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**PACIFIC GAS AND ELECTRIC COMPANY
BAY AREA OPERATIONS & MAINTENANCE
ENVIRONMENTAL IMPACT REPORT**

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December 2020



ICF. 2020. *Pacific Gas and Electric Company Bay Area Operations & Maintenance Environmental Impact Report*. Draft December. (ICF 00068.18.) San Francisco and Sacramento, California. Prepared for California Department of Fish and Wildlife, Stockton, California.

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Acronyms and Abbreviations

µg/m ₃	micrograms per cubic meter
AB	Assembly Bill
ABAG	Association of Bay Area Governments
AC	alternating current
ACWD	Alameda County Water District
AMM	avoidance and minimization measure
APM	applicant proposed measure
APP	Avian Protection Plan
AQI	Air Quality Index
ARPA	Archaeological Resource Protection Act
ATVs	all-terrain vehicles
BAAQMD	Bay Area Air Quality Management District
BACT	best available control technologies
BAHCP	Bay Area HCP
BARWRP	Bay Area Regional Water Recycling Program
Bay Area	San Francisco Bay Area
Bay Area O&M HCP	Bay Area Operations & Maintenance Habitat Conservation Plan
BCDC	San Francisco Bay Conservation and Development Commission
BGEPA	Bald and Golden Eagle Protection Act
BLM	U.S. Bureau of Land Management
BMP	best management practices
BNSF	Burlington Northern Santa Fe
C&D	construction and demolition
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Cal/OSHA	California Occupational Safety and Health Administration
Cal/OSHA	California Division of Occupational Safety and Health
Cal-Fire	California Department of Forestry and Fire Protection
Caltrans	California Department of Transportation
CALVEG	Classification and Assessment with Landsat of Visible Ecological Groupings
CARB	California Air Resources Board
CBC	California Building Code
CCWD	Contra Costa Water District
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CH ₄	methane
CHP	California Highway Patrol

CHRIS	California Historical Resources Information System
Clean Power Plan	Mandatory Reporting Rule and Clean Power Plan
CLG	Certified Local Government Program
CMA	congestion management agency
CNDDB	California Natural Diversity Database
CNEL	community noise equivalent level
CNPS	California Native Plant Society
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
Coastal Act	California Coastal Act
CONPLAN	Concept of Operations Plan
CPS	cathodic protection system
CPSI	Community Pipeline Safety Initiative
CPUC	California Public Utilities Commission
CPUs	cathodic protection units
CRCR	Cultural Resources Constraints Report
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Rank
CRS	cultural resource specialist
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
dB	decibel
dBA	A-weighted dB scale
DDT	Dichlorodiphenyltrichloroethane
Delta	Sacramento–San Joaquin River Delta
DOC	California Department of Conservation
DOT	Department of Transportation
DPM	diesel particulate matter
DPS	distinct population segment
DTSC	Department of Toxic Substances Control
DWR	California Department of Water Resources
EBMUD	East Bay Municipal Utility District
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
ERTC	environmental release-to-construction
ETS	Electric Test System
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FESA	federal Endangered Species Act
FIRM	Flood Insurance Rate Map
FMMP	Farmland Mapping and Monitoring Program
FPs	Field Protocols
GGNRA	Golden Gate National Recreation Area
GHG	greenhouse gas
GIS	geographic information systems

GO	General Order
HA	Hydrologic Area
HCP	Habitat Conservation Plan
HDD	horizontal directional drilling
HFCs	hydroflourocarbons
HI	hazard index
HMMP	Hazardous Materials Management Plan
HSA	Hydrologic Subarea
HSAA	Hazardous Substance Account Act
HWCL	Hazardous Waste Control Law
in/sec	inches per second
IPCC	Intergovernmental Panel on Climate Change
ITP	Incidental Take Permit
kV	kilovolt
LCP	Local Coastal Program
L _{dn}	day-night sound level
L _{eq}	equivalent sound level
LID	low-impact development
L _{max}	maximum noise level
L _{min}	minimum sound levels
LOS	level of service
LRA _s	Local Responsibility Areas
LSAA	Lake or Streambed Alteration Agreement
MBTA	Migratory Bird Treaty Act
MEI	maximum exposed individual
MFL	magnetic flux leakage
MLD	most likely descendant
MLRA	major land resource area
MMWD	Marin Municipal Water District
mph	miles per hour
MRZ	Mineral Resource Zone
MS4 _s	municipal separate storm sewer systems
MTC	Metropolitan Transportation Commission
N ₂ O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCAB	North Coast Air Basin
NCCP	Natural Community Conservation Plan
NCP	National Contingency Plan
NERC	North American Electric Reliability Corporation
NFIP	National Flood Insurance Program
NMFS	National Marine Fisheries Service
NNL	National Natural Landmark
NO	nitric oxide
NO ₂	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration

NOP	Notice of Preparation
NO _x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRNL	National Registry of Natural Landmarks
NSCAPCD	Northern Sonoma County Air Pollution Control District
NSR	new source review
NWP	Nationwide Permit
O&M	operations and maintenance
OAK	Oakland International Airport
OEHHA	Office of Environmental Health Hazard Assessment
OES	California Office of Emergency Services
OSHA	Occupational Safety and Health Administration
PCP	Pentachlorophenol
PFCs	perfluorocarbons
PG&E	Pacific Gas and Electric Company
PLS	pressure limiting station
PM	particulate matter
PM ₁₀	PM less than or equal to 10 microns in diameter
PM _{2.5}	PM less than or equal to 2.5 microns in diameter
ppm	parts per million
PPV	peak particle velocity
psi	pounds per square inch
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act of 1976
RECP	Regional Emergency Coordination Plan
ROGs	reactive organic gases
ROW	right-of-way
RPS	Renewables Portfolio Standard
RWQCB	Regional Water Quality Control Board
RWS	Regional Water System
SB	Senate Bill
SCADA	Supervisory Controlled and Data Acquisition
Scoping Plan	California's 2017 Climate Change Scoping Plan
SCVWD	Santa Clara Valley Water District
SF ₆	sulfur hexafluoride
SFBAAB	San Francisco Bay Area Air Basin
SFBAAB	San Francisco Bay Area Air Basin
SFHAs	special flood hazard areas
SFO	San Francisco International Airport
SFPUC	San Francisco Public Utilities Commission
SIP	State Implementation Plan
SJC	Norman Y. Mineta San Jose International Airport

SMAQMD	Sacramento Metropolitan Air Quality Management District
SMARA	Surface Mining and Reclamation Act
SMGB	State Mining and Geology Board
SO ₂	sulfur dioxide
SRA	State Responsibility Area
SR	State Route
SSC	Species of Special Concern
Statewide Natural Gas Utility Permit	Notice of Applicability to PG&E that the Statewide General Order for Discharges from Natural Gas Utility Construction, Operation, and Maintenance Activities
STS	Charles M. Schulz Sonoma County Airport
SUVs	sport utility vehicles
SVAB	Sacramento Valley Air Basin
SWDA	Solid Waste Disposal Act
SWP	State Water Project
SWPPP	stormwater pollution prevention plan
SWRCB	State Water Resources Control Board
TACs	toxic air contaminants
Tanner Act	Toxic Air Contaminant Identification and Control Act
TCMs	traffic control measures
TCR	tribal cultural resource
TMDL	total maximum daily load
TPZ	timberland preserve zone
TSCA	Toxic Substances Control Act
TSPs	tubular steel poles
TVMP	Transmission Vegetation Management Plan
U.S.	United States
Unified Program	Unified Hazardous Waste and Hazardous Materials Management Regulatory Program
UP	Union Pacific
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
VOCs	volatile organic compounds
VRC	Visual Resource Management
YSAQMD	Yolo-Solano Air Quality Management District

Introduction

Pacific Gas and Electric Company (PG&E) has filed an application for an Incidental Take Permit (ITP) under Section 2081 of the California Endangered Species Act (CESA) with the California Department of Fish and Wildlife (CDFW). The ITP would cover PG&E's San Francisco Bay Area (Bay Area) Operations and Maintenance (O&M) and minor new construction activities for its natural gas and electric lines, and establish a comprehensive approach to avoid, minimize, and fully mitigate impacts on covered species and habitat (collectively "covered activities"). CDFW has directed preparation of this Bay Area O&M Incidental Take Permit Environmental Impact Report (EIR) in conformance with the California Environmental Quality Act (CEQA) (Public Resources Code, Section 21000 et seq.) and the CEQA Guidelines (14 California Code of Regulations, Section 15000 et seq.). For purposes of CEQA, the project consists of PG&E's covered activities for which CDFW is issuing an ITP (proposed Project). The ITP will provide incidental take coverage for three species, the California tiger salamander, Alameda whipsnake, and California freshwater shrimp (covered species), in the Bay Area for the next 30 years.

The activities covered in the ITP are essential to support PG&E's obligation to provide safe and reliable energy to customers throughout the Bay Area. Much of the work included in the covered activities is specifically aimed at making PG&E's gas and electric systems more resilient and resistant to risks such as wildfires and earthquakes, while all covered activities will make the gas and electric systems safer and more reliable.

Project Location

The geographic scope of the proposed Project encompasses Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Sonoma, and Solano Counties; collectively this area is known as the *study area*. Within those nine counties, the *Permit Area* consists of PG&E gas and electric transmission and distribution facilities, rights-of-way (ROWs plus standard buffers), lands owned or obtained by PG&E or subject to PG&E easements, access routes, and conservation areas acquired to provide compensatory mitigation for impacts resulting from covered activities. The total Permit Area encompasses approximately 402,440 acres.¹ PG&E facilities in the Permit Area are located in the following land-cover types: urban (approximately 61%), natural (approximately 32%) and agricultural (approximately 7%). Activity and project locations vary year to year based on maintenance schedules, changes in maintenance priority, and the need to respond to emergencies. As a result, work may be implemented anywhere in the Permit Area. O&M and minor new construction work are expected to be performed throughout PG&E's ROW and in close proximity to the ROW over the course of the permit term. Activities on habitat conservation lands would also be covered.

¹ This number and the percentages and acreages of existing conditions shown throughout the EIR are approximate and based on conditions as described in PG&E's Bay Area O&M HCP. Over the next 30 years, changes will occur due to land use and regulatory changes, new construction, acquisition of additional utility property and habitat lands, and other factors.

Project Overview

PG&E applied for an ITP to streamline the incidental take permitting for three species in the nine-county Bay Area region for its ongoing natural gas and electric O&M activities, minor new construction, and habitat conservation and enhancement activities. The ITP would cover California tiger salamander and Alameda whipsnake, which are listed as threatened under CESA, and California freshwater shrimp, which is listed under CESA as endangered.

Covered activities under the ITP would consist of O&M of PG&E's gas and electrical transmission and distribution systems, minor new construction, and habitat conservation and enhancement. PG&E has conducted O&M activities in the Bay Area for decades. CDFW's issuance of the ITP would not change the nature and extent of the work that will be required within the next 30 years on PG&E's natural gas and electric systems in the Bay Area, but it would eliminate the need for PG&E to obtain incidental take authorization on a case by case basis when implementing covered activities likely to cause take of the covered species. The ITP would establish standardized avoidance and minimization measures, which would shape the way PG&E carries out covered activities, and provide a comprehensive approach to habitat conservation that enables landscape-level habitat preservation and enhancement that is more ecologically beneficial. The ITP's comprehensive approach to compensatory mitigation would result in more comprehensive habitat conservation than would otherwise occur over the 30-year term because many of PG&E's O&M activities for which measures would be implemented would not individually cause incidental take requiring related mitigation of species impacts. The Bay Area-wide ITP, as proposed, assumes that, even with the implementation of avoidance and minimization measures, covered activities are likely to cause incidental take of the covered species, and that take must be fully mitigated.

