure limiting stations are anticipated to have no effect on listed anadromous fish or designated critical habitat.

### **2.5.3. Effects of O&M Activities on Access Roads**

The O&M Program proposes to perform routine maintenance on roads that provide access to PG&E's natural gas and electrical infrastructure facilities. Routine road maintenance activities will primarily occur in upland areas and the majority of activities will have no effect on waterways in the action area. However, there will be repair and replacement of culverts at stream crossings on non-public roadways within the nine-county Program area. The locations of culvert work at road crossings are not known at this time, but could include streams that support CCC steelhead and/or designated critical habitat for CCC steelhead, CCV steelhead, CV spring-run Chinook salmon, Sacramento River winter-run Chinook salmon, and Southern DPS green sturgeon do not occur in freshwater streams in the action area; therefore, culvert repairs and replacements will have no effect on these four listed fish species.

As with gas line work at stream crossings, construction activities associated with culvert repairs and replacements will not occur in flowing waters on streams with CCC steelhead or their designated critical habitat. PG&E proposes to only conduct culvert maintenance activities when the work sites are naturally dry. No stream dewatering or cofferdams will be used to dewater work sites for road maintenance and culvert repair/replacement. In addition, PG&E will ensure that all culvert repair and replacements in waterways with listed anadromous fish and/or critical habitat will be designed to meet the most current NMFS guidelines for fish passage at stream crossings (NOAABA-AMM-15). Additionally, PG&E proposes to limit the number of culvert repair/replacement projects to a maximum of two per year on streams with CCC steelhead and/or critical habitat.

If temporary bridges are installed, the structure will be clear span and no effects within the channel are anticipated because the bridge ends will be placed on existing roads outside the

channel. Temporary bridges will only remain in place during O&M activities which will range from a few days to 24 weeks. As a clear span structure with no structural elements extending into the channel, stream habitat, water quality, and fish passage are expected to remain unaffected while the temporary bridge is in place. Use of a crane to place and remove the temporary bridge will also avoid disturbance of the channel.

#### Effects on Fish during Construction

By limiting work at culverts to periods when the work sites are naturally dry, no flowing water and no listed fish will be present during work activities. Construction activities are expected to proceed with no effects to CCC steelhead and no discharge of construction debris into flowing water because no water will be present. O&M activities would be completed prior to the return of fall/winter surface flow in freshwater streams. Thus, no impacts to CCC steelhead are expected to occur during construction activities associated with culvert repairs and replacement.

#### Water Quality

Post-construction, minor turbidity will occur in waters downstream of culvert work sites when the site is re-watered during the following wet season with rainfall. Some disturbed soils will be discharged into the stream, but use of erosion control measures and plantings of native vegetation are expected to minimize the mobilization of sediments from areas disturbed by construction activities. The resulting increase in turbidity levels in the waterways is expected to be minor and rapidly dissipate to ambient levels. For these reasons, the effects of O&M Program activities at culverts on water quality in the action area are expected to be negligible for CCC steelhead.

Water quality in the freshwater portion of the action area may also be affected by maintenance activities associated with roadway drainage systems. Stormwater runoff from roads drain to waterways with listed anadromous fish and designated critical habitat. These drainage systems carry tire shreds/dust with the degradation product (6PPD-quinone) from roadways to waterways. All freshwater life stages of listed salmonids within the action area are exposed to degraded water quality due to stormwater runoff from roadways, including roads used by PG&E to access their facilities. Although the O&M Program will not construct new roads, PG&E does have maintenance agreements for roads that include drainage systems. While these roads will continue to convey stormwater runoff to streams, NMFS anticipates such runoff will be unlikely to contain large amounts of toxic materials because traffic on these roads will likely be very light and may only be sporadic. As mentioned in Section 2.2.5.2 of this opinion, recent publications have identified a degradation product of tires (6PPD-quinone) as the causal factor in salmonid mortality at concentrations of less than a part per billion (Tian *et al.* 2022, Brinkmann *et al.* 2022, Tian *et al.* 2020; Peter *et al.* 2018). Access roads to PG&E facilities include both public and private ownership. Some roads are located on State and Federal lands. Road maintenance activities conducted under this RGP would not change existing ownership, vehicle traffic levels, or drainage patterns. New roadway construction is not permitted by the RGP. For these reasons, the O&M Program is not expected to contribute meaningful amounts of contaminant loading in waterways of the action area.

### Stream Channel Conditions and Fish Passage

By design, bridges and culverts stabilize stream channels at road crossings and prevent lateral channel migration, effectively forcing streams into a simplified linear configuration. Without the ability to move laterally, stream channels tend to erode and deepen vertically (Leopold 1968; Dunn and Leopold 1978). The resulting channel may fail to create and maintain aquatic and riparian habitat through lateral migration, and can instead impair groundwater/stream flow connectivity and repress floodplain and riparian habitat function. Simplified stream reaches typically produce limited macroinvertebrate prey and provide poor functional habitat for rearing juvenile salmonids (Florsheim *et al.* 2008). The Program's proposed maintenance of road crossings by repairing and replacing culverts are expected to maintain the current channel alignments and maintain existing simplification of stream habitat adjacent to culverts.

Culverts can also have significant adverse effects on fish passage. Culverts commonly clog with debris, particularly when undersized. Clogged culverts can physically prevent fish and streamflow from passing at road crossings. Culverts also concentrate flow and accelerate water velocities to levels that exceed the swimming abilities of steelhead, resulting in an impediment to migration. To ensure culverts repaired and replaced by the O&M Program on streams with CCC steelhead, culverts must be designed to conform with NMFS fish passage guidelines for anadromous salmonids at stream crossings (NOAABA-AMM-15). Culvert project designs will be presented to NMFS and the Corps in Pre-Construction Notification packages for NMFS review prior to construction. Via this implementation procedure, all culvert repairs and replacements by the Program will be designed and constructed to ensure fish passage is not impaired. In some cases, the Program's repair and replacement of culverts would improve fish passage conditions over the baseline condition where existing culverts are poorly designed or undersized.

### Riparian Vegetation

As described above for work activities at gas line crossings, culvert projects will result in the removal or disturbance of existing riparian vegetation. Riparian vegetation provides several essential functions to maintain suitable habitat and water quality conditions on streams with anadromous salmonids (see Section 2.5.3 of this opinion). Per NOAABA-AMM-16, the Program will revegetate culvert work sites with appropriate native plant species to compensate for riparian vegetation impacts. Revegetation actions are expected to reduce impacts to the riparian zone and restore the ecosystem functions of the riparian zone within a few years following construction. Furthermore, the small number of culvert projects on steelhead streams each year (no more than two per year) will limit the aggregate impacts on riparian zones and no adverse effects to riparian ecosystem function are anticipated over the 10-year period of this RGP.

### Critical Habitat

Proposed culvert repair/replacement work has the potential to affect critical habitat through impacts to water quality, impacts to riparian vegetation, and impairment of fish passage. As presented above, work will only be performed in dry channels and effects to water quality will be limited to minor increases in turbidity when project sites are re-watered during the wet season with rainfall. Riparian vegetation will also be damaged and removed by construction activities; however, PG&E will replant work sites with appropriate native species post-construction to mitigate for impacts to riparian vegetation. Culverts constructed on streams can impair fish



passage, stream flow, and bedload transport. To ensure culvert projects do not adversely affect critical habitat, PG&E proposes to design culverts to conform with NMFS guidelines for fish passage at stream crossings. Based on the above, the effects of culvert projects conducted by PG&E under this RGP are expected to be negligible on designated critical habitat for CCC steelhead.

## **2.6. Cumulative Effects**

“Cumulative effects” are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation [50 CFR 402.02 and 402.17(a)]. 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 ESA.

Some continuing non-Federal activities are reasonably certain to contribute to climate effects within the action area. However, it is difficult if not impossible to distinguish between the action area’s future environmental conditions caused by global climate change that are properly part of the environmental baseline *vs.* cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described earlier in the discussion of environmental baseline (Section 2.4).

Potential non-Federal actions affecting the action area in the future could include State angling regulation changes, voluntary or State sponsored upslope habitat restoration activities, discharge of stormwater and agricultural runoff, and continued development, including building of private roads, wells, and land use change. Urban development, including rural residential and agricultural development is likely to continue throughout the greater San Francisco Bay Area. NMFS assumes the rate of such development would be similar to that observed in the last decade.

## **2.7. Integration and Synthesis**

The Integration and Synthesis section is the final step in assessing the risk that the proposed action poses to species and critical habitat. In this section, we add the effects of the action (Section 2.5) to the environmental baseline (Section 2.4) and the cumulative effects (Section 2.6), taking into account the status of the species and critical habitat (Section 2.2), to formulate the agency’s biological opinion as to whether the proposed action is likely to: (1) reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) appreciably diminish the value of designated or proposed critical habitat as a whole for the conservation of the species.

The action area of this project encompasses nine counties in the San Francisco Bay Area.<sup>8</sup> CCC steelhead, CCV steelhead, CV spring-run Chinook salmon, Sacramento River winter-run Chinook salmon, and Southern DPS green sturgeon occur in the San Francisco Bay estuarine portion of the action area. Of these species, only CCC steelhead are present in the freshwater

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<sup>8</sup> The nine Bay Area counties consist of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties.

streams portion of the action area. All the above listed fish species have experienced serious declines in abundance, and long-term population trends suggest a negative growth rate. Human-induced factors have reduced populations and degraded habitat, which in turn has reduced the population's resilience to natural events, such as droughts, floods, and variable ocean conditions. Global climate change presents another real threat to the long-term persistence of the population, especially when combined with the current depressed population status and human caused impacts. Within the Program's action area, the effects of shoreline development, bank stabilization, water development, flood control, and urbanization are evident. These activities have degraded instream habitat conditions, reduced water quality, contaminated sediment, altered the hydrology of streams, precluded access into some watersheds, and limited access in other watersheds. Drought conditions from 2012 to 2022 exacerbated these impacts by increasing water temperatures and stream-drying, limiting habitat connectivity in the freshwater portion of the action area.

As described in the Effects of the Action (Section 2.5), several proposed O&M Program activities are expected to adversely affect listed anadromous salmonids, green sturgeon, and their habitat. These activities are associated with electrical infrastructure maintenance in San Francisco Bay, and consist of the following: pile driving, cofferdam construction, permanent loss of benthic habitat, and fish collection and relocation. PG&E proposes to limit impact hammer driving and cofferdam installation to the period between June 1 and November 30 of each year (referred to as the "limited operating period" [LOP]). However, there may be some projects where the cofferdam will remain installed past November 30 and pile driving operations would also continue past November 30. Threatened green sturgeon juveniles, sub-adults and adults are present in San Francisco Bay year-round and will be subjected to adverse effects by O&M Program activities at any time of year. Listed salmon and steelhead are generally not present in the Bay until the winter and spring months; thus, PG&E Program activities that continue after November 30 will adversely affect listed anadromous salmonids. However, O&M Program activities may that may result in adverse effects only extend a maximum of six additional weeks from November 30 because work must be completed each year by January 15.

Injury or mortality of green sturgeon, steelhead, and salmon due to barotrauma will occur during the use of impact hammers at some project sites. NMFS expects the number of PG&E maintenance projects at electrical towers that create conditions with barotrauma effects will be small because the majority of pile driving work will be performed at shallow water sites that naturally dewatered at low tide (approximately 92% of the tower sites are located above MLLW). Sound levels attenuate quickly in shallow water, but some electrical tower sites are located in deeper water. When 60-inch and 72-inch piles are installed by impact hammer in water, the zone of physical injury and mortality adjacent to the pile could extend as far as 1,778 feet due to cSEL above 187 dB. The zone of physical injury and mortality will be less when smaller piles are installed by an impact hammer (see Table 7). As described above in Section 2.5.1.4, only a few listed fish are expected to incur injury or mortality from cSEL when they are continuously exposed to high underwater sound levels in this zone by multiple impact hammer pile strikes. Injury and mortality due to exposure to peak sound levels at and above 206 dB will also occur, but will not extend beyond 30 feet from a pile being installed. The area of injury or mortality associated with peak SPLs is reduced for smaller diameter steel piles.

The use of vibratory hammers to install piles and install cofferdams will not create underwater sound levels that are harmful to listed fish. Vibratory hammers generate lower sound levels with different wave forms than impact hammers (Buehler *et al.* 2015). During use of vibratory hammers, sound levels are not expected to exceed the dual metric criteria for injury and mortality of fish established by the FHWG (*i.e.*, peak pressure of 206 dB and cSEL of 187 dB).

Vibratory hammers and impact hammers can also create noise that startle fish and result in temporary dispersal from habitats adjacent to work sites. Behavioral effects during impact hammer pile driving will extend up to 15,226 feet. The zone of behavioral effects will be less for vibratory hammers. If listed green sturgeon, salmon, or steelhead were to react behaviorally to the sound produced by impact hammers or vibratory pile driving, adequate water depths and area within adjacent open waters of San Francisco Bay are expected to provide fish sufficient area to disperse. When pile driving ceases each day, elevated underwater sound levels will conclude and these habitat areas will become available again without disturbance.

Sections 2.5.1.1 and 2.5.1.2 describe the impacts associated with the installation of cofferdams, dewatering work sites, and fish collection/handling. NMFS anticipates that a very small number of green sturgeon will be collected during dewatering events and collection of listed anadromous salmonids is improbable for several reasons. First, cofferdam installation and dewatering will not be initiated after November 30 and listed salmonids are unlikely to be present prior to that time. Second, the majority of work sites where cofferdams will be deployed are located in very shallow water and the sites will naturally dewater at low tide. Closure of cofferdams during periods of low tide will avoid entrapping water and fish. Finally, although green sturgeon will be present during cofferdam construction, construction activities are likely to cause green sturgeon to flee work sites prior to closure of cofferdams. If green sturgeon are collected and relocated for cofferdam construction, they would be subject to injury but mortality is unlikely. A compilation of 10 years of reports submitted to NMFS by fishery researchers indicates collection, handling, and relocation of green sturgeon by qualified biologists rarely results in mortality.

Benthic habitat will be disturbed by Program activities at work sites during construction. Temporary mats will be placed on the substrate to create a work area for personnel and equipment. Barges would temporarily rest on the bottom at low tide. Areas internal to cofferdams will be dewatered and subjected to disturbance by equipment and personnel. These impacts are expected to be temporary disturbance that will recover rapidly following O&M activities due to the small footprint of individual work sites and limited to the surface of the substrate. Any elevated levels of turbidity during disturbance of the substrate are anticipated to not extend beyond one or two tide cycles. Upon removal of cofferdams, mats, and work barges, minimal changes to the surface elevation of the bottom are expected. For these reasons, the potential effects of localized areas of elevated turbidity and benthic habitat disturbance associated with O&M Program activities in San Francisco Bay are expected to be negligible for ESA-listed fish. Permanent loss of benthic habitat is expected when tower footings and foundations are re-located, but the overall area impacted by the program is estimated to be very small (0.08 acres per year) and not adversely affect prey availability and foraging by listed fish. At some sites, abandoned footings and piles will be removed and result in no net increase in the extent of fill in the Bay.

In waterways upstream from San Francisco Bay, freshwater streams with threatened CCC steelhead and designated critical habitat will be affected by the O&M Program's maintenance activities at natural gas line crossings and culvert repair/replacements on access roads. PG&E will only perform work in these stream channels when work sites are seasonally dry. With no flowing water during these construction and maintenance activities, no effects to threatened CCC steelhead are anticipated during construction. The program has also incorporated measures including no placement of new hardscape materials, replanting of native riparian vegetation, and annual limits upon the number and size of projects to ensure O&M activities do not adversely affect steelhead habitat in streams of the action area. Culvert repairs and replacements will be designed to conform with NMFS guidelines for fish passage at stream crossings.

Designated critical habitat for Southern DPS green sturgeon, CCC steelhead, and Sacramento River winter-run Chinook salmon occurs in the action area. While conditions vary across the DPSs, critical habitat is generally impaired by channel modification, habitat alteration and fragmentation, dams and water diversions, groundwater extraction, and estuarine habitat loss. These factors also affect designated critical habitat in the action area of this project.

The estuarine portion of the action area includes areas designated as critical habitat for Southern DPS green sturgeon, CCC steelhead, and Sacramento River winter-run Chinook salmon. Effects to critical habitat in San Francisco Bay include temporary degradation of water quality, benthic disturbance, and elevated levels of underwater sound. A small amount of benthic habitat at widely dispersed sites is also expected to be permanently lost due to relocation or replacement of electrical tower foundations and pilings; however, these permanent impacts to benthic habitat are not expected to exceed 0.08 acre per year at all work sites combined.

Within the freshwater portion of the action area, several streams are designated critical habitat for CCC steelhead. O&M Program activities will affect freshwater CCC steelhead critical habitat at gas line crossings and culverts on streams; however, proposed measures at stream crossing are anticipated to avoid adverse effects to CCC steelhead critical habitat. Measures include prohibiting use of hardscape for erosion protection, limiting the extent of scour protection to not exceed 20 percent of the channel width, and all culverts will be designed to provide unimpeded fish passage by conforming with NMFS guidelines for salmonid passage at stream crossings. The O&M Program will maintain access roads, including existing drainage systems that convey stormwater runoff from roadways. PG&E's maintenance of stormwater drainage on some of these roads is unlikely to meaningfully increase the amount of contaminants from roadways to streams. After considering the O&M Program's measures for work in streams with CCC steelhead critical habitat, NMFS concludes that the value of critical habitat as a whole for species conservation will not be appreciably reduced.