The vast majority of O&M activities affect less than 0.1 acre (approximately 66 by 66 feet), are regularly reoccurring, and take a few hours to complete. Operational activities typically consist of inspecting, monitoring, testing, cleaning, and operating valves, enclosures, switches, insulators, and other components. These O&M activities involve utility personnel working at existing facilities in existing ROWs or other utility properties. Maintenance activities consist of repairing and replacing facilities, structures, and access roads. This work includes electrical transmission and distribution reconductoring projects, and gas pipeline replacement. This work also includes emergency repair and replacement, and vegetation management, including tree pruning and removal. These activities primarily take place at existing facilities and within existing ROWs and utility properties, although, to ensure regulatory compliance and the safety of its facilities, PG&E is required by law to manage or remove hazard trees and incompatible vegetation wherever they are located.

Minor new construction activities would also be covered under the ITP. When conducted in undisturbed, natural vegetation, service extensions to locally approved new residential, commercial or industrial customer would be limited to 2 miles from an existing facility. New structures would be limited to new gas pressure limiting stations with an impact of up to 1 acre of natural vegetation, and electrical substation expansions with up to 3 acres of impacts on natural vegetation.

As part of its conservation strategy and obligations under the ITP, PG&E will conserve, manage and enhance habitat for covered species. PG&E will provide an endowment for mitigation lands to address the management needs of conserved properties. Activities required for land management typically include vehicle use in or near upland habitat, regular pedestrian surveys or sampling, installation and maintenance of fencing, and use of handheld equipment to manage vegetation and invasive species and otherwise enhance or restore habitat. In the course of acquiring, managing,

monitoring, or enhancing habitat conservation lands consistent with a CDFW-approved management plan, take of covered species could result. The ITP is intended to cover habitat management activities. The proposed Project will contain a compensatory mitigation plan that allows for offset of impacts on a regional basis. The plan would benefit habitat because it would provide permanent protection and management of lands that are large enough to support populations of covered species. Compensatory mitigation on a project-by-project basis does not typically provide the opportunity for this landscape-level approach.

Project Objectives

The proposed project has the following objectives:

- Streamline the incidental take permitting for the continued long-term O&M of PG&E electrical and natural gas facilities to ensure delivery of reliable and safe energy to PG&E customers, in accordance with California Public Utilities Commission mandates and in compliance with CESA.
- Complete necessary O&M activities and minor new construction in a manner that minimizes impacts on California tiger salamander, Alameda whipsnake, and California freshwater shrimp in the Bay Area's nine counties.
- Fully mitigate environmental impacts on California tiger salamander, Alameda whipsnake, and California freshwater shrimp from O&M activities and minor new construction in a manner that contributes to the long-term survival of these species as well as other species with similar habitat requirements.

Contents of the Environmental Impact Report

This EIR serves as an informational document for the public agency decision makers and the general public regarding the characteristics and objectives of the project, potential environmental impacts, recommended mitigation measures, applicant-proposed measures that would lessen or reduce potentially significant impacts, and feasible alternatives to the project. Chapter 2, *Project Description*, provides a detailed description of the project. This discussion includes information regarding the background and purpose of the project, as well as descriptions of covered activities and applicant-proposed measures that are part of the project. Chapter 3, *Impact Analysis*, describes the environmental and regulatory settings, identifies the environmental impacts of the project and covered activities, and specifies applicant-proposed measures and mitigation measures that would lessen or reduce significant impacts to a less-than-significant level or further reduce less-than-significant impacts. Chapter 4, *Alternatives Analysis*, describes potential alternatives to the project, provides analysis of the alternatives' ability to meet project objectives, and identifies differences in the level of environmental impacts. Chapter 5, *Other CEQA Considerations*, discusses potential growth-inducing impacts, significant unavoidable impacts on the environment, significant irreversible environmental changes, and cumulative effects on the environment.

Summary of Impact Analysis

The impacts of the covered activities, proposed mitigation, and significance conclusions before and after mitigation are identified in detail in Chapter 3, *Impact Analysis*. Impact determinations associated with each resource area are summarized below.

Less-than-Significant Impact with Mitigation

- Aesthetics
- Biological resources
- Cultural resources
- Hazards and hazardous materials
- Hydrology and water quality
- Noise
- Transportation and traffic
- Wildfires

Less-than-Significant Impact

- Agricultural and forestry resources
- Air quality
- Energy
- Geology and soils
- Greenhouse gas emissions
- Land use and planning
- Mineral resources
- Population and housing
- Public services
- Recreation
- Utilities and service systems

Table ES-1. Summary of Impacts and Mitigation Measures

Impact	Significance	Applicant-Proposed Measures (APMs)	Significance after APMs	Mitigation Measure (MM)	Significance after MM
Aesthetics					
Impact AES-1: Potential to have substantial adverse effect on a scenic vista	Less than Significant	APM AES-1: Restore disturbed areas APM AES-2: Protect scenic vistas and scenic highways APM AES-3: Shield temporary construction lighting APM AES-4: Apply minimum lighting standards APM AES-5: Reduce visibility of new structures in sensitive landscapes APM AES-6: Implement landscape buffers or other screening for minor	Less than Significant	None needed	Less than Significant
Impact AES-2: Potential to substantially damage scenic resources along a scenic highway	Less than Significant	APM AES-1: Restore disturbed areas APM AES-2: Protect scenic vistas and scenic highways APM AES-5: Reduce visibility of new structures in sensitive landscapes APM AES-6: Implement landscape buffers or other screening for minor	Less than Significant	None needed	Less than Significant
Impact AES-3: Degradation of the existing visual character or quality of the site and its surroundings in non-urbanized areas or conflict with applicable zoning and other regulations governing scenic quality in urbanized areas	Less than Significant	APM AES-1: Restore disturbed areas APM AES-2: Protect scenic vistas and scenic highways APM AES-5: Reduce visibility of new structures in sensitive landscapes APM AES-6: Implement landscape buffers or other screening for minor	Less than Significant	None needed	Less than Significant

Impact	Significance	Applicant-Proposed Measures (APMs)	Significance after APMs	Mitigation Measure (MM)	Significance after MM
Impact AES-4: Introduction of a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.	Significant	APM AES-3: Shield temporary construction lighting APM AES-4: Apply minimum lighting standards APM AES-5: Reduce visibility of new structures in sensitive landscapes APM AES-6: Implement landscape buffers or other screening for minor	Less than Significant with APMs	None needed	Less than Significant with APMs
Agricultural and Forest Resources					
Impact AG-1: Conversion of Important Farmland to nonagricultural use	Less than Significant	APM AG-1: Coordination with farmers and ranchers regarding construction activities	Less than Significant	None needed	Less than Significant
Impact AG-2: Conflict with existing zoning for agricultural use or with a Williamson Act contract	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact AG-3: Conflict with existing zoning of forest land, timberland, or timberland zoned Timberland Production	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact AG-4: Loss of forest land or conversion of forest land to non-forest use	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact AG-5: Potential to cause changes in the existing environment that could result in conversion of Farmland to nonagricultural use or conversion of forest land to non-forest use	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Air Quality					
Impact AQ-1: Conflict with or obstruct implementation of the applicable air quality plans	Less than Significant	APM AIR-1: Implement Dust Control Best Management Practices	Less than Significant	None needed	Less than Significant

Impact	Significance	Applicant-Proposed Measures (APMs)	Significance after APMs	Mitigation Measure (MM)	Significance after MM
Impact AQ-2: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact AQ-3: Expose sensitive receptors to substantial pollutant concentrations	Less than Significant	APM AIR-1: Implement Dust Control Best Management Practices	Less than Significant	None needed	Less than Significant
Impact AQ-4: Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Biological Resources					
Impact BIO-1: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by CDFW or USFWS	Significant	<p>APM BIO-1: Prevent or minimize spread of invasive weeds</p> <p>APM BIO-2: Protect covered wildlife encountered while performing covered activities</p> <p>APM BIO-3: Design and site minor new construction projects to avoid sensitive areas</p> <p>APM BIO-4: Avoid special-status plants</p> <p>APM BIO-5: Erect wildlife exclusion fencing</p> <p>APM BIO-6: Protect nesting birds</p> <p>APM BIO-7: Avoid breeding and pupping bats</p> <p>APM BIO-8: Avoid Alameda whipsnake in core habitat</p> <p>APM HYDRO-1: Develop and implement a frac-out plan for projects using horizontal directional drilling</p>	Significant	MM BIO-1: Acquire, preserve, and/or enhance suitable habitat for mitigation	Less than Significant with Mitigation
Impact BIO-2: Have a substantial	Less than	APM BIO-1: Prevent or minimize spread of	Less than	None needed	Less than

Impact	Significance	Applicant-Proposed Measures (APMs)	Significance after APMs	Mitigation Measure (MM)	Significance after MM
adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFW or USFWS	Significant	invasive weeds APM BIO-3: Design and site minor new construction projects to avoid sensitive areas	Significant		Significant
Impact BIO-3: Have a substantial adverse effect on federally protected wetlands as defined by CWA Section 404 (including marsh, vernal pool, coastal) through direct removal, filling, hydrological interruption, or other means	Less than Significant	APM BIO-1: Prevent or minimize spread of invasive weeds APM BIO-3: Design and site minor new construction projects to avoid sensitive areas	Less than Significant	None needed	Less than Significant
Impact BIO-4: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites	Less than Significant	APM BIO-3: Design and site minor new construction projects to avoid sensitive areas APM BIO-6: Protect nesting birds APM BIO-7: Avoid breeding and pupping bats	Less than Significant	None needed	Less than Significant
Impact BIO-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance	No Impact	None needed	No Impact	None needed	No Impact
Impact BIO-6: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Cultural Resources					
Impact CUL-1: Causes a substantial adverse change in the significance of a historical resource	Less than Significant	APM CR-1: Inventory, evaluate, and protect cultural resources	Less than Significant	None needed	Less than Significant

Impact	Significance	Applicant-Proposed Measures (APMs)	Significance after APMs	Mitigation Measure (MM)	Significance after MM
Impact CUL-2: Cause a substantial adverse change in the significance of an archaeological resource	Less than Significant	APM CR-1: Inventory, evaluate, and protect cultural resources APM CR-2: Provide worker training APM CR-3: Inadvertent discovery of previously unidentified cultural resources	Less than Significant	None needed	Less than Significant
Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries	Less than Significant	None Needed	Less than Significant	None needed	Less than Significant
Impact CUL-4: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined in Public Resources Code Section 5020.1(k))	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Energy					
Impact EN-1: Wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact EN-2: Conflict with or obstruction of a state or local plan for renewable energy or energy efficiency	No Impact	None needed	No Impact	None needed	No Impact
Geology and Soils					
Impact GEO-1: Exposure of people or structures to potential substantial adverse effects involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, including liquefaction, or landslides	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact GEO-2: Potential to result in substantial soil erosion or the loss of topsoil	Less than Significant	None needed	Less than Significant	None needed	Less than Significant

Impact	Significance	Applicant-Proposed Measures (APMs)	Significance after APMs	Mitigation Measure (MM)	Significance after MM
Impact GEO-3: Placement of project-related facilities on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact GEO-4: Placement of project-related facilities on expansive soil, creating substantial risk to life or property	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact GEO-5: Placement of facilities on soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater	No Impact	None needed	No Impact	None needed	No Impact
Impact GEO-6: Directly or indirectly destroy a significant paleontological resource or site or unique geologic feature	Significant	APM GEO-1: Protect unanticipated paleontological resource discoveries APM GEO-2: Provide worker environmental awareness training	Less than Significant with APM	None needed	Less than Significant with APM
Greenhouse Gas Emissions					
Impact GHG-1: Generation of greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment	Less than Significant	APM GHG-1: Avoid and minimize potential sulfur Hexafluoride (SF ₆) emissions	Less than Significant	None needed	Less than Significant
Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Hazards and Hazardous Materials					

Impact	Significance	Applicant-Proposed Measures (APMs)	Significance after APMs	Mitigation Measure (MM)	Significance after MM
Impact HAZ-1 and HAZ-2: Creation of a significant hazard to the public or the environment through either the routine transport, use, or disposal of hazardous materials or reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment	Less than Significant	APM HAZ-1: Spill response AMP HAZ-2: Vehicle refueling	Less than Significant	None needed	Less than Significant
Impact HAZ-3: Emission of hazardous emissions or handling of hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school	Less than Significant	APM HAZ-1: Spill response AMP HAZ-2: Vehicle refueling	Less than Significant	None needed	Less than Significant
Impact HAZ-4: Placement of project-related facilities on a site that is included on a list of hazardous materials sites, and resulting creation of a significant hazard to the public or the environment	Less than Significant	APM HAZ-1: Spill response AMP HAZ-2: Vehicle refueling	Less than Significant	None needed	Less than Significant
Impact HAZ-5: Placement of project-related facilities within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in a safety hazard for people residing or working in the project area	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact HAZ-6: Placement of project-related facilities in the vicinity of a private airstrip, resulting in a safety hazard for people residing or working in the project area	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact HAZ-7: Impairment of implementation of or physical interference with an adopted emergency response plan or emergency evacuation plan	Significant	APM HAZ-1: Spill response AMP HAZ-2: Vehicle refueling APM TRA-1: Implement transportation best management practices	Less than Significant with APMs	None needed	Less than Significant with APMs

Impact	Significance	Applicant-Proposed Measures (APMs)	Significance after APMs	Mitigation Measure (MM)	Significance after MM
Impact HAZ-8: Exposure of people or structures to a significant risk involving wildland fires	Less than Significant	APM HAZ-1: Spill response AMP HAZ-2: Vehicle refueling	Less than Significant	None needed	Less than Significant
Hydrology and Water Quality					
Impact WQ-1: Violation of any water quality standards or waste discharge requirements	Less than Significant	APM HYDRO-1: Develop and implement a frac-out plan for projects using horizontal directional drilling	Less than Significant	None needed	Less than Significant
Impact WQ-2: Substantial depletion of groundwater supplies or substantial interference with groundwater recharge	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact WQ-3: Substantial alteration of existing drainage patterns, including through the alternation of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact WQ-4: Substantial alteration of existing drainage patterns, including through the alteration of the course of a stream or river, in a manner that would result in flooding onsite or offsite	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact WQ-5: Creation of or contribution to runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact WQ-6: Other substantial degradation of water quality	No Impact	None needed	No Impact	None needed	No Impact
Impact WQ-7: Placement of housing within a 100-year flood hazard area	No Impact	None needed	No Impact	None needed	No Impact

Impact	Significance	Applicant-Proposed Measures (APMs)	Significance after APMs	Mitigation Measure (MM)	Significance after MM
Impact WQ-8: Placement of structures that would impede or redirect flood flows within a 100-year flood hazard area	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact WQ-9: Exposure of people or structures to significant risk involving flooding, including flooding as a result of the failure of a levee or dam	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact WQ-10: Contribution to inundation by seiche, tsunami, or mudflow	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Land Use					
Impact LU-1: Physical division of an established community	No Impact	None needed	No Impact	None needed	No Impact
Impact LU-2: Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Mineral Resources					
Impact MIN-1: Contribute to the loss of availability of a known mineral resource that would be of value to the region and the residents of the state	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact MIN-2: Contribute to the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Noise and Vibration					
Impact NOI-1: Exposure of persons to or generation of noise levels in excess of applicable standards	Significant	APM NOI-1: Restrict construction hours APM NOI-2 Limit noise during construction near occupied residences	Less than Significant with APMs	None needed	Less than Significant with APMs

Impact	Significance	Applicant-Proposed Measures (APMs)	Significance after APMs	Mitigation Measure (MM)	Significance after MM
Impact NOI-2: Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels	Less than Significant	APM NOI-1: Restrict construction hours	Less than Significant	None needed	Less than Significant
Impact NOI-3: For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, exposure of people residing or working in the project area to excessive noise levels	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Population and Housing					
Impact POP-1: Create substantial population growth either directly or indirectly	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact POP-2: Displace a substantial number of people or existing housing units, necessitating the construction of replacement housing elsewhere	No Impact	None needed	No Impact	None needed	No Impact
Public Services					
Impact PS-1: Create a need for new or physically altered governmental facilities to maintain acceptable service ratios, response times, or other performance objectives for fire protection, police protection, schools, parks, or other public facilities	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Recreation					
Impact REC-1: Increased use of existing recreational facilities, resulting in substantial physical deterioration	No Impact	None needed	No Impact	None needed	No Impact

Impact	Significance	Applicant-Proposed Measures (APMs)	Significance after APMs	Mitigation Measure (MM)	Significance after MM
Impact REC-2: Construction or expansion of recreational facilities that might have an adverse physical effect on the environment	No Impact	None needed	No Impact	None needed	No Impact
Transportation and Traffic					
Impact TRA-1: Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities	Less than Significant	APM TRA-1: Implement transportation best management practices	Less than Significant	None needed	Less than Significant
Impact TRA-2: Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)	Less than Significant	APM TRA-1: Implement transportation best management practices	Less than Significant	None needed	Less than Significant
Impact TRA-3: Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)	Less than Significant	APM TRA-1: Implement transportation best management practices	Less than Significant	None needed	Less than Significant
Impact TRA-4: Result in inadequate emergency access	Less than Significant	APM TRA-1: Implement transportation best management practices	Less than Significant	None needed	Less than Significant
Utilities and Public Services					
Impact UT-1: Exceedance of wastewater treatment requirements of the applicable Regional Water Quality Control Board	No Impact	None needed	No Impact	None needed	No Impact
Impact UT-2: Construction of new water or wastewater treatment facilities or expansion of existing facilities, with the potential to cause significant environmental effects	No Impact	None needed	No Impact	None needed	No Impact

Impact	Significance	Applicant-Proposed Measures (APMs)	Significance after APMs	Mitigation Measure (MM)	Significance after MM
Impact UT-3: Consturction of new stormwater drainage facilites or expansion of existing facilites, with the potential to cause significant environmental effects	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact UT-4: Creation of a need for new or expanded entitlements or resources for sufficient water supply	No Impact	None needed	No Impact	None needed	No Impact
Impact UT-5: Project-related exceedance of existing wastewater treatment capacity	No Impact	None needed	No Impact	None needed	No Impact
Impact UT-6: Project-related exceedance of the relevant landfill's permitted cpacity	Less than Significant	None needed	Less than Significant	None needed	Less than Significant
Impact UT-7: Inconsistency with federal, state, and local statutes and regulations related to solid waste	No Impact	None needed	No Impact	None needed	No Impact
Wildfire					
Impact WF-1: Substantially impair an adopted emergency response plan or emergency evacuation plan	Less than Significant	APM TRA-1: Implement transportation best management practices	Less than Significant	None needed	Less than Significant
Impact WF-2: Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire	Less than Significant	APM FIRE-1: Construction fire prevention practices	Less than Significant	None needed	Less than Significant
Level of significance: LTS = less than significant; S = significant; SU = significant and unavoidable; NI = no impact.					

Introduction and Scope of Environmental Impact Report

Pacific Gas and Electric Company (PG&E) has filed an application for an Incidental Take Permit (ITP) under Section 2081 of the California Endangered Species Act (CESA) with the California Department of Fish and Wildlife (CDFW). The ITP would cover PG&E's San Francisco Bay Area (Bay Area) Operations and Maintenance (O&M) activities and minor new construction for natural gas pipelines and electric lines, and would establish a comprehensive approach to avoid, minimize and fully mitigate impacts on three covered species: California tiger salamander, Alameda whipsnake, and California freshwater shrimp. Please refer to Chapter 2, *Project Description*, for more information about the activities that would be covered by the ITP.

CDFW's issuance of the ITP would not change the nature and extent of the work that will be required within the next 30 years on PG&E's natural gas and electric systems in the Bay Area; however, the ITP would eliminate the need for PG&E to obtain incidental take authorization on a case by case basis when implementing covered activities likely to cause take of the covered species. The ITP would establish standardized avoidance and minimization measures, which would shape the way PG&E carries out covered activities, and provide a comprehensive approach to habitat conservation that enables landscape level habitat preservation and enhancement that is more ecologically beneficial. The ITP's comprehensive approach to compensatory mitigation would result in more habitat conservation than would otherwise occur over the 30-year term because many of PG&E's O&M activities would not individually require an ITP and related offsets to species impacts. The Bay Area-wide ITP, as proposed, assumes that, even with the implementation of avoidance and minimization measures, covered activities are likely to cause incidental take of the covered species, and that take must be fully mitigated.

1.1 The California Environmental Quality Act

This PG&E Bay Area O&M Incidental Take Permit Environmental Impact Report (EIR) has been prepared in conformance with the California Environmental Quality Act (CEQA) (Public Resources Code §§ 21000 et seq.) and the CEQA Guidelines (14 California Code of Regulations §§ 15000 et seq.) (CEQA Guidelines). Issuing the ITP is a discretionary action that requires CDFW to comply with CEQA in accordance with CEQA Guidelines Sections 15021 and 15040 as well as Title 14, Section 783.5(d) of the California Code of Regulations. While the California Public Utilities Commission (CPUC) has jurisdiction over PG&E's design, construction, operations and maintenance, and construction activities, CDFW is the lead agency for CEQA review because the ITP is the only discretionary permit being requested for this regional, multi-species action. The covered activities, when they take place as individual projects, may require discretionary permits or approvals from the CPUC or other state agencies in addition to coverage under the ITP, although a majority of the O&M work would not require any discretionary permitting or would be exempt from CEQA review.

Under the CEQA process, an EIR must be prepared when there is substantial evidence that supports a fair argument that significant effects may result from project implementation. Consistent with Section 15121(a) of the CEQA Guidelines, this EIR is a public information document that assesses

and discloses the potential environmental effects of conducting O&M and minor new construction activities, as well as habitat conservation and enhancement, covered by the ITP.

CEQA authorizes a lead agency to impose mitigation “in order to substantially lessen or avoid significant effects on the environment, consistent with applicable constitutional requirements such as the “nexus” and “rough proportionality” standards established by case law (citations omitted).” (CEQA Guidelines, § 15041, subd. a.) Thus, the aim of CEQA mitigation is to reduce project impacts to a less-than-significant level. In contrast, CESA requires that impacts related to the incidental take of species be “fully mitigated.” CDFW may issue an ITP for an otherwise lawful activity if the impacts of the take are minimized and fully mitigated, there is adequate funding for the mitigation measures, and the take does not jeopardize the continued existence of the species.