Regarding future climate change effects in the action area, California could be subject to higher average summer air temperatures and lower total precipitation levels. The Sierra Nevada snow pack is likely to decrease by as much as 70 to 90 percent by the end of this century under the highest emission scenarios modeled. Reductions in the amount of rainfall would reduce stream flow levels in rivers of the action area. Estuaries may also experience changes in productivity due to changes in freshwater flows, nutrient cycling, and sediment amounts. California's most recent period of drought began in approximately 2012. This long-term drought, as well as the

increased incidence and magnitude of wildfires in California, have likely been exacerbated by climate change (Williams *et al.* 2019, Williams *et al.* 2020, Williams *et al.* 2022, Diffenbaugh *et al.* 2015.). For PG&E's O&M Program, the immediate effects of construction activities would occur over the next five to 10 years, and the long-term effects of climate change are unlikely to be detected within this time frame. If these effects of climate change are detected over the short term, they will likely materialize as moderate changes to the current climate conditions with the action area. These changes may place further stress on ESA-listed fish populations. Most of the effects of the proposed action are likely to occur during these nearer term climate change effects (droughts with occasional years of heavy rainfall) as described in the Environmental Baseline Section of this opinion (Section 2.4). Long-term impacts from the proposed action are limited to very small areas of permanent habitat loss in the action area and, thus are unlikely to exacerbate the impacts of climate change on listed species and their critical habitat. Considering the above, we do not expect climate change to alter conditions in the action area beyond the scope already considered in this opinion.

While PG&E's O&M Program will result in adverse effects to listed fish during pile driving and cofferdam construction, we expected these losses to be very small fraction of the ESU and DPS populations. Benthic habitat losses due to new and expanded tower foundations and pilings are also expected to be very small (0.08 acres year) in relation to the amount of estuarine habitat area in San Francisco Bay. In consideration of the O&M Program's proposed avoidance and minimization measures (Section 1.3.5 of this opinion), actions conducted by PG&E in freshwater streams will avoid adverse effects to listed CCC steelhead. Culvert projects on streams will be designed to conform with NMFS guidelines for fish passage at stream crossings and these upgrades may improve existing passage conditions for steelhead, particularly at undersized culverts. NMFS does not expect any of the aforementioned effects of PG&E's O&M Program to combine with other effects in any significant way. Effects from proposed activities under the RGP are limited in time and area, and anticipated adverse effects are minimal and only affect a small number of listed fish during the five to 10-year period of this RGP. Ultimately, the effects of the proposed activities that would be conducted under this RGP, when added to the environmental baseline, cumulative effects, and species status, are not expected to appreciably reduce the likelihood of survival or recovery of listed salmonids and green sturgeon, nor does it appreciably degrade the value of their critical habitat.

## **2.8. Conclusion**

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and the cumulative effects, it is NMFS' biological opinion that the proposed PG&E O&M Program is not likely to jeopardize the continued existence of threatened CCC steelhead, threatened CCV steelhead, threatened CV spring-run Chinook salmon, endangered Sacramento River winter-run Chinook salmon, and threatened Southern DPS green sturgeon or destroy or adversely modify designated critical habitat for CCC steelhead, Sacramento River winter-run Chinook salmon, and Southern DPS green sturgeon.

## **2.9. Incidental Take Statement**

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a 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. “Harm” is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). “Harass” is further defined by interim guidance as to “create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering.” “Incidental take” is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02). Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this ITS.

### **2.9.1. Amount or Extent of Take**

In this opinion, NMFS determined that incidental take of threatened CCC steelhead, threatened CCV steelhead, threatened CV spring-run Chinook salmon, endangered Sacramento River winter-run Chinook salmon, and threatened Southern DPS green sturgeon in the form of injury, harm, or mortality is reasonably certain to occur in association with impact hammer pile driving in San Francisco Bay. Additionally, the incidental take of Southern DPS green sturgeon will occur during fish collection and relocation associated with cofferdam construction.

For impact hammer pile driving, NMFS is not able to estimate the specific number of CCC steelhead, CCV steelhead, CV spring-run Chinook salmon, winter-run Chinook salmon, and green sturgeon that will be incidentally taken by elevated underwater sound levels due to the large geographic scope of the action area, varying environmental conditions between project sites, and the number of proposed sites for the Program. Additionally, monitoring or measuring the number of listed fish actually injured or killed by elevated sound levels during pile driving is also not feasible. Injured or killed fish are unlikely to be observed because they may not float to the surface or may be carried away by strong currents in portions of the action area. Due to the difficulty in quantifying the number of listed fish that could be injured or killed by pile driving, a surrogate measure of incidental take is necessary to establish a limit to take exempted by this incidental take statement. NMFS will therefore use the following incidental take surrogate pursuant to 50 CFR 402.14(i)(1)(i) for elevated underwater sound levels during impact hammer pile driving:

The extent of incidental take will be considered exceeded if elevated sound levels during pile driving are greater than 206 dB peak or 187 dB cSEL at the following specified distances for each steel pile size:

<b>Steel Pile Size</b>	<b>Distance (ft) to 206 dB peak</b>	<b>Distance (ft) to 187 dB accumulated SEL/day</b>
16-inch	0	30
20-inch	20	446
24-inch	10	552
36-inch	20	827
60-inch	30	1,778
72-inch	30	1,309

For cofferdam construction, NMFS is not able to estimate the specific number of Southern DPS green sturgeon that will be collected and relocated during construction of cofferdams; however, it is expected to be a low number of individual fish during implementation of O&M Program activities for the reasons presented above in this opinion.

Unintentional injury of green sturgeon during capture, handling, and relocation will occur; however, mortality is unlikely absent an unintentional accident. The amount of incidental take during dewatering and fish relocation will be considered exceeded if more than one green sturgeon is killed during dewatering and fish relocation activities.

### **2.9.2. Effect of the Take**

In the biological opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

### **2.9.3. Reasonable and Prudent Measures**

“Reasonable and prudent measures” are measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take (50 CFR 402.02).

NMFS believes the following reasonable and prudent measures are necessary and appropriate to minimize take of listed fish:

1. Undertake measures to ensure that harm and mortality to listed fish resulting from fish relocation and dewatering activities is low.
2. Ensure proposed culvert repair and replacement actions are designed to provide unimpeded fish passage.
3. Prepare and submit post-construction reports for each O&M program activity that includes cofferdam construction in San Francisco Bay and/or pile driving with an impact hammer on steel piles 20 inches or greater in diameter.
4. Prepare and submit annual reports for O&M program activities performed on streams with listed anadromous salmonids and/or designated critical habitat.

#### 2.9.4. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Federal action agency must comply (or must ensure that any applicant complies) with the following terms and conditions. The Corps or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

1. The following terms and conditions implement reasonable and prudent measure 1:
  - a. PG&E shall retain qualified fisheries biologist(s) with expertise in the areas of identification, handling, collecting, and relocating anadromous fish species to oversee cofferdam construction and fish relocation at work sites in San Francisco Bay. The qualified biologist(s) must be on site during all dewatering events to capture, handle, and safely relocate ESA-listed fish.
  - b. Biologists shall conduct fish collections in a manner which minimizes potential risks to ESA-listed fish. The biologist must monitor construction sites during placement and removal of cofferdams to ensure that any adverse effects to listed fish are minimized.
  - c. ESA-listed fish shall be handled with extreme care and kept in water to the maximum extent possible during rescue activities. Captured fish will be relocated, as soon as possible, to a location with suitable habitat conditions.
  - d. If any salmonids or sturgeon are found dead or injured, the biologist shall contact NMFS biologist Sara Azat by phone at 707-575-6067, by email at [sara.azat@noaa.gov](mailto:sara.azat@noaa.gov) or the NMFS Santa Rosa Area Office at 707-387-0737. The purpose of the contact is to review the activities resulting in take and to determine if additional protective measures are required. All mortalities of listed fish must be retained. Tissue samples are to be acquired from each mortality per the methods identified in the NMFS Southwest Fisheries Science Center Genetic Repository protocols (contact the above NMFS office at the phone number provided) and sent to: NOAA Coastal California Genetic Repository, Southwest Fisheries Science Center, 110 McAllister Way, Santa Cruz, CA 95060.
2. The following terms and conditions implement reasonable and prudent measure 2:
  - a. The Corps or PG&E shall submit draft design plans for projects that include culvert repair or replacement on streams with listed anadromous fish to NMFS for review and approval at least 120 days prior to construction. Design plans are to be submitted to NMFS North Central Coast Office, Attention: San Francisco Bay Branch Chief, 777 Sonoma Avenue, Room 325, Santa Rosa, California 95404-6528.



3. The following terms and conditions implement reasonable and prudent measure 3:
  - a. PG&E shall provide a written post-construction report to NMFS within 60 days of completion of work for each project site in San Francisco Bay that includes cofferdam construction and/or driving of steel piles 20 inches or greater in diameter. The report must include the following information:
    - Summary of construction activities, including: dates construction began and ended; use of a cofferdam and other measures to protect aquatic habitat; a description of the minimization measures taken to address any unanticipated issues; photographs pre-, during, and post-construction; and any other relevant information.
    - Summary of fish relocation activities, including: the number of fish collected by species; the condition of fish at the time of release; the number and species of fish injured or killed; description of the equipment and methods used to collect, hold, and transport fish; and a description of any problems which may have arisen during the relocation activities and a statement as to whether or not the activities had any unforeseen effects.
    - Summary of pile driving activities and hydroacoustic monitoring, including: size and number of piles installed by impact hammer; results of hydroacoustic monitoring, if any was performed; functionality of air bubble curtain, if any was used; and a description of any problems which may have arisen during the pile driving and associated unforeseen effects.
  - b. Post-construction reports are to be submitted to NMFS North Central Coast Office, Attention: San Francisco Bay Branch Chief, 777 Sonoma Avenue, Room 325, Santa Rosa, California 95404-6528.
4. The following terms and conditions implement reasonable and prudent measure 4:
  - a. PG&E shall include the following additional information in the annual reports to NMFS (to be submitted on March 31 per BA-AMM-03):
    - Summary of construction activities at gas line crossings and access roads (*i.e.*, culvert repair/replacements), including: dates construction began and ended; measures to protect riparian habitat and riparian revegetation; a description of the minimization measures taken to address any unanticipated issues; photographs pre-, during, and post-construction; and any other relevant information.
  - b. Annual reports are to be submitted to NMFS North Central Coast Office, Attention: San Francisco Bay Branch Chief, 777 Sonoma Avenue, Room 325, Santa Rosa, California 95404-6528.