1.1.1 The Purpose of this Environmental Impact Report

Pursuant to the CEQA, this EIR analyzes the potential environmental effects associated with the proposed Project, which consists of PG&E’s covered activities for which CDFW is issuing an ITP under Section 2081 of the California Fish and Game Code, which regulates take of species listed under the CESA. The ITP will provide incidental take of three species, the California tiger salamander, Alameda whipsnake, and California freshwater shrimp for the next 30 years. This EIR is intended to serve as an informational document for the public agency decision makers and the general public regarding the characteristics and objectives of the project, potential environmental impacts, recommended mitigation measures and feasible alternatives to the project.

CDFW has determined that preparation and certification of the EIR in compliance with CEQA is required before CDFW may decide whether to issue the requested ITP for proposed Project activities in compliance with CESA. (See generally Fish & G. Code, § 2081, subd. (b), (c).) CDFW is the lead agency under CEQA. In this respect, this EIR will analyze significant environmental impacts that are under CDFW’s permitting authority, as well as those impacts to fish and wildlife resources held in trust by CDFW for the people of California.

The standards for adequacy of an EIR, as defined in the State CEQA Guidelines, section 15151, are as follows:

An EIR should be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure.

This document has been prepared in accordance with the above legal standards for adequacy of an EIR under CEQA and the State CEQA Guidelines.

The provisions governing PG&E's request for an ITP for proposed Project activities that would result in the take of state-listed species under CESA are found in Fish and Game Code section 2081, subdivisions (b) and (c). "Take" as defined in section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt pursue, catch, capture, or kill." As discussed below, CESA allows for authorized take incidental to otherwise lawful activities.

According to Section 15002(a) of the CEQA Guidelines, the basic purpose of CEQA is to:

- Inform government decision makers and the public about the potential significant environmental effects of proposed activities.
- Identify ways that adverse environmental impacts can be avoided or significantly reduced.
- Prevent significant, avoidable adverse impacts to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governing agency finds the changes to be feasible.
- Disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved.

The process of preparing an EIR involves the following discrete steps.

- **Notice of Preparation (NOP).** Prior to preparing the Draft EIR, the lead agency releases an NOP to solicit the comments of public agencies and interested organizations and individuals regarding the scope and content of the EIR. The NOP is available for comment for at least 30 days. An NOP was distributed for this EIR in November 2017. The comments on the NOP received from agencies and the public are included in Appendix A, *Notice of Preparation*, of this EIR.
- **Scoping Meeting.** A scoping meeting is intended to offer an additional opportunity for input prior to preparation of the Draft EIR. Two scoping meetings were conducted for public agencies and members of the public at the Burlingame Recreation Center (850 Burlingame Avenue, Burlingame, CA 94010) on January 8, 2018, from 4:00 p.m. to 6:00 p.m. and the Mill Valley Community Center, Terrace Lounge (180 Camino Alto, Mill Valley, CA 94941) on January 9, 2018, from 4:30 p.m. to 6:30 p.m.
- **Preparation and release for public review and comment of the Draft EIR.** The Draft EIR will be available for 45 days for review and comment by public agencies and interested organizations and individuals.
- **Preparation of the Final EIR.** The Final EIR will present the comments received during the public review period (and a complete list of commenters), written responses to the comments related to environmental issues, and any revisions that are made to the Draft EIR in response to the comments. CDFW will certify the Final EIR prior to taking action on the project.
- **Adoption of findings and a statement of overriding considerations.** If there are any unavoidable adverse environmental effects that cannot be mitigated to a less-than-significant level, an adoption of findings and a statement of the overriding considerations will be issued.

1.1.2 Document Format

Sections 15120 et seq. of the CEQA Guidelines identify the content requirements for EIRs. An EIR must include a description of the environmental setting, an environmental impact analysis,

mitigation measures, alternatives, significant irreversible environmental changes, growth-inducing impacts, and cumulative impacts. This EIR is organized as follows.

- **Executive Summary**—presents an overview of the project including its location and objectives, a brief description of the purpose and contents of the environmental impact report, and a summary of the impact conclusions with a table listing the impacts that would result from the project and covered activities and each impact’s level of significance.
- **Chapter 1—Introduction and Scope of Environmental Impact Report** (this chapter) provides an overview of the project and CEQA requirements, and a summary of the scope, intent, and contents of the EIR.
- **Chapter 2—Project Description** presents an overview of the project, the location and description of O&M and minor new construction activities; provides a summary of the project’s purpose and objectives; and identifies anticipated permits and approvals.
- **Chapter 3—Impact Analysis** describes the existing environmental setting, regulatory setting, and discusses the environmental impacts of the project and covered activities. This chapter also identifies mitigation measures and applicant-proposed measures to reduce potential impacts.
- **Chapter 4—Alternatives Analysis** describes potential alternatives to the project, along with analyses of the alternatives’ ability to meet project objectives and differences in the level of environmental impacts.
- **Chapter 5—Other CEQA Considerations** discusses other CEQA issues, including potential growth-inducing impacts, significant unavoidable impacts on the environment, significant irreversible environmental changes, and cumulative effects on the environment.
- **Chapter 6—Environmental Impact Report Preparers** provides the names of the EIR authors and consultants, and agencies or individuals consulted during preparation of the EIR.
- **Appendix A—Notice of Preparation** presents the proposed Project covered by the application for an ITP under CESA Section 2081 with CDFW.
- **Appendix B—Summary of Plant Analysis** presents the results of additional GIS analysis of California Natural Diversity Database records conducted for all special-status plant species.
- **Appendix C—Avian Protection Plan** describes PG&E’s program to address avian electrocutions, collisions, and nesting birds.

1.2 Intended Uses of this EIR

As the lead agency, CDFW will use this EIR in accordance with CEQA Guidelines Section 15092 to analyze the potential environmental effects associated with the issuance of an ITP under Section 2081 of the California Fish and Game Code, which regulates take of species listed under the CESA.

The ITP would cover incidental take of three species that could result from PG&E’s implementation of O&M activities, minor new construction, and habitat conservation and enhancement for a period of 30 years. The covered species are California tiger salamander and Alameda whipsnake, which are listed under CESA as threatened, and California freshwater shrimp, which is listed under CESA as endangered.

The covered activities are not being approved by this ITP and may require other discretionary permits by other agencies that could trigger additional formal CEQA review (CEQA Guidelines, §§ 153002, subdiv. (3), 15004) or application of CEQA's statutory or categorical exemptions (CEQA Guidelines, § 15061) and the exceptions to the exemptions (CEQA Guidelines, § 15300.2). This EIR could be used to establish that impacts to the covered species resulting from the covered activities under this ITP would be less than significant. It could also be used by CDFW to support issuance of future Lake and Streambed Alteration Agreements for individual covered activities within the Bay Area.

1.3 Reviewing an EIR

1.3.1 Making Effective Comments

CDFW will accept written comments during the review period described below. Please focus your comments on the environmental issues and adequacy of the Draft EIR.

1.3.2 Submitting Comments

The Draft EIR will be available for public review during the 45-day public review period, beginning on ____, 2020, and ending on ____, 2020. During that time, agency representatives and members of the public will have the ability to submit written comments on the Draft EIR to the address provided below. Please insert "PG&E Bay Area O&M ITP DEIR" in the subject line.

Address

Contact:

Phone:

Email:

1.4 Final EIR

After the end of the public review period and as part of preparing the Final EIR, CDFW will prepare written responses to all environmental issues raised through the public review process. The Final EIR will present the comments received, written responses to comments, a complete list of commenters, and revisions made to the Draft EIR (if warranted) in response to comments received. It may also contain additional information necessary to respond to the comments.

Chapter 2

Project Description

For purposes of the California Environmental Quality Act (CEQA), the project consists of Pacific Gas & Electric Company's (PG&E's) covered activities, described in detail in Section 2.7, *Covered Activities*, for which the California Department of Fish and Wildlife's (CDFW's) is issuing an Incidental Take Permit (ITP). The ITP will provide take coverage for three species, the California tiger salamander, Alameda whipsnake, and California freshwater shrimp (covered species). This chapter presents a description of the objectives of the proposed project, the ITP under consideration by CDFW, and the covered activities.

PG&E has submitted an application to CDFW for an ITP under Section 2081 of the California Endangered Species Act (CESA).

The ITP would cover PG&E's operations and maintenance (O&M) activities related to natural gas pipelines and electric transmission and distribution lines, minor new construction activities, and habitat management and enhancement activities in a nine-county region consisting of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Sonoma, and Solano Counties. The ITP also would establish a comprehensive approach to avoid and minimize impacts on covered species and to mitigate impacts. The duration of the ITP would be 30 years to coincide with PG&E's federal permit issued under the *Bay Area Operations and Maintenance Habitat Conservation Plan* (Bay Area O&M HCP) in October 2017.

This ITP will not change the nature and extent of the work that will be required within the next 30 years on PG&E's natural gas and electric systems in the San Francisco Bay Area (Bay Area), nor will the ITP enable work to be done by PG&E that would not otherwise be done. Rather, the ITP will eliminate the need to obtain individual incidental take authority when its covered activities would affect a covered species. In exchange, the ITP will establish standardized avoidance and minimization measures (AMMs), which will shape the way PG&E conducts covered activities, and a comprehensive approach to habitat conservation that enables landscape-level habitat preservation and enhancement that is ecologically beneficial resulting from a programmatic approach. The ITP's comprehensive approach to compensatory mitigation will result in more habitat conservation than would otherwise take place over the 30-year term because many of PG&E's O&M activities would not individually require an ITP and related mitigation for species impacts. Rather, the Bay Area-wide ITP will facilitate compensatory mitigation for temporary and permanent impacts when covered activities take place in potential habitat for covered species.

2.1 Project Objectives

The proposed project has the following objectives.

- Streamline incidental take permitting for the continued long-term O&M of PG&E electrical and natural gas facilities to ensure delivery of reliable and safe energy to PG&E customers, in accordance with California Public Utilities Commission (CPUC) mandates.

- Complete necessary O&M activities and minor new construction in a manner that minimizes impacts on California tiger salamander, Alameda whipsnake, and California freshwater shrimp in the Bay Area's nine counties.
- Fully mitigate environmental impacts on California tiger salamander, Alameda whipsnake, and California freshwater shrimp from O&M activities and minor new construction in a manner that contributes to the long-term survival of these species and other species with similar habitat requirements.

2.2 Permit Area

For purposes of this environmental impact report (EIR), the *Permit Area* (Figure 2-1) consists of PG&E gas and electrical transmission and distribution facilities plus rights-of-way (ROWs), the lands owned by PG&E or subject to PG&E easements to maintain these facilities, access routes associated with PG&E's routine maintenance, a buffer around the ROW, and mitigation areas acquired to mitigate impacts resulting from O&M and minor new construction activities within the nine Bay Area counties: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma. The *study area* consists of the nine counties collectively.

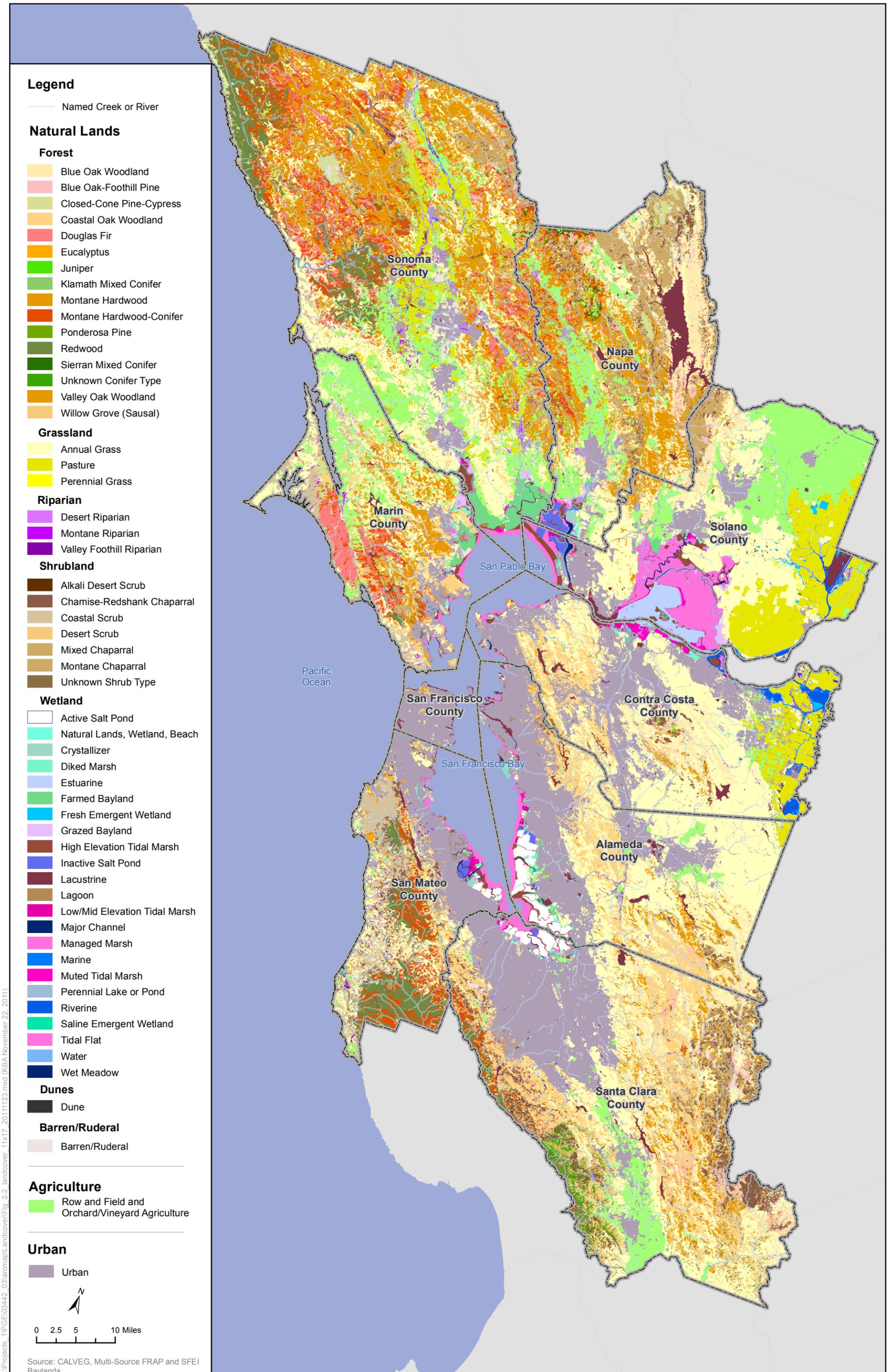
The Permit Area currently encompasses approximately 402,440 acres.¹ PG&E facilities in the Permit Area are located in the following land cover types: approximately 128,735 acres (32%) are in natural land cover types, approximately 246,777 acres (61%) are in urban areas, and approximately 26,928 acres (7%) are in agricultural areas (Figure 2-2).

Activity and project locations vary year to year based on maintenance schedules, changes in maintenance priority, and the need to respond to emergencies. As a result, in any given year work may be implemented anywhere in the Permit Area. O&M activities are expected to be performed throughout PG&E's ROWs and in close proximity to the ROWs over the course of the 30-year permit term.

All proposed O&M and most minor new construction activities would be implemented within or adjacent to the Permit Area, with the exception of gas and electric line extensions, which would extend from existing ROWs for no more than 2 miles. Although most activities described in this chapter would be conducted only in the Permit Area, this EIR addresses the potential environmental impacts in the study area of covered activities.

Maximum facility corridor widths were established based on the facility type to establish an approximate maximum area in which O&M activities would be implemented. Table 2-1 summarizes the land area associated with each type of activity or facility. Minor new construction activities, which consist of new gas pressure limiting stations, substation expansions, and new lines to extend service to new commercial or residential customers, could require the acquisition of additional small easements. These easements would be adjacent to, or extend from, existing facilities. A buffer was established along gas lines and electric transmission and distribution lines to include the facility infrastructure (e.g., pipes, towers, conductors, and poles) and immediately adjacent lands. The

¹ This number and the percentages and acreages of existing conditions shown throughout the EIR are approximate and based on conditions as described in PG&E's *Bay Area Operations and Maintenance Habitat Conservation Plan*. Over the next 30 years, changes will occur due to land use and regulatory changes, new construction, acquisition of additional utility property and habitat lands, and other factors.



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Figure 2-2
Land-Cover Types in the Study Area



buffers vary by facility size and type with the maximum facility corridor width for electric facilities established at 200 feet for 500 kilovolt (kV) lines, 120 feet for 230 kV lines, and 80 feet for 60/70/115 kV lines. Maximum facility corridor width for gas transmission and distribution facilities is 150 feet and 25 feet, respectively.

Table 2-1. Type and Size of Facilities and Work Areas (Estimated Acreage)

Type of Facility	Size of Facility	Maximum Facility Corridor Width (feet)	Buffer Area (feet)	Work Area (feet)
Electrical transmission	500 kilovolt (kV)	200	200	400
Electrical transmission	230 kV	120	120	240
Electrical transmission	60/70/115 kV	80	80	160
Gas transmission	All	150	150	300
All distribution facilities	All	25	25	50

2.3 Permit Term

The ITP is proposed to have a 30-year term.

2.4 Covered Species

The ITP would cover California tiger salamander and Alameda whipsnake, which are listed under CESA as threatened, and California freshwater shrimp, which is listed under CESA as endangered.

2.5 Conservation Strategy

PG&E's proposed ITP includes a compensatory mitigation plan to ensure that impacts on covered species are fully mitigated. The plan includes a strategy for mitigating both temporary and permanent impacts. The plan requires that PG&E provide mitigation in advance of impacts. Mitigation options include the placement of conservation easements on land purchased in fee by PG&E or on lands owned by others, and the purchase of mitigation credits from approved banks. For the conservation easements, PG&E would fund endowments to provide for management in perpetuity. The plan would ensure that mitigation is achieved on a larger, regional scale, which would benefit habitat. Specifically, a regional approach to mitigation provides permanent protection and management of lands that are large enough to support populations of covered species. Mitigation of impacts on a project-by-project basis does not necessarily provide the opportunity for this landscape-level approach. The mitigation sites may require restoration or enhancement work, which would be considered a covered activity under the ITP. Additionally, field protocols (FPs), HCP AMMs, and applicant proposed measures (APMs) would be implemented to reduce impacts on covered species.

2.6 System Overview

PG&E is one of the largest combined natural gas and electric utilities in the United States, serving more than 5.3 million electricity customers and 4.3 million natural gas customers in 50 of California's 58 counties. Nearly 11% of its total service area lies within the nine Bay Area counties.

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 (PLSs). 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. On the electric side, high-voltage transmission lines convey power from generation plants to switching stations or substations, where power is redirected and transformed to lower voltages. Distribution lines carry the lower-voltage service to industrial, commercial, and residential customers. In the Bay Area, PG&E currently owns and operates 4,430 miles of electric transmission lines and 207 substations, which convey electricity to approximately 23,015 miles of distribution lines.

The majority of PG&E's Bay Area electric and gas transmission and distribution infrastructure was installed from the 1950s through the 1970s. Ongoing operations result in normal wear and tear, which also trigger the need to periodically test, maintain, and repair facilities. These activities ensure compliance with CPUC mandates concerning the siting, design, operation, and maintenance of public utilities in California, specifically CPUC General Order (G.O.) 95 (overhead electrical line construction), G.O. 112-E (construction, testing, operation, and maintenance of gas gathering, transmission, and distribution piping systems), and G.O. 131-D (planning and construction of electrical generation, transmission/power/ distribution line facilities and substations). As part of O&M, PG&E occasionally needs to install new or replacement structures to upgrade existing facilities or extend service to new residential or commercial customers.

2.6.1 Natural Gas Transmission and Distribution System Overview

PG&E's natural gas system consists of a transmission system and a distribution system. The transmission system in the Bay Area includes 16 primary gas transmission lines totaling approximately 1,820 miles of pipeline. The largest three transmission facilities in the Bay Area are Line 2 and Lines 300A and B, as described below.

- **Line 2.** This 115-mile-long (of which 13.3 miles are within the Bay Area), 12- to 20-inch-diameter pipeline runs from the Brentwood Terminal in Contra Costa County to the Panoche Metering Station in Fresno County.
- **Lines 300A and 300B.** These 502-mile-long (of which 42 miles are within the Bay Area), 34-inch-diameter pipelines run from the California/Arizona border near Needles, California, to PG&E's Milpitas Terminal in the Bay Area.

The gas transmission system transports natural gas in steel pipelines buried 3 to 4 feet deep (measured to the top of the pipe). Depending on the location and type of pipe, pipe diameter can vary from 8 to 42 inches. Gas pressure in transmission pipelines generally exceeds 60 pounds per

square inch (psi). The Bethany Compressor Station in Alameda County maintains the gas pressure in the pipelines within the Bay Area.

The Bay Area gas distribution system consists of approximately 19,350 miles of both steel and plastic lines. Typically, the 0.25- to 24-inch-diameter lines are buried 2 to 4 feet deep. Gas pressure in distribution pipelines is generally less than 60 psi. Approximately 90% of the gas distribution lines are in urban areas. The transmission and distribution pipelines are buried in native soil; however, in areas of rocky soil, imported backfill is used to prevent potential damage to the pipes.

The ROW width for the natural gas system varies from 5 to 150 feet. PG&E owns less than 1% of linear ROWs in fee title; the remainder is in easements and franchise. Generally, PG&E has nonexclusive easements that do not allow PG&E the rights to fence the pipeline corridors. PG&E obtains exclusive easements with the right to construct fences when security fencing is required for valve lots, compressor stations, and other aboveground facilities, or subsurface vaults.

2.6.2 Electrical Transmission and Distribution System Overview

PG&E's electrical system consists of a transmission system and a distribution system. 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 (TSPs), and lattice towers are also used in certain areas.

PG&E currently operates 207 transmission substations in the Bay Area. Power from high-voltage transmission lines is transformed to lower voltage at these substations. The in-line spacing of these structures varies. The height of conductors above the ground varies according to topography and the design of the transmission system. Generally, conductors on 230 kV and 500 kV systems are designed to maintain a minimum clearance of 30 feet above the ground. CPUC G.O. 95 dictates the design of electrical facilities. Conductor sag (the extent to which an electrical conductor can hang between poles and towers) varies and is dependent on the height of the towers or poles, the electrical load through the conductors, ambient air temperature, conductor type, and span length.