## **2.10. Conservation Recommendations**

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, “conservation recommendations” are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

- NMFS recommends that hydroacoustic monitoring be performed at all sites that utilize an impact hammer on steel piles greater than 20-inches in diameter to improve the breadth of information related to elevated underwater sound levels during pile driving in the San Francisco Bay.

## **2.11. Reinitiation of Consultation**

This concludes formal consultation for the PG&E’s Bay Area Operation and Maintenance Program.

Under 50 CFR 402.16(a): “Reinitiation of 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 agency 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.”

## **2.12. Not Likely to Adversely Affect” Determinations**

Under the ESA, “effects of the action” are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 CFR 402.02). In our analysis, which describes the effects of the proposed action, we considered 50 CFR 402.17(a) and (b). When evaluating whether the proposed action is not likely to adversely affect listed species or critical habitat, NMFS considers whether the effects are expected to be completely beneficial, insignificant, or discountable. Completely beneficial effects are contemporaneous positive effects without any adverse effects to the species or critical habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Effects are considered discountable if they are extremely unlikely to occur.

### 2.12.1. Background and Action Agency's Effects Determination

The Corps has determined that the proposed action is not likely to adversely affect the following species and critical habitat (Evolutionarily Significant Units [ESU]) or (Distinct Population Segments [DPS]) under the jurisdiction of NMFS:

**California Coastal (CC) Chinook salmon ESU** (*Oncorhynchus tshawytscha*)  
Threatened (70 FR 37160; June 28, 2005)  
Critical habitat (70 FR 52488; September 2, 2005);

**South-Central California Coast (S-CCC) steelhead DPS** (*Oncorhynchus mykiss*)  
Threatened (71 FR 834; January 5, 2006)  
Critical habitat (70 FR 52488; September 2, 2005);

**Central California Coast (CCC) coho salmon ESU** (*Oncorhynchus kisutch*)  
Endangered (70 FR 37160, June 28, 2005)  
Critical habitat (64 FR 24049; May 5, 1999).

The life history of Chinook salmon is summarized in Myers *et al.* (1998) and the most recent NMFS status review (NMFS 2016e). The CC Chinook salmon ESU are typically fall spawners, entering their natal streams in the early fall. Adults tend to spawn in the mainstem or larger tributaries of rivers, and eggs are deposited in redds for incubation. When the 0+ age fish emerge from the gravel in the spring, they typically migrate to salt water shortly after emergence. Prey resources during early freshwater rearing and out-migration are critical to Chinook salmon survival as they grow and move out to the open ocean.

The life history of steelhead is summarized in Busby *et al.* (1996) and the most recent NMFS status review (Williams *et al.* 2016). S-CCC Steelhead are anadromous forms of *Oncorhynchus mykiss*, spending some time in both fresh- and saltwater. Juveniles – typically in spring as smolts – migrate to the ocean where they mature. Adult steelhead return to freshwater rivers and streams to reproduce, or spawn. Unlike Pacific salmon, steelhead are iteroparous, or capable of spawning in multiple years before death (Busby *et al.* 1996; Moyle 2002). Within the S-CCC steelhead DPS, adults typically enter freshwater between December and April, with peaks occurring in January through March (Fukushima and Lesh 1998). Eggs (laid in gravel nests called redds), alevins (gravel dwelling hatchlings), fry (juveniles newly emerged from stream gravels), and other juvenile life stages all rear in freshwater until they migrate to the ocean where they reach maturity.

The life history of coho salmon in California is summarized by NMFS (1995; 2016f). Coho are also anadromous salmonids, spending some time in both freshwater and saltwater. In California coastal streams, adult coho salmon upstream migration occurs between November and February, and smolt outmigration occurs between March and June, peaking March through May (Fukushima and Lesh 1998). CCC coho salmon were historically abundant in the Russian River and tributaries. Presently, however, coho are rare throughout the action area.

Critical habitat for CC Chinook, S-CCC steelhead, and CCC coho salmon is present in the action area. The PBFs of designated critical habitat for CC Chinook salmon and S-CCC steelhead in freshwater include:

1. Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation, and larval development;
2. Freshwater rearing sites with:
  - a) Water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility;
  - b) Water quality and forage supporting juvenile development; and
  - c) Natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks;
3. Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.

For CCC coho salmon critical habitat, the following essential habitat types were identified: 1) juvenile summer and winter rearing areas; 2) juvenile migration corridors; 3) areas for growth and development to adulthood; 4) adult migration corridors; and 5) spawning areas. Within these areas, essential features of coho salmon critical habitat includes adequate: 1) substrate, 2) water quality, 3) water quantity, 4) water temperature, 5) water velocity, 6) cover/shelter, 7) food, 8) riparian vegetation, 9) space, and 10) safe passage conditions (64 FR 24029).

### **2.12.2. Effects of the Action**

As described in Section 2.5.1 of this opinion, the O&M Program includes maintenance of electrical transmission lines that are supported by steel-lattice towers, steel poles, and wooden poles. The majority of PG&E's electrical infrastructure in the Bay Area is located in terrestrial areas. Electrical infrastructure facilities to be maintained by the proposed O&M Program in tidal waters are limited to San Francisco Bay. Threatened CC Chinook salmon, threatened S-CCC steelhead, endangered CCC coho salmon, and their designated critical habitat are not present in San Francisco Bay.

In the freshwater portion of the action area, no electrical infrastructure is located in freshwater streams and no electrical infrastructure maintenance would be conducted in streams. Measures proposed by PG&E in terrestrial areas during work on electrical towers and poles are expected to prevent the degradation of water quality in streams with listed anadromous fish. Thus, electrical tower and pole repairs/replacements in terrestrial areas are anticipated to have no effect on threatened CC Chinook salmon, threatened S-CCC steelhead, endangered CCC coho salmon and their designated critical habitat.

Within the action area, PGE&E O&M Program activities that will affect threatened CC Chinook salmon, threatened S-CCC steelhead, and endangered CCC coho salmon are associated with

natural gas line maintenance and culvert repair/replacements on freshwater streams. Natural gas system O&M activities are described in Section 1.3.3 of the opinion. At stream crossings with listed anadromous fish, these activities consist of site-specific erosion measures over pipelines, pipeline recoating, pipeline replacement, valve recoating, and valve replacement. Proposed maintenance activities at access roads are described in Section 1.3.4 of the opinion. For access road maintenance at stream crossings with listed anadromous fish, the Program proposes to repair and replace culverts.

Table 5 of the opinion presents the known streams with listed anadromous fish and/or designated critical habitat in the action area where PG&E gas line activities may occur. There may be additional gas line crossings on streams with listed anadromous fish in the action area that were not identified by PG&E during consultation and are not listed in Table 5. For road maintenance work on culverts, the location of these stream crossing activities could occur throughout the nine-county O&M Program area, including sites on streams with listed anadromous fish and/or critical habitat. During implementation of the RGP, PG&E's pre-construction notifications for individual O&M activities will identify specific locations and specify whether or not listed anadromous fish or designated critical habitat may be present at work sites.

The proposed O&M activities associated with gas line infrastructure generally involve the excavation of soils to expose the gas line or valve, performing the recoating or replacement work (valve or pipeline), and then replacing the excavated materials to re-bury the pipeline. For site-specific erosion protection, biodegradable jute netting and other non-hardscape materials will be placed on exposed sections of pipeline in the stream channel to prevent further erosion. PG&E proposes to limit O&M activities associated with gas line crossings at waterways with listed anadromous fish to periods when the work sites are naturally dry (see NOAABA-AMM-13). By restricting gas line maintenance to sites that are naturally dry, no dewatering with cofferdams will be required and the potential adverse effects associated with excavation and trenching in wetted areas will be avoided. Similarly, proposed repair and replacement of culverts on streams with listed anadromous fish, will only be conducted by PG&E when work sites are naturally dry.

Sections 2.5.3 and 2.5.4 of the opinion present the potential effects of gas line O&M activities and culvert maintenance on freshwater streams with threated CCC steelhead and their designated critical habitat. These effects also apply to threatened CC Chinook salmon, threatened S-CCC steelhead, and endangered CCC coho salmon. With no flowing water present during work at sites on freshwater streams during O&M Program activities, no listed salmon or steelhead will be present and no effects during construction are expected. Post-construction, minor turbidity will occur in waters at work sites when the site is re-watered during the following wet season with rainfall, but use of erosion control measures and plantings of native vegetation are expected to minimize the mobilization of sediments from areas disturbed by construction activities. For these reasons, the effects of O&M activities at gas line infrastructure and culvert repair/replacement sites on water quality and riparian vegetation are expected to be insignificant for CC Chinook salmon, S-CCC steelhead, and CCC coho salmon.