Transmission ROWs are of varying widths and generally are within easements that are negotiated with private landowners of private lands or public agency landowners of public lands. PG&E owns less than 1% of these ROWs in fee title; the rest are in easements. The ROW widths depend on circuit or line voltage, the number of lines per ROW, terrain, and other factors. The electrical transmission system includes a network of fiber optic communications cable associated with the Supervisory Controlled and Data Acquisition (SCADA) system. In addition, there may be cables owned by other entities located inside PG&E ROWs. For example, third-party fiber optic communications cables (for telephone, television, or internet) are typically installed on PG&E facilities, either above or below the electrical circuits.

PG&E's electrical distribution system provides links between most customers and the transmission system. Approximately 14,885 miles of overhead distribution lines extend through the Bay Area, and another 8,130 miles are underground. Wood or steel poles support the overhead distribution conductors. The electrical distribution ROW widths vary according to the system voltage, terrain, and other factors. 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. Secondary distribution transformers can further reduce voltage to the required secondary voltage at or near a customer's service connection.

Insulators are positioned between support structures and conductors to support the wires and isolate energized conductors from potential grounding. Most insulators for transmission voltages are ceramic; non-ceramic insulators made of fiberglass rods and rubber shrouds also are used.

2.6.3 Emergency Work

Emergency work includes the same activities as otherwise described under O&M activities for the natural gas and electric systems, respectively, but it typically must be done immediately or under an abbreviated schedule to respond to a triggering event, such as an outage. It is defined in PG&E's Utility Procedure ENV-8003P-01 as

...a project or activity which includes but is not limited to emergency repairs to facilities necessary to maintain service essential to the public health, safety or welfare. Emergency work would be covered activities under the ITP. Emergency repairs include those that require a reasonable amount of planning where delay of project or activity would result in significant safety or environmental impacts. Furthermore, emergency projects include specific actions necessary to prevent or mitigate an emergency.

The emergency work is the same as other O&M activities; however, the difference is the timing and urgency of completing the work. Emergency work typically requires an abbreviated initial environmental review process, or none at all, as well as a post-project assessment to determine impacts and associated mitigation for the impacts of the covered activity.

2.7 Covered Activities

O&M and minor new construction activities would be covered activities under the ITP. These activities are associated with PG&E's gas and electrical transmission and distribution system, as mandated for public safety and reliable energy. The vast majority of O&M activities occur regularly and would affect less than 0.1 acre (approximately 66 by 66 feet).

Typical O&M activities take 4 hours to 2 days to complete, although some larger activities take up to 3 months of work. Minor new construction activities may take 3 days to 3 months for gas pipeline extensions and PLS, 5 days to 3 months for transmission line extensions and substations and 5 to 10 days for distribution line extensions.

The EIR addresses those O&M activities necessary for the safe and efficient operation of PG&E's gas and electrical systems. To meet the needs of customers and satisfy the CPUC's requirements to offer "adequate, efficient, just, and reasonable" service, PG&E must operate and maintain facilities and, in some cases, perform minor new construction for safe and efficient gas and electrical service. The EIR covers the three categories of activities that would be conducted in accordance with CPUC requirements and for which PG&E is requesting incidental take authorization: (1) O&M; (2) minor new construction; and (3) habitat conservation and enhancement.

The alpha-numeric coding system for the various O&M activities listed in the following sections is tied to PG&E's internal tracking system used throughout the state. Activities with a "G" refer to the natural gas system, while activities with an "E" refer to the electrical system.

2.7.1 Natural Gas System

2.7.1.1 Operation and Maintenance Activities for the Natural Gas System

G1. Patrols

Aerial Patrol

PG&E conducts aerial patrols of gas pipelines and associated facilities quarterly using fixed-wing aircraft that fly at an elevation of 500 feet. Helicopters are used periodically as needed.

Ground Patrol

Compliance with CPUC regulations requires periodic ground patrols of the gas transmission lines. On a quarterly to annual basis, PG&E conducts ground patrols of the pipelines and associated facilities on foot, with all-terrain vehicles (ATVs), or by using small trucks or SUVs on existing access and pipeline patrol roads. The purpose of the patrols is to observe surface conditions on and adjacent to the transmission line ROW and look for indications of leaks, ensure that pipeline markers are clearly visible, and record conditions that might affect safety and operation. Ground patrols also read gas meters.

Leak Detection Patrol

PG&E conducts leak detection patrol of the gas facility system at either 6-month or 12-month intervals. Leaking gas from pressurized pipelines can present hazardous conditions that must be corrected. The patrol is conducted on foot or by small trucks, depending on the terrain and accessibility. PG&E uses either a portable hydrogen-flame ionization gas detector or a laser-methane detector to sample air above the gas line to test for leaks.

G2. Inspections

Valves

Valves are located along all pipelines at different intervals depending on the size of the line and number of taps (i.e., point of interconnection of a similar diameter or smaller diameter pipeline) off the line. PG&E inspects valve sites along the pipelines and tests the valves three to four times per year. Light trucks are used on existing access and pipeline patrol roads. Valves are not marked but are located inside vaults or fenced areas and can be accessed by a two- or three-member maintenance crew. Crews lubricate valves as necessary, using a gun pump to apply either motor oil or grease (e.g., 1033 grease).

Telecommunication Sites

PG&E conducts routine inspections of telecommunication sites, which are used to monitor gas pipeline functions remotely, on a monthly basis unless problems are identified at specific sites. Light trucks use existing access and pipeline patrol roads, or PG&E uses fixed-wing aircraft.

Anode Beds

Anode beds are part of the cathodic protection system (CPS) and usually placed approximately every 10–20 miles along the pipeline. PG&E inspects cathodic protection every 2 months, or as indicated by the integrity management team, by checking the electric current at various Electric Test System (ETS) stations along the line and at anode bed sites. Simple testing instruments are used. Surveys of pipelines located within the Permit Area typically require 10 days to complete. Light trucks use existing access and pipeline patrol roads.

Pressure Limiting Stations

PG&E conducts routine inspections of existing PLSs every 2 months along transmission lines and annually along distribution lines. A single light truck uses existing access and pipeline patrol roads.

Land Surveys

PG&E periodically conducts land surveys of facilities and facility ROWs along the alignment. It is estimated that the entire gas transmission and distribution system is inspected once per year.

G3. Pipeline Remedial Maintenance and Internal Pipeline Inspections

G3a. Pipeline Remedial Maintenance

Remedial maintenance corrects erosion and vandalism problems and involves the evaluation of internal pipeline issues. PG&E performs remedial maintenance at approximately 100 locations per year. The majority of these locations are in upland land cover types, but some are in streams. Maintenance materials used for site-specific solutions to erosion problems may include biodegradable jute netting and, to a lesser extent, the periodic use of concrete, Ercon mats, or concrete pillow systems. The extent of concrete, Ercon mat, or concrete pillow system installation does not typically exceed 100 feet long or 50 feet wide on any stream. During such installation, PG&E complies with permits for work in waterways. PG&E installs concrete, Ercon mats, or concrete pillow systems at approximately one location per year.

Vandalism can affect any structures located above ground; it usually entails visual (e.g., graffiti) rather than structural impacts. Of the 100 sites maintained each year, PG&E estimates that only 10 will require fencing for protection from vandalism. Fencing these areas requires excavation for fence post installation; this action results in a 50- by 50-foot disturbance area for each fenced location and a 50- by 50-foot work area.

G3b. Internal Pipeline Inspections

PG&E inspects the internal coatings of its pipelines annually. Every 7 years, on average, each segment is inspected above ground by electronically measuring the integrity of the pipeline coating. Using technology such as magnetic flux leakage, PG&E inspects the pipeline with sensors to measure pipe corrosion, cracks, and indentations. During these procedures, the pipeline remains in operation. If problems are indicated, the pipeline is inspected internally using a pipeline inspection gauge (pig) that is inserted into the pipe at an external launch and receiver point. No excavation is required. The pig travels throughout the length of the pipeline, employing robotically operated cameras to look directly inside pipes. Once the “pigging” data are analyzed, the inspection crew conducts a calibration test (i.e., excavates a bell hole) at two or three locations along the pipeline to confirm that the pigging results are accurate. The area exposed depends on the length of pipeline

where the pig has indicated possible problems. If corrosion cannot be repaired, pipeline replacement is necessary.

PG&E internally inspects approximately 100 miles of pipeline each year, resulting in 50 inspection locations per year. On average, two or three calibration tests are conducted at each site along a 10-foot length of pipe, requiring a bell hole work area of approximately 10 by 10 feet along the exposed pipeline. Soil excavation, soil stockpiling, and construction vehicle travel are within the work area during the inspection.

For the purposes of estimating impacts, PG&E assumed that all internal inspections result in a section of pipeline that needs to be replaced, and that excavation, soil stockpiling, staging, and the use of construction vehicles would disturb a 50- by 50-foot work area. PG&E hydrostatically tests the new section of pipe and disposes of the water by discharging overland, using a baker tank, discharging to a sewer, or using other approaches. Before test water is discharged from the banker tank to the land or sewer, PG&E tests the water under the appropriate water quality permits.

G4. Compressor Station Upgrades and Maintenance

The Bethany Compressor Station is a 100-acre facility in eastern Alameda County and within the Permit Area. The compressor station occupies a developed and fenced site. Some routinely maintained natural land is present within the grounds, and approximately 17 acres of landscaped and natural lands surround the station. PG&E conducts inspections daily and performs maintenance and upgrades two times every couple of years. Typical maintenance tasks include overhauling compressors and engines, repairing and replacing piping, painting the station, and drilling or cleaning water wells. In addition, operations and air quality standards may require modifications or upgrades to station equipment. To make such improvements, PG&E acquires permits, as necessary, to meet these standards. Inspections, maintenance, and upgrades to the Bethany Compressor Station are within the fenced facility footprint. Access to the site is from existing roads. Crews mow a strip approximately 600 feet long by 20 feet wide outside the perimeter of the facility's fence line once each year to comply with local fire standards.

G5. Pipeline Electric Test System Installation

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

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

G6. Pipeline Valve Maintenance—Recoating

As part of activities G10, Pipeline Coating Replacement, and G11, Pipeline Replacement, PG&E may need to recoat a gas pipeline valve. Mainline valves, which are generally 7 to 20 miles apart, regulate the flow of gas through the pipeline and enable crews to isolate portions of pipeline. Occasionally, these valves malfunction or wear out, causing leaks. Depending on the condition of the valve, PG&E will either recoat or replace approximately five valves annually. Recoating is done by sandblasting the valve over tarps, collecting the debris, and recoating the valve with a specialized epoxy that protects against corrosion.

G7. Pipeline Valve Maintenance—Replacement or Automation

As part of activities G10, Pipeline Coating Replacement, and G11, Pipeline Replacement, PG&E may replace a gas pipeline valve. Mainline valves, which regulate the flow of gas through the pipeline and enable crews to isolate portions of pipeline, occasionally malfunction or wear out, causing leaks. PG&E also replaces valves to allow for the passage of inspecting devices (i.e., pigging for in-line inspections). To ensure overall pipeline system safety PG&E will be automating valves and, when automation is not possible, replacing valves. Enhancing or replacing approximately eight of the valves per year may include an aboveground valve, several small cabinets for a SCADA system, and electric service extension. Mainline valves are generally 7 to 20 miles apart.