Proposed site-specific erosion solutions on exposed gas line crossing have the potential to prevent lateral channel migration, effectively forcing streams into a simplified linear configuration. Simplified stream reaches typically produce limited macroinvertebrate prey and

provide poor functional habitat for rearing juvenile salmonids (Florsheim *et al.* 2008). Meandering streams create and maintain both the hydraulic and physical components of healthy instream habitat used by fish and other aquatic species (Spence *et al.* 1996). For erosion protection actions authorized by this RGP in waterways with listed anadromous fish, PG&E will not utilize any hardscape materials. Erosion protection materials will include jute netting, straw waddles, native plants, and hydroseeding. Materials will be placed in the channel to avoid constricting flow and not increase water velocities in the channel. Additionally, erosion protection projects will not span more than 20 percent of the active channel width and not exceed 500 square feet per site (NOAABA-AMM-14). These measures will significantly limit the extent of impacts on channel morphology and stream hydraulics. The 20 percent channel width limit, combined with placement of materials to not constrict flow nor increase water velocities, will ensure fish passage is unaffected and the channel maintains existing features that provide complex rearing, feeding, spawning, and shelter habitat. On average, only two site-specific erosion protection projects would be performed per year in anadromous salmonid streams throughout the nine-county action area. Based on the proposed measures and limits for erosion protection activities at gas line crossings, the effects of this O&M Program element are expected to be insignificant on CC Chinook salmon, S-CCC steelhead, and CCC coho salmon.

Culverts can impair fish passage, streamflow and bedload transport in streams. To ensure all culvert projects on streams with listed anadromous salmonids do not produce adverse effects, PG&E proposes to design culverts to conform with NMFS guidelines for fish passage at stream crossings (NOAABA-AMM-15). Culvert project designs will be presented to NMFS and the Corps in Pre-Construction Notification packages for NMFS review prior to construction. Via this implementation procedure, all culvert repairs and replacements by the Program will be designed and constructed to ensure fish passage is not impaired, and streamflow and bedload transport are unimpeded. In some cases, the Program's repair and replacement of culverts would improve fish passage conditions over the baseline condition at existing undersized culverts. For these reasons, the effects of O&M activities at culverts on fish passage and streams in the action area are expected to be insignificant on CC Chinook salmon, S-CCC steelhead, and CCC coho salmon.

The action area is located within designated critical habitat for CC Chinook salmon, S-CCC steelhead, and CCC coho salmon. Effects to designated critical habitat will include minor levels of turbidity post-construction, channel and habitat impairment from erosion solutions, and fish passage impairment at culverts. For reasons presented above, these construction and post-construction effects on designated critical habitat are expected to be insignificant.

### **2.12.3. Conclusion**

Based on this analysis, NMFS concurs with the Corps that the proposed action is not likely to adversely affect the subject listed species and designated critical habitats.

### **2.12.4. Reinitiation of Consultation**

Reinitiation of consultation is required and shall be requested by the Corps or by NMFS, where discretionary Federal involvement or control over the action has been retained or is authorized by law and (1) the proposed action causes take; (2) 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) 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 written concurrence; or (4) a new species is listed or critical habitat designated that may be affected by the identified action (50 CFR 402.16).

### **3. MAGNUSON–STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT RESPONSE**

Section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. Under the MSA, this consultation is intended to promote the conservation of EFH as necessary to support sustainable fisheries and the managed species' contribution to a healthy ecosystem. For the purposes of the MSA, EFH means “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity”, and includes the physical, biological, and chemical properties that are used by fish (50 CFR 600.10). Adverse effect means any impact that reduces quality or quantity of EFH, and may include direct or indirect physical, chemical, or biological alteration of the waters or substrate and loss of (or injury to) benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects on EFH may result from actions occurring within EFH or outside of it and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) of the MSA also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH. Such recommendations may include measures to avoid, minimize, mitigate, or otherwise offset the adverse effects of the action on EFH [CFR 600.905(b)].

This analysis is based, in part, on the EFH assessment provided by the Corps and descriptions of EFH for Pacific Coast Groundfish (Pacific Fishery Management Council (PFMC 2020), Coastal Pelagic Species (CPS) (PFMC 1998), and Pacific Coast Salmon (PFMC 2014) contained in the fishery management plans (FMPs) developed by the PFMC and approved by the Secretary of Commerce.

#### **3.1. Essential Fish Habitat Affected by the Program**

The Corps has determined that the proposed action would adversely affect EFH for various life stages of fish species managed under the Pacific Coast Groundfish, Coastal Pelagic, and Pacific Coast Salmon FMPs. This determination is based on the potential for O&M activities to result in disturbance of benthic habitat, increased turbidity, increased in-water sound and vibration, and other adverse effects to water quality. In addition, the Program action area includes areas designated as Habitat Areas of Particular Concern (HAPC) for various species of fish with the Pacific Coast Groundfish and Pacific Coast Salmon FMPs; estuaries and eelgrass are designated HAPC for both FMPs.

#### **3.2. Adverse Effects on Essential Fish Habitat**

NMFS has determined the proposed action would adversely affect EFH for various life stages of fish species managed under the Pacific Coast Groundfish, Coastal Pelagic, and Pacific Coast Salmon FMPs through (1) elevated levels of underwater sound, (2) disturbance to benthic

habitat, (3) impacts to water quality in the form of increased turbidity in the water column and suspension of sediments, (4) stream channel disturbance during repair and replacement gas lines at stream crossings, and (5) impacts to water quality associated with access road maintenance.

EFH may also be temporarily impacted by dewatering of construction areas in San Francisco Bay. Culvert repair and replacements in streams throughout the action area may have beneficial effects on EFH for Pacific Coast Salmon by upgrade passage conditions. The short-term and long-term effects of the Bay Area O&M Program's activities on EFH for the Pacific Coast Groundfish and Coastal Pelagic FMPs are generally the same as that presented in Section 2.5.1.8 of this opinion for designated critical habitat for the Southern DPS of green sturgeon. Effects to EFH for the Pacific Coast Salmon FMP are generally the same extent and type as described in Section 2.5.1.8 of this opinion for CCC steelhead designated critical habitat.

### **3.3. Essential Fish Habitat Conservation Recommendations**

NMFS determined that the following conservation recommendations are necessary to avoid, minimize, mitigate, or otherwise offset the impact of the proposed action on EFH.

The Corps and PG&E should avoid and minimize adverse effects of EFH quantity and quality by:

1. follow Term and Condition #2(a) from the ITS in Section 2.9.2 above;
2. complete the monitoring and reporting described in Terms and Conditions #3(a), 3(b) 4(a) and 4(b) from the ITS in Section 2.9.2 above; and
3. follow the ESA conservation recommendation described in Section 2.10 above.

### **3.4. Statutory Response Requirement**

As required by section 305(b)(4)(B) of the MSA, the Corps must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS' EFH Conservation Recommendations unless NMFS and the Federal agency have agreed to use alternative time frames for the Federal agency response. The response must include a description of the measures proposed by the agency for avoiding, minimizing, mitigating, or otherwise offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the Conservation Recommendations, the Federal agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects [50 CFR 600.920(k)(1)].

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.



### 3.5. Supplemental Consultation

The Corps must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH Conservation Recommendations [50 CFR 600.920(1)].

## 4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

The Data Quality Act (DQA) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the opinion addresses these DQA components, documents compliance with the DQA, and certifies that this opinion has undergone pre-dissemination review.

### 4.1. Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion are the Corps. Other interested users could include PG&E, California Department of Fish & Wildlife, San Francisco Bay Conservation and Development Commission, and San Francisco Bay Regional Water Quality Control Board. Individual copies of this opinion were provided to the Corps and PG&E. The document will be available within 2 weeks at the NOAA Library Institutional Repository [<https://repository.library.noaa.gov/welcome>]. The format and naming adhere to conventional standards for style.

### 4.2. Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

### 4.3. Objectivity

Information Product Category: Natural Resource Plan

**Standards:** This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA regulations, 50 CFR 402.01 et seq., and the MSA implementing regulations regarding EFH, 50 CFR part 600.

**Best Available Information:** This consultation and supporting documents use the best available information, as referenced in the References section. The analyses in this opinion and EFH consultation contain more background on information sources and quality.

**Referencing:** All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

**Review Process:** This consultation was drafted by NMFS staff with training in ESA and MSA implementation, and reviewed in accordance with West Coast Region ESA quality control and assurance processes.

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- 59 FR 404. January 4, 1994. National Marine Fisheries Service. Final Rule: Endangered and Threatened Species; Status of Sacramento River Winter-run Chinook Salmon. Federal Register 59:440-450.
- 62 FR 43937. August 18, 1997. National Marine Fisheries Service. Final Rule: Listing of Several Evolutionary Significant Units of West Coast Steelhead. Federal Register 62:43937-43954.
- 64 FR 50394. September 16, 1999. National Marine Fisheries Service. Final Rule: Endangered and Threatened Species; Threatened Status for Two Chinook Salmon Evolutionarily Significant Units in California. Federal Register 64:50394-50415.
- 70 FR 17386. April 6, 2005. National Marine Fisheries Service. Proposed Rule: Endangered and Threatened Wildlife and Plants: Proposed Threatened Status for Southern Distinct Population Segment of North American Green Sturgeon. Federal Register 70:17386-17401.
- 70 FR 37160. June 28, 2005. National Marine Fisheries Service. Final Rule: Final Listing Determinations for 16 ESUs of West Coast Salmon, and Final 4(d) Protective Regulations for Threatened Salmonid ESUs. Federal Register 70:37160-37204.
- 70 FR 52488. September 2, 2005. Endangered and Threatened Species; Designation of Critical Habitat for Seven Evolutionarily Significant Units of Pacific Salmon and Steelhead in California; Final Rule. Federal Register 70:52488-52536.
- 71 FR 834. January 5, 2006. National Marine Fisheries Service. Final rule: Listing Determinations for 10 Distinct Population Segments of West Coast Steelhead. Federal Register 71:834-862.
- 71 FR 17757. 2006. Endangered and Threatened Wildlife and Plants: Threatened Status for Southern Distinct Population Segment of North American Green Sturgeon. Federal Register. 71:17757-17766.
- 74 FR 52299. 2009. Endangered and threatened wildlife and plants: final rulemaking to designate critical habitat for the threatened southern distinct population segment of North American green sturgeon. Federal Register. 74:52299-52351.
- 81 FR 7214. Fish and Wildlife Service and the National Oceanographic and Atmospheric Administration. Final Rule. Interagency Cooperation-Endangered Species Act of 1973, as Amended. Definition of destruction or adverse modification of critical habitat. February 11, 2016. Federal Register.



**PRE-CONSTRUCTION NOTIFICATION/NOTICE OF INTENT  
PG&E Bay Area Operations and Maintenance Program**

<b>1. Activity Type(s) (select all that apply):</b>	
<b><i>Natural Gas System Activities</i></b>	<b><i>Electrical System Activities</i></b>
<input type="checkbox"/> Fencing	<input type="checkbox"/> Substation Maintenance
<input type="checkbox"/> Site-Specific Erosion Solutions	<input type="checkbox"/> Tower Replacement or Repair
<input type="checkbox"/> Internal Pipeline Inspection and Repair	<input type="checkbox"/> Boardwalk Replacement or Repair
<input type="checkbox"/> Pipeline Recoating	<input type="checkbox"/> Pole Reinforcement and Replacement
<input type="checkbox"/> Valve Recoating and Replacement	<input type="checkbox"/> Line Reconductoring
<input type="checkbox"/> Pipeline Cathodic Protection	<input type="checkbox"/> Facility Access
<input type="checkbox"/> Pipeline Lowering and Replacement	
<input type="checkbox"/> Water Diversion Techniques	
<input type="checkbox"/> Pipeline Access	
<b>2. Duly Authorized Representative (Project Contact):</b>	
Name:	Phone Number:
Title:	Email Address:
Address:	City, State:
	Zip Code:
<b>3. Project Name:</b>	
<b>4. Transmission Line/Tower/Pole/Pipeline Name(s)/Number(s):</b>	
<b>5. Project Information</b>	
Street Address (if applicable):	City:
County:	Zip Code:
Latitude:	Longitude:
Assessor's Parcel Number (APN):	
<b>6. Driving Directions:</b>	
<b>7. Activity Purpose:</b>	

**8. Description of Activity and Water Quality Impacts:**

**9. Site-Specific Avoidance and Minimization Measures (as applicable):**

**10. Description of Other Known Projects in the Vicinity Scheduled to Occur at the Same Time:**

**11. Anticipated Activity Timeframe:**

Start Date:

End Date:

**12. USACE District:**     Sacramento     San Francisco

**13. RWQCB:**

- Region 1 – North Coast
- Region 2 – San Francisco Bay
- Region 3 – Central Coast
- Region 5 – Central Valley



**17. Other Agency Permits, Licenses, Agreements, Plans, and Email Correspondence**

Fill out the table below for each related permit.

Related Permits	Have you applied? (yes/no)	If yes, have you received the permit? (yes/no)	Permit Type	ID Number (e.g., USACE file number)
USACE Nationwide Construction Permit Pre-Notification				
United States Fish and Wildlife Service Incidental Take Permit				
National Oceanic and Atmospheric Administration National Marine Fisheries Service Incidental Take Permit				
Other Federal Permits				
California Department of Fish and Wildlife Lake and Streambed Alteration Agreement				
Coastal Development Permit				
Other State Permits				
Local Permit(s)				
Construction Stormwater General Permit				

<b>18. Receiving Waters Information<sup>1</sup></b>						
<b>Site ID</b>	<b>Waterbody Name</b>	<b>Impacted Aquatic Resource Type</b>	<b>Water Board Hydrologic Units (HUC 8)</b>	<b>Receiving Waters</b>	<b>Receiving Waters Beneficial Uses</b>	<b>303(d) Listing Pollutant (if any)</b>
		<input type="checkbox"/> Lake <input type="checkbox"/> Ocean/Bay/Estuary <input type="checkbox"/> Riparian Zone <input type="checkbox"/> Stream Channel <input type="checkbox"/> Vernal Pool <input type="checkbox"/> Wetland				
		<input type="checkbox"/> Lake <input type="checkbox"/> Ocean/Bay/Estuary <input type="checkbox"/> Riparian Zone <input type="checkbox"/> Stream Channel <input type="checkbox"/> Vernal Pool <input type="checkbox"/> Wetland				
		<input type="checkbox"/> Lake <input type="checkbox"/> Ocean/Bay/Estuary <input type="checkbox"/> Riparian Zone <input type="checkbox"/> Stream Channel <input type="checkbox"/> Vernal Pool <input type="checkbox"/> Wetland				
		<input type="checkbox"/> Lake <input type="checkbox"/> Ocean/Bay/Estuary <input type="checkbox"/> Riparian Zone <input type="checkbox"/> Stream Channel <input type="checkbox"/> Vernal Pool <input type="checkbox"/> Wetland				

<sup>1</sup> For receiving waters information (e.g., beneficial uses, watershed identification, etc.), refer to the Regional Water Basin Plans on the applicable Regional Water Board website or the State Water Board's Plans and Policies website ([www.waterboards.ca.gov/plans\\_policies/](http://www.waterboards.ca.gov/plans_policies/)).



**19. Individual Direct Impact Information**

Please fill out the table below. Choose either "Permanent" or "Temporary" and either "Dredge" or "Fill/Excavation" once per row. Provide a restoration plan, as appropriate, demonstrating how any temporary impacts will be restored to pre-project conditions.

Latitude	Longitude	Impact Type	Site ID	Acres	Cubic Yards	Linear Feet	Dredge or Fill/Excavation
		<input type="checkbox"/> Permanent <input type="checkbox"/> Temporary					<input type="checkbox"/> Dredge <input type="checkbox"/> Fill/Excavation
		<input type="checkbox"/> Permanent <input type="checkbox"/> Temporary					<input type="checkbox"/> Dredge <input type="checkbox"/> Fill/Excavation
		<input type="checkbox"/> Permanent <input type="checkbox"/> Temporary					<input type="checkbox"/> Dredge <input type="checkbox"/> Fill/Excavation
		<input type="checkbox"/> Permanent <input type="checkbox"/> Temporary					<input type="checkbox"/> Dredge <input type="checkbox"/> Fill/Excavation

**20. Proposed Compensatory Mitigation**

Complete Attachment I: Permittee-Responsible Mitigation Proposal Form or Attachment II: Mitigation Banking Proposal Form depending on the type of compensatory mitigation proposed for the project.