Prior to replacing or installing valves, a portion of the gas line must be blown down. Valves are replaced within the existing station facility corridor. If PG&E replaces a small section of the pipeline during valve placement or automation, the pipeline must be hydrostatically tested. PG&E may replace or automate valves at any time, depending on weather and on operational restrictions related to the need to temporarily shut down the pipeline.

Estimated disturbance areas include the anticipated need for facility upgrades and fencing at 10% of the valve locations, which expands the footprint to a 50- by 50-foot facility. Soil excavation, soil stockpiling, and the use of construction vehicles require an approximate 150- by 150-foot work area. A 50- by 50-foot laydown area to store equipment may also be required. Once the pipeline valves are automated, PG&E checks them annually to ensure that they work properly.

G8. Pipeline Cathodic Protection

Corrosion of underground steel pipes is a continual maintenance issue for gas system pipelines. Pipes generate or carry corrosion-cell current that, as it moves to the soil, can form pits in the pipe. These pits can weaken sections of the pressurized pipe and cause it to fail. PG&E uses cathodic protection to prevent corrosion.

PG&E undertakes approximately 100 cathodic protection activities per year using the methods described below. Of those activities, approximately 25 require excavation, and an estimated 20% (five total activities) are in natural vegetation. A work area approximately 100 by 10 feet wide is needed to install the cable, excavate the soil, stockpile soil, and house construction equipment. Most installations require 5 to 7 days to complete.

Anode Beds

As a pipeline's coating degrades over time, it requires increased cathodic protection to prevent corrosion. *Cathodic protection* is a technique to control pipeline corrosion by making the pipeline the cathode of an electrochemical cell. A cable rated for the expected current output connects the

negative terminal of a *rectifier*, which is a small piece of equipment that is mounted on an existing utility pole, to the pipeline. 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 pipeline continues to operate during installation or replacement of the anodes.

Galvanic anode cathodic protection is PG&E's preferred method for distribution facilities and for use in urban areas. Galvanic anodes do not require an external power source, and installation requires minimal excavation for installation. There is some flexibility as to where the anode beds can be located, with beds usually placed approximately every 10 to 20 miles along the pipeline. The installation of anodes typically can be accomplished in a single day.

Deep-Well Anode Beds

Deep-well anode beds typically have a 20-year life span and are abandoned in place when no longer in use. Installation of deep-well anode beds involves drilling deep ground wells (200–300 feet) and installing zinc or magnesium bars, platinum anode rods, or ground mats. PG&E uses this installation method where pipelines are exposed to large amounts of induced alternating current (AC) (typically from adjacent high-voltage electric transmission lines) or where soil conditions dictate. For many applications, the anodes are installed in a 200 to 300-foot-deep (or more), 10-inch-diameter vertical hole and backfilled with conductive coke (a nontoxic carbon material that improves the performance and life of the anodes). Once an anode bed is installed, it is connected to the pipeline and the electric line by an underground cable. The deep-well anode bed typically is located approximately 10 to 15 feet from the gas pipeline and every 10 to 20 miles along the pipeline corridor. In the Permit Area, a rectifier is the standard method PG&E uses to provide electricity. Installation of deep-well anodes typically requires 4 days to complete. Work crews evenly distribute leftover fill over the buried work site and grade it to blend in with the existing site, reserving topsoil to spread on top.

Other Types of Anode Beds

Other protection measures include the installation of cathodic protection units (CPUs), anode flex and magnesium anodes, and horizontal anode beds. Although deep anodes are preferable, these other measures can be used for certain soils or in isolated corrosion areas where installing a deep well is not practical.

Installation of CPUs involves trenching a few feet parallel to the pipeline and installing the flex or magnesium anode at the same depth as the pipeline. Trenching for CPU installation varies in width, from approximately 4 inches to 2 feet.

Horizontal anode beds are installed parallel to the pipeline, 400 to 1,000 feet from the ROW centerline, at approximately the same depth as the pipeline. The need to install or replace a horizontal anode bed is relatively infrequent, and PG&E anticipates it will occur less than once per year in the Permit Area. A small underground cable delivers an electric current from the horizontal anode bed to the pipeline.

G9. Pipeline Lowering

PG&E may need to lower gas pipelines to increase the depth below surface and thereby improve public safety. The need for pipeline lowering arises mostly in agricultural areas and areas of intense land use, but pipeline lowering also may be needed in other land cover types or in waterways where pipe structures are exposed.

Pipeline lowering typically involves trenching and installing a new pipeline parallel to, and to a greater depth than, the existing pipeline. Typically, the old pipe is abandoned in place and either capped or filled with slurry and then capped. Pipeline lowering may be needed at any time of year, depending on operational restrictions related to the need to temporarily shut down the pipeline.

PG&E lowers approximately 1 mile of pipeline every 3 years. A 20-foot-wide work corridor is needed for trenching and soil excavation, soil stockpiling, and the use of construction vehicles. The pipeline requires hydrostatic testing prior to pressurizing the gas pipeline.

G10. Pipeline Coating Replacement

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 ETS station and then measures for a loss of voltage, which would indicate degradation in coating integrity.

To avoid bending or affecting the integrity of the pipe, the pipeline must be excavated in sections and supported at intervals typically of 40 feet. Workers remove the old coating by jetting, scraping, or sandblasting and typically place plastic sheeting or tarps below the pipe to collect the residue. PG&E performs testing to determine if the material is hazardous and then disposes of it in accordance with regulations. The surface is then prepared for the new wrap by running a self-contained grit- or shot-blasting machine over the pipe. The pipeline continues to operate while a coating machine applies the coating.

PG&E recoats approximately 1 mile of pipeline every 5 years. This requires construction vehicles and includes vegetation removal, trenching, soil excavation, and soil stockpiling. On average, a 20-foot-wide work area is needed for this activity. The majority of recoating is in upland land cover types but may periodically be within streams. In intermittent and ephemeral streams, PG&E schedules instream maintenance when the stream is dry. One mile of pipeline coating replacement typically involves three different access locations.

G11. Pipeline Replacement

Public safety sometimes necessitates replacing sections of pipe for various reasons, including those listed below.

- Development alongside the pipeline has resulted in a change of class location.
- Aging or corrosion has affected the integrity of the pipeline.
- Pipelines have been damaged by private contractor(s) during construction (i.e., dig-ins).
- Acts of nature have damaged the pipeline.

In the case of class location changes, PG&E must move or replace the line with upgraded pipe to comply with regulations mandated by the California Department of Transportation and CPUC. PG&E uses standard pipeline construction techniques. As the old pipeline is removed from service for the tie-in to the new line, it is *blown down* (i.e., gas is evacuated to the atmosphere from the affected section of pipe through a blowdown stack). Any gas condensation is captured and removed from the old pipeline and disposed of in compliance with current regulatory standards. The existing pipeline is abandoned in place by filling it with slurry before the pipeline is capped. Typically, the crew will cut and cap the pipeline every 1,000 feet, depending on the location. Slurry is used if the pipeline crosses a water body or needs to be stabilized. In the event a pipeline is abandoned in place, PG&E will typically place the new section of pipe as close to the abandoned pipeline as possible and modify existing easements by expanding existing ROW or acquiring additional land rights.

PG&E performs pipeline replacement approximately five times per year. The length of pipe affected varies, depending on the reason for replacement. The minimum length of pipe replaced is typically 40 feet (one joint of pipe), although 8 miles could be replaced during each targeted replacement effort. Replacing an existing pipeline with a new pipeline includes clearing and grading the ROW, trenching and excavating the existing pipeline alignment, placing the pipe (including welding, inspecting the welds, field-coating or fiber-wrapping, and backfilling), performing hydrostatic testing, protecting pipes against corrosion, marking the pipeline, implementing erosion control measures, stockpiling spoil in the ROW, removing or abandoning existing line, and cleaning up and restoring the ROW. In general, the existing pipeline will be abandoned in place and filled with slurry and capped, although some of the pipelines will be removed and restored. PG&E may need to acquire additional ROW to accommodate an increase in the pipeline corridor for about 75% of the new pipeline. A 50- by 50-foot area for new valve equipment is required along each pipeline replacement. Trenching and soil excavation, soil stockpiling, staging, and construction vehicles disturb a 20-foot-wide work area, which includes the 10-foot excavation area. As the new pipeline is installed, PG&E hydrostatically tests the pipe, collects test water in a baker tank for discharge to land or a municipal sewer system (based on water quality, quantity, local conditions and relevant discharge or release requirements), and backfills the trench. Before test water is discharged from the banker tank to the land or sewer, PG&E tests the water under the appropriate water quality permits.

PG&E estimates that it will replace approximately 248 miles of pipeline during the course of the 30-year permit term. Of the 248 miles, approximately 75% (186 miles) are in urban areas where replacement would cause no disturbance to natural or agricultural land cover types. The remaining 62 miles are in nonurban areas. A new 10-foot-wide ROW above the pipeline alignment is required and could be in natural vegetation. Trenching and soil excavation, soil stockpiling, staging, and the use of construction vehicles require a work area, which includes the 10-foot-wide excavation area along the length of the pipeline.

PG&E may perform pipeline replacement at any time of year, depending on operational restrictions related to the need to temporarily shut down the pipeline. In the event that no access road exists or an emergency arises, construction of a temporary road that is estimated to be 0.5-mile in length by 12 feet wide may be necessary to implement this O&M activity.

G12. Pipeline Telecommunication Site Maintenance

A SCADA system monitors pipeline functions remotely and transmits pipeline operational information to PG&E's operations offices at the Brentwood Gas Terminal via PG&E's utility

telecommunications system. Periodic vehicle or helicopter access is required to check the telecommunication facilities, replace batteries, conduct minor maintenance, or make adjustments to the facilities or components. In the event of major storm damage, reconstruction of the facility or replacement of a component is required as soon as weather permits. A staging area may be required for major maintenance or storm damage repairs. The staging area may be located either next to the site within the temporary work area or at a distant location (for helicopter transport of workers and materials). The pipelines continue to operate during site maintenance.

PG&E performs this activity approximately once per year. A 20- by 20-foot work area is needed for soil excavation, soil stockpiling, and the use of construction vehicles. Also, approximately once per year, PG&E must install new fiber optic cable, which requires an estimated 10- by 1,500-foot work area.

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

G13a. Pipeline Right-of-Way Vegetation Management

PG&E manages vegetation along the pipeline ROWs to prevent damage to the natural gas system, facilitate inspections related to routine O&M tasks, and comply with state and federal regulations that require PG&E to patrol periodically for gas leaks. The gas system vegetation management program is designed to remove weeds, brush, and trees around equipment and facilities for ROW visibility, fire hazard reduction, security, safety, and maintenance access. Trees and brush that interfere with patrols or tree and brush roots that may pose a threat to buried pipelines may require periodic removal. PG&E also clears any tree canopy and brush that obscures the ROW to facilitate aerial inspections and maintain the line of sight between gas line markers. PG&E's ROW management associated with vegetation management focuses on the need to be able to patrol, inspect, and protect facilities. To keep incompatible vegetation from growing over the facilities, PG&E does not replant trees within the ROW after vegetation management, although reseeding—with the landowner's notification—is routinely performed.

PG&E identifies areas within the ROW that require vegetation removal during routine patrols. ROW width averages 20 feet over the gas pipeline and is dependent upon legal documentation. Maintenance width is dependent on the width of the easement. For example, some easements are 10 feet wide, and others can be up to 65 feet wide. Vegetation management usually is accomplished by manually removing (with a chainsaw) large-diameter woody vegetation, then mechanically removing other vegetation with a brush hog, hydro-axe, or brush rake, usually to establish a maximum clearance height of 1 foot from the ground (depending on vegetation and the return growth rate), and to allow surveys by foot. If access is poor, vegetation is manually lopped into 6- to 24-inch lengths and scattered within the ROW. PG&E also relies on chemical control (herbicides) for vegetation management.