**Attachments (check all that apply):**

- Site Map(s)\*
- Additional Pages and/or Supplemental Information
- Drawings, or Design Plans \*
- Pre-Project Site Photographs\*
- Aquatic Resource Delineation Report
- Archaeological Information (under separate cover)
- Proposed Dewatering Plan
- Horizontal Directional Drill or Drilling Plan
- Temporary Impact Restoration Plan
- Water Quality Monitoring Plan
- Other Agency Correspondence, Permits, and Permit Applications
- Fee Check or Online Payment Receipt \*
- Other(s) (list below):

**ATTACHMENT I: PERMITTEE-RESPONSIBLE MITIGATION PROPOSAL FORM**

**I-1. Summary of Proposed Mitigation**

--

**I-2. Location**

APN(s):	Ownership:
	Proponent(s):
County:	Sectional Coordinates (Mount Diablo Base Meridian):
Nearest City:	
Total Acres of APN(s):	

**I-3. Summary of Proposed Mitigation by Water Type**

Resource/Habitat Type Affected	Acres of Permanent Impact	Acres of Credit			
		Establishment	Restoration	Enhancement	Preservation
Lake					
Ocean/Bay/Estuary					
Riparian Zone					
Stream Channel					
Vernal Pool					
Wetland					

**I-4. Summary of Proposed Mitigation by Species**

Resource/Habitat Type Affected	Acres of Permanent Impact	Acres of Credit			
		Establishment	Rehabilitation	Enhancement	Preservation
Western snowy plover ( <i>Charadrius alexandrinus nivosus</i> )					
California least tern ( <i>Sternula antillarum browni</i> )					
Delta smelt ( <i>Hypomesus transpacificus</i> )					
Palmate-bracted bird's-beak ( <i>Chloropyron palmatum</i> )					
Soft bird's-beak ( <i>Chloropyron molle</i> ssp. <i>molle</i> )					
Sonoma alopecurus ( <i>Alopecurus aequalis</i> var. <i>sonomensis</i> )					

**I-5. Supporting Attachments**


**ATTACHMENT II: MITIGATION BANKING PROPOSAL FORM**

**II-1. Bank Identification**

Bank Name:
Bank Owner:

**II-2. Location**

APN(s):	Sectional Coordinates (Mount Diablo Base Meridian):
County:	

**II-3. Summary of Proposed Mitigation by Water Type**

Resource/Habitat Type Affected	Acres of Permanent Impact	Acres of Credit			
		Establishment	Rehabilitation	Enhancement	Preservation
Lake					
Ocean/Bay/Estuary					
Riparian Zone					
Stream Channel					
Vernal Pool					
Wetland					

**II-4. Summary of Proposed Mitigation by Species**

Resource/Habitat Type Affected	Acres of Permanent Impact	Acres of Credit			
		Establishment	Rehabilitation	Enhancement	Preservation
Western snowy plover ( <i>Charadrius alexandrinus nivosus</i> )					
California least tern ( <i>Sternula antillarum browni</i> )					
Delta smelt ( <i>Hypomesus transpacificus</i> )					
Palmate-bracted bird's-beak ( <i>Chloropyron palmatum</i> )					
Soft bird's-beak ( <i>Chloropyron molle</i> ssp. <i>molle</i> )					
Sonoma alopecurus ( <i>Alopecurus aequalis</i> var. <i>sonomensis</i> )					

## Attachment B – Notice of Intent Instructions

### How to Apply

Applicants seeking Pacific Gas and Electric Company Bay Area Operations and Maintenance Program authorization are required to submit a Notice of Intent (NOI) to the State Water Resources Control Board or the appropriate Regional Water Quality Control Board (collectively the Water Board). A [map showing regional water board jurisdictional boundaries](#) is available on the Water Board's website (<http://www.waterboards.ca.gov/waterboardsmap.shtml>). Addresses and contact information can be found in the online [Staff Directory](#) ([https://www.waterboards.ca.gov/water\\_issues/programs/cwa401/docs/staffdirectory.pdf](https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/staffdirectory.pdf)).

### Regional Water Board NOI Submission

Submit the NOI and application fee to the Regional Water Board with jurisdiction where the proposed project impacts would occur. For projects that cross a regional board boundary, submit the NOI to the State Water Board as directed below.

### State Water Board NOI Submission

For projects that cross a Regional Water Board boundary: submit the NOI and application fee to the State Water Board. The appropriate Regional Water Boards should also be provided a copy of any NOI submitted to the State Water Board. For State Water Board NOIs, mail to:

State Water Resources Control Board, Division of Water Quality  
1001 I Street; 15th Floor  
Sacramento, CA 95814  
(SWBNWP@waterboards.ca.gov)

### Fees

Fee amounts are determined according to the [Cal. Code Regs., tit. 23, § 2200\(a\)\(2\) fee schedule](#) ([https://govt.westlaw.com/calregs/Document/IEEE14760D45A11DEA95CA4428EC25FA0?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=\(sc.Default\)](https://govt.westlaw.com/calregs/Document/IEEE14760D45A11DEA95CA4428EC25FA0?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default))).

- A [fee calculator](#) is available online and may be used to **estimate** fees ([https://www.waterboards.ca.gov/water\\_issues/programs/cwa401/#fees](https://www.waterboards.ca.gov/water_issues/programs/cwa401/#fees)).
- Include only the application fee with your NOI. Water Board staff will determine whether any additional project fees are required during NOI review.
- Fees may be paid online or by check, money order, or cashier check. Information on how to make an online payment is available at the State Water Board's [Fee Payment Website](#) ([https://www.waterboards.ca.gov/make\\_a\\_payment/](https://www.waterboards.ca.gov/make_a_payment/)). If fees are paid online prior to application submission, attach payment receipt to the NOI. Although fees should be included

with the NOI and submitted to the appropriate Water Board, **make all checks, money orders, and cashier checks payable to the “State Water Board.”**

- Fees are subject to change.

### **Notice of Intent Review Process**

**To avoid project delays, submit an NOI as early as possible.** Within 30 days of NOI receipt, Water Board staff will determine if the NOI is complete.

- Incomplete NOIs will be returned to the applicant with a request to provide information needed to determine the NOI complete. In cases where the NOI is incomplete and the applicant fails to provide the requested information, the Water Board may issue a Notice of Exclusion (NOE).
- If the NOI is determined complete, within 45 days of NOI receipt, the Water Board will either issue a Notice of Applicability (NOA) or an NOE.
  - If the Water Board does not issue an NOA or NOE within 45 days of receiving a complete NOI, the discharger may proceed with the project according to all applicable Certification conditions.
- An NOA authorizes the proposed activity for enrollment under the Certification. An NOE denies authorization and enrollment of the proposed activity under the Certification.

## **Definitions**

*Consider the following definitions while completing your NOI.*

**Permanent aquatic resource impacts** will permanently change an aquatic resource to a non-aquatic habitat type or permanently changes the bottom elevation of an aquatic resource. Permanent impacts can result in physical loss of area and ecological degradation.

**Temporary aquatic resource impacts** are impacts that temporarily cause a physical loss or ecological degradation of an aquatic resource. The impact must be restored to pre-project conditions through natural ecological processes or active restoration in order to be classified as temporary. If the impact is not restored to pre-project condition, it is classified as permanent.

**Consider the following instructions while completing the NOI form:**

### **Activity Type**

Identify the planned Activity Type(s).



## Legally Responsible Party and Duly Authorized Representative Information

**Duly Authorized Representative Name and Title:** The Duly Authorized Representative (agent) is authorized to certify and submit applications or reports to the Water Boards on behalf of the Legally Responsible Party. Telephone number, email address, and the agent's mailing address (not the project address) including the street, city, state, and zip code must be provided.

**Project Name:** Provide the project name. The project name will be used in all correspondence referencing the project. Be sure the project name is consistent with other agency permits and applications for the same project, and is consistent on all maps, drawings, and reports. The project name should be clearly relevant to the project (e.g., Blue Creek Bridge Project; Jones Subdivision Road Widening Project).

**Transmission Line/Tower/Pole/Pipeline Name(s)/Number(s):** Provide the name and/or number of each transmission line, tower, pole and/or pipeline that will be affected by the project.

## Project Information

**Project Address:** Provide the street address of the project location and the Assessor's Parcel Number (APN). If the proposed project does not have a physical street address, be as descriptive as possible in this section. For example, "Leisure Town Rd., 5.5 miles south of the intersection of I-80 and Leisure Town Rd."

**Coordinates:** Indicate the location for the center point of your project in decimal degrees (approximate location is acceptable). Assistance in determining a project's coordinates is widely available through various free online services or your local library.

**Driving Directions:** Provide directions to the project site from the nearest major intersection.

**Activity Purpose:** Provide a brief narrative description of the proposed project's end goal.

**Description of Activity and Water Quality Impacts:** Provide a detailed, technically accurate narrative description of the proposed project purpose, project design, all activities planned to complete the design. Include total impacts, area of ground disturbance and area of impact to all aquatic resources on the site (i.e., any and all streams, wetlands, lakes, ponds, beaches, shorelines, etc). If temporary diversions or impoundments of water, cofferdams, or similar structures are proposed, include a dewatering plan as required in Certification. If trimming of riparian vegetation is proposed, describe the species impacted and explain why trimming is necessary to complete the project.

**Site-Specific Avoidance and Minimization Measures:** Describe steps taken to avoid impacts to waters and measures incorporated into the project design to minimize loss of, or significant adverse impacts to, beneficial uses of waters of the state, including on-site restoration of the project area. A

description may include actions or methods proposed for erosion control, including winterization strategies to stabilize bare soils and revegetation proposals. A map may be included to indicate the approximate location and area of soil, land and vegetation disturbance, and proposed erosion and sediment control best management practices (BMPs) proposed to avoid and minimize project impacts to waters of the state, including BMPs for hazardous substances. Refer to the Procedures' state Supplemental Dredge or Fill Guidelines, subpart H, for actions to minimize adverse impacts to waters of the state. If the effects of impervious surfaces will be minimized through implementation of Low Impact Development treatments, describe those minimization treatments.

**Description of Other Known Projects in the Vicinity Scheduled to Occur at the Same Time:**

Provide a brief description, including estimated adverse impacts of any projects implemented by the project applicant within the last year or planned for implementation by the applicant within the next year that are in any way related to the proposed activity or that may impact the same receiving water body(ies) as the proposed activity. For this item, the waterbody extends to a named source or stream segment identified in the relevant Regional Water Quality Control Plan (Basin Plan). Water Board Basin Plans are found on the applicable Regional Water Board Basin Plan webpage, and also located on the [State Water Board's Plans and Policies website](https://www.waterboards.ca.gov/plans_policies/) ([https://www.waterboards.ca.gov/plans\\_policies/](https://www.waterboards.ca.gov/plans_policies/)).

**Anticipated Activity Timeframe:** Provide the estimated start and end dates for the proposed project.

**USACE District:** Indicate whether the project impacts will occur within the boundaries of the Sacramento and/or San Francisco district.

**RWQCB:** Indicate which Water Boards Region(s) will be affected by the project.

**Endangered Species:** Indicate yes if your project will be located in an area with the potential for endangered species that is not covered by PG&E's Bay Area O&M Habitat Conservation Plan, Biological Opinions associated with the Regional General Permit, or the Programmatic Biological Opinion for delta smelt; indicate no if it will not. If yes, indicate which special status species will be affected and where special status impacts are expected to occur, if known, and indicate yes or no on the questions regarding whether or not the activity will be conducted outside of the estuary/bay Limited Operating Period; if impact pile-driving or cofferdam installation will occur in estuary/bay habitat beyond November 30; and if impact pile-driving or cofferdam installation will occur in estuary/bay habitat beyond January 15.

**Tree Removal:** Indicate yes if your project results in the removal of riparian trees; indicate no if it will not. If yes, populate the Riparian Tree Removal Table with the requested information, or attach a similar table if additional rows are needed.

- Species name
- Common name

- Diameter at breast height (DBH)
- Indicate if the tree(s) are part of the riparian overstory or understory

### Temporary and Permanent Impacts

**Temporary Impacts:** Indicate yes if your project will result in temporary impacts to waters of the state. Provide the total temporarily impacted area in acres, to the nearest thousandth of an acre. Provide the total temporarily impacted length to the nearest whole foot. These quantities must match the sum of the temporary impact quantities provided in Table 3. If you are proposing temporary impacts attach a restoration plan, that contains all Certification requirements (a schedule; plans for grading of disturbed areas to pre-project contours; a planting palette with plan species native to the project area; seed collection location; invasive species management; performance standards; and maintenance requirements (e.g., watering, weeding, and replanting). A restoration plan must be provided before your NOI may be determined complete.

**Permanent Impacts:** Indicate yes if your project would result in permanent impacts; indicate no if it would not. Provide the total permanently impacted area in acres, to the nearest thousandth of an acre. Provide the total temporarily impacted length to the nearest whole foot.

### Other Agency Permits, Licenses, Agreements, Plans, and Email Correspondence

Provide the following information for each permit from other agencies:

- **Have you applied?** Indicate yes if you have applied for the specified permit; indicate no if you have not.
- **Have you received the permit?** Indicate yes if you have received the permit; indicate no if you have not.
- **Permit Type:** Provide the name of the permit.
- **ID Number:** Provide the permit's identification number or unique identifier.

**Receiving Waters Information:** Populate Receiving Waters Information Table with the requested information as described below.

- **Impact Site ID:** Identify the impact site with a site ID. Site IDs should correspond to those used in project maps and other agency application materials.
- **Waterbody Name:** List the waterbody name found in the applicable Basin Plan. If the impact site ID occurs in an unnamed waterbody enter "unnamed" and provide the first named downstream receiving water. Contact Water Board staff for Basin Plan maps or general assistance completing this section, if needed. Regional Water Board Basin Plans are also located on the [State Water Board's Plans and Policies website](https://www.waterboards.ca.gov/plans_policies/) ([https://www.waterboards.ca.gov/plans\\_policies/](https://www.waterboards.ca.gov/plans_policies/)).

- **Impacted Aquatic Resource Type:** For each impact site ID, identify the impacted aquatic resource type from the following list: lake, ocean, bay, estuary, riparian zone, stream channel, vernal pool, or wetland. (More refined or precise resource classifications may be used in project plans and related documents.)
- **Water Board Hydrologic Units:** Identify the Water Board Basin Plan hydrologic unit code (HUC). Note that the Basin Plan HUC is not the same as a U.S. Geological Survey HUC. If unknown, indicate UNK and this information will be completed by Water Board staff.
- **Receiving Waters:** List the first downstream waterbody with beneficial use designation in the Water Board Basin Plan. If unknown, indicate UNK and this information will be completed by Water Board staff.
- **Receiving Waters Beneficial Uses:** List the beneficial use designation. If unknown, indicate UNK and this information will be completed by Water Board staff.
- **303d Listing Pollutant:** List pollutants for receiving waters that have a 303(d) impairment designation; if the water is not listed, indicate NA. If unknown, indicate UNK and this information will be completed by Water Board staff.

**Individual Direct Impact Information:** Populate the Individual Direct Impact Information Table with the requested information as described below. This table may be used for dredge or fill/excavation activities.

- **Latitude:** Provide the center coordinate of the impact site in decimal degrees.
- **Longitude:** Provide the center coordinate of the impact site in decimal degrees.
- **Impact Type:** Indicate if the impact at the impact site ID is permanent or temporary.
- **Site ID:** Identify the impact site with a site ID; site IDs should correspond with those used in the Receiving Waters Information Table.
- **Acres, Cubic Yards, and Linear Feet:** Provide the area in acres, volume in cubic yards dredged (if applicable), and length in linear feet for each impact site. For acres, round to the nearest thousandth of an acre.
- **Dredge or Fill/Excavation?** For each impact site, identify if the impact is from dredging or from fill/excavation activities.

### Compensatory Mitigation Proposal(s)

- **Attachment I/II:** Complete the corresponding form (I or II) depending on whether the permittee responsible or mitigation bank mitigation is proposed. List the size, type, functions and values of the proposed mitigation. Describe the success criteria, monitoring, long-term funding, management, and protection details.

### Attachments Checklist

Use the checklist to confirm the necessary documentation is attached to your NOI. If you determine one of the listed items does not pertain to your project, leave the checkbox empty:

- **Site Map(s):** Submit maps of sufficient detail to clearly illustrate all project elements, site characteristics, and impacts, with a scale of at least 1:24000 (1" = 200'). Acceptable map formats, listed in order of preference, are:
    - **GIS shapefiles:** Shapefiles must depict the boundaries of all project areas, site characteristics, and extent of aquatic resources impacted or avoided. Each shapefile should be attributed with the extent/type of aquatic resources impacted. Features and boundaries should be accurate to within 33 feet (10 meters). Identify datum/projection used and, if possible, provide map with north American datum of 1983 (NAD 83) in the California Teale Albers projection in feet.
    - **KLM files:** Saved from online mapping services. Maps must show the boundaries of all project areas and extent/type of aquatic resources impacted. Include URL(s) of maps. If this format is used, include a spreadsheet with the object ID and attributed with the extent/type of aquatic resources impacted.
    - **Other electronic format:** (CAD or illustration format) that provides a context for location (inclusion of landmarks, known structures, geographic coordinates, or USGS DRG or DOQQ). Maps must show the boundaries of all project areas and extent/type of aquatic resources impacts. If this format is used, include a table with the object ID and attributed with the extent/type of aquatic resources impacted.
    - Aquatic resource maps marked on paper **USGS 7.5 minute topographic maps or Digital Orthophoto Quarter Quads (DOQQ):** Original or legible copies are acceptable. Maps must show boundaries of all project areas and extent/type of aquatic resources impacted. If this format is used, include a spreadsheet with the object ID and attributed with the extent/type of aquatic resources impacted.
  - **Additional Pages and/or Supplemental Information:** For example, if the requested information does not fit in the space provided on the form, or if you would like to provide supplemental information not requested in the NOI.
  - **Drawings, or Design Plans:** As applicable, attach drawings, including plan and cross-section views, clearly depicting the location, size, and dimensions of the proposed activity, as well as the location of delineated waters on the site. The drawings should contain a title block, legend and scale, amount (in cubic yards, if applicable) and area (in acres) of fill, including both permanent and temporary impacts. The ordinary high-water mark or, if tidal waters, the mean high-water mark and high tide line, should be shown (in feet), based on National Geodetic Vertical Datum (NGVD) or other appropriate referenced elevation and design plans. Maps prepared according to the description below may satisfy some or all of this information.
  - **Pre-Project Site Photographs:** Include a unique identifier, date stamp, written description of photo details, and latitude/longitude (in decimal degrees) or map indicating location of photo. Successive photos should be taken from the same vantage point to compare pre/post construction conditions.
  - **Aquatic Resource Delineation Report:** Include if available.
  - **Archaeological Information (under separate cover)**
  - **USACE Upload Spreadsheet**
-

- **Proposed Dewatering Plan:** If not included in project description.
- **Horizontal Directional Drill or Drilling Plan:** Include if project involves Horizontal Directional Drilling or similar drilling operations.
- **Temporary Impact Restoration Plan:** Should include plans for restoring any proposed temporary impacts to pre-project conditions.
- **Water Quality Monitoring Plan:** Include if project involves planned work in water or stream diversions.
- **Other Agency Correspondence, Permits, and Permit Applications:** Attach other agency permits, applications, or correspondence as required.
- **Fee Check or Online Payment Receipt**