PG&E uses herbicides in accordance with label requirements and U.S. Environmental Protection Agency (EPA) regulations, and herbicides are applied by a qualified applicator licensed by the California Department of Food and Agriculture. In general, herbicides are used in the gas transmission ROWs and for cut-stump applications (where PG&E has notified the landowner). Only federal and California EPA-registered herbicides are used. These include selective and nonselective, inorganic and organic, contact and translocated, and pre-emergent and post-emergent types. The use of herbicides is subject to landowner notification. PG&E contracts with licensed and registered

pest control advisors to prepare herbicide prescriptions for vegetation control and eradication within ROWs.

The O&M activity described in this section is for those instances in which vegetation management is necessary as a distinct and separate action that PG&E crews perform, and not a part of ROW clearing necessary for other O&M activities, such as pipeline replacement. On average, there are 10 sections of ROW reclaimed per year by removing 10 feet of vegetation on each side of the pipeline over a 0.5-mile length. Ongoing vegetation management of the ROW disturbs a 20-foot-wide corridor averaging 1 mile in length. Frequency is based on an assumed return interval of 5 years within tree- and shrub-dominated land cover types.

G13b. Pipeline Access Road Maintenance

Access road maintenance work takes place in the ROW. PG&E maintains the road without altering the road profile. Every 2 to 3 years, PG&E performs surface maintenance on an as-needed basis to keep access roads in operational condition. At approximately five locations a year a temporary turnout that is approximately 45 feet in length and 10 feet wide is needed. If a culvert is replaced during maintenance activities, PG&E obtains additional required permits (e.g., U.S. Army Corps of Engineers [USACE] Clean Water Act [CWA] Section 404 permit).

2.7.1.2 Minor New Construction Activities for the Natural Gas System

G14. Gas Pressure Limiting Station Construction

Human population densities determine the class location designations of pipelines. A change of class location designation may require PG&E to move or replace a pipeline with upgraded pipe to increase safety, as mandated by CPUC.

An alternative to replacing the pipeline is installing a PLS that lowers the pressure of the gas in the line. A typical PLS encompasses a footprint area of approximately 250 by 100 feet, including aboveground pipe and valve structures and a small control/monitoring building (usually 100 square feet) surrounded by security fencing. The control building houses pressure flow monitoring and SCADA equipment. The local distribution system or solar panel-charged batteries provide the electricity for the SCADA equipment.

Installation of a PLS occurs approximately once every 5 years and involves excavating a pipeline joint. A construction corridor approximately 100 feet long by 100 feet wide and a laydown area approximately 100 by 100 feet may be required. In addition, the footprint of the PLS is approximately 250 by 100 feet, including fencing. In all cases, the work would disturb less than 1 acre of land. As part of the PLS installation, natural gas is cleared from a portion of the pipeline using forced air. Once the PLS is in place, the pipeline must be hydrostatically tested.

G15. New Customer/Business Pipeline Extension

To serve new residential or commercial gas customers, PG&E installs new pipelines as needed. Installing new sections of pipeline, up to 2 miles in length in natural vegetation, to existing segments involves clearing and grading the ROW, trenching and excavating, pipe placement (including welding, inspection of welds, field-coating or fiber-wrapping, and backfilling), hydrostatic testing, corrosion protection, marking the pipeline, erosion control, and cleanup and restoration. In most terrains, trenching is used to install the pipeline, unless specific circumstances, such as an open

crossing of a ravine or a similar small open area, dictate construction of aboveground sections. Specialized trenching and boring methods are used at crossings of rivers, streams, backwaters, washes, faults, roads, railroads, utilities, aqueducts, and canals.

PG&E installs new pipeline extensions approximately once per year. A new 10-foot-wide ROW over the pipeline alignment is required and could be in natural vegetation, city streets, or agricultural settings. Trenching and soil excavation, soil stockpiling, and the use of construction equipment require an approximate 125- by 20-foot work area, which includes the 10-foot excavation area on one side of the alignment. In the event that no access road exists or an emergency arises, it may be necessary to construct a new temporary access road to implement this activity.

2.7.2 Electric System

2.7.2.1 Operation and Maintenance Activities for the Electric System

E1. Patrols

PG&E conducts patrols of its lines and associated facilities annually or on more frequent basis as needed or required. Patrols alternate annually between patrols by air and patrols from the ground.

Aerial Patrol

PG&E conducts aerial patrols of electric transmission lines, distribution lines, and associated facilities biannually (in terms of calendar years) using helicopters only.

Ground Patrol

If electric transmission lines and associated facilities are located in no-fly zones, PG&E personnel conduct ground patrols on foot or with ATVs or use small trucks or SUVs on existing access roads. These patrols occur on a 2- to 5-year cycle, depending on whether the facility is wood or steel. Vegetation management personnel conduct biannual ground patrols of transmission and distribution lines by vehicle and on foot. It is estimated that 33.3% (7,664 miles) of the electric distribution system and 87.5% (3,876 miles) of the transmission system is patrolled each year. Approximately 95% of the patrolled system length is accessible from existing roads. The rest is patrolled on foot or by use of a helicopter. Approximately 5% (577 miles) of the electric system requires access by off-road travel using light trucks or ATVs.

E2. Inspections

Tower, Pole, and Equipment Inspection

PG&E routinely inspects tower footings and poles 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.

Outage Inspection

When outages and CPUC Reportable Incidents take place because of weather, accidents, equipment failure, or other reasons, PG&E inspects lines to determine the location and probable cause of the

outage. Lines are accessed from existing roads or may require off-road travel, either in vehicles or on foot.

Substation Inspection

PG&E inspects all transmission and distribution substations every 1 to 2 months to verify equipment operation and conduct safety inspections. Substations are accessed from existing roads in vehicles.

Telecommunication Sites

PG&E conducts routine inspections of telecommunication sites annually unless problems are identified at specific sites. Access is by light truck on existing access and power line ROW roads or by helicopter. Helicopter patrols are infrequent, and hovering typically lasts only a few minutes, allowing personnel to collect a Global Positioning System (GPS) point for the site or note the facility location.

Sections of Line

The regular inspection of underground facilities, instrumentation and control, and support systems is critical for safe and reliable operation. PG&E inspects aboveground components at least annually for corrosion, equipment misalignment, loose fittings, and other common mechanical problems. The underground portion of the line is inspected at vault locations annually. Inspections are performed from existing roads or may require off-road travel, either in vehicles or on foot.

Land Surveys

When new construction is proposed by a property or land developer, PG&E conducts land surveys of facilities and facility ROWs for construction layouts and other purposes. Data collected include precision measurements regarding length and slope and other geology-related information. Access is by vehicles on existing roads but may include off-road travel or surveys on foot.

E3. Insulator Washing or Replacement

Conductive airborne particles or bird droppings that settle on ceramic insulators can provide a conductive path across the insulators, causing contamination-induced electric faults. PG&E personnel periodically wash ceramic insulators to reduce the risk of such faults. Non-ceramic insulators tend to perform better in contamination-prone areas. Insulators are washed periodically to prevent faults using a truck- or trailer-mounted spray system or a helicopter. Washing typically is done during energized conditions (i.e., while the power lines are operating). Distilled water is used to wash the insulators; dry washing using ground corn hulls also is used.

PG&E replaces insulators when they have been damaged by gunshot, lightning, heavy corrosion or when they no longer can be washed. They can be replaced while energized or de-energized, depending on access, loading, and safety. Replacement typically takes a four- to six-person crew with a small truck for hauling crewmembers, tools, and materials. If access is limited, a helicopter may be used to land crewmembers and tools on a tower. Insulators are washed or replaced approximately once per year.

E4. Substation Maintenance

Most of PG&E's substations are located near load centers, such as residential, commercial, and industrial areas. Typical minor maintenance tasks at these substations include repair and replacement of transformers, switches, fuses, cutouts, meters, and insulators. Maintenance of substation systems requires this type of work approximately once per year. Load demands may require modifications of station equipment or installation of new facilities. These O&M activities could require use of station property or adjacent property for construction staging, materials storage, permanent facilities, and land management.

PG&E conducts vegetation management inside and outside of substation facilities as required to meet CPUC and local regulations and ordinances, reduce and eliminate fire hazards, enhance security for fenced facilities, enhance aesthetics, and reduce potential for illegal dumping and homeless encampments. O&M activities on PG&E lands to control vegetation external to substations may include the mowing of grass and weeds. Treatments include pruning or removal of vegetation where needed inside or on the immediate perimeter of a fenced facility (usually within 3–5 feet of the fence).

Occasionally, public agencies, municipalities, or neighboring landowners ask PG&E to conduct additional fuels reduction activities on PG&E parcels outside of the fenced facility, usually for the purpose of improving or maintaining compliance with local and state fire codes. These activities, aimed at managing fire risk or public nuisances, may include brush and weed mowing and discing, herbicide treatments, tree thinning or pruning, and trash removal. Workers may use tractors, flail mowers, or string trimmers for mowing and discing operations. Tree service crews use chainsaws to manually prune or remove hazard trees and to cut brush. Herbicides may be applied, when appropriate, by use of vehicle-mounted spray equipment on tractors, ATVs, and pickups, or manually applied by backpack sprayer. Herbicide applications on special projects are prescribed by a California Licensed Pest Control Adviser and may include pre-emergent, directed post-emergent, and cut stump treatments. Substations are located primarily in residential, commercial, and industrial areas. No impacts on natural vegetation result within the fenced perimeters during maintenance because the grounds are paved with blacktop or gravel. An estimated 150 acres of PG&E property external to fenced substation perimeters is disced, mowed, or cleared of vegetation annually and is part of the baseline condition for sites that have been maintained annually. It is estimated that on an annual basis one of these substations has adjacent natural habitat, resulting in a 20- by 1,000-foot disturbance area.

E5. System Outage Repair

O&M activities involving outage repair are necessary to maintain reliable service and ensure public safety. Weather, equipment failure, accidents, fire, or bird electrocution are typical causes of outages. When an outage is reported, PG&E patrols the line until personnel determine the cause of the outage. Access is primarily on existing roads, although some overland access with small trucks or SUVs is expected. Depending on the cause of the outage, repair may entail anything from reclosing a switch to replacing a transformer or pole. Crews repair and restore circuits as quickly as possible.

PG&E performs outage repair approximately 500 times per year in rural locations throughout the Permit Area. Soil excavation, soil stockpiling, and the use of construction equipment disturb an approximate 22- by 22-foot work area during each repair.

E6. Tower and Boardwalk Replacement or Repair

E6a. Tower Replacement or Repair

PG&E 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. PG&E extends towers approximately 360 times annually.

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

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

Strengthening Tower Foundations. To strengthen tower foundations, concrete from the existing footings is broken away to expose the steel reinforcements. A new replacement concrete footing, called a grade beam, is poured between reinforcements. When the towers are accessible from existing roads, the old concrete footings are removed and hauled offsite on large trucks. For some project locations the old concrete footings are bagged in a giant tarp with ropes and bundled and taken by helicopter from the tower site and disposed of according to regulations, typically at a local landfill. To repair foundations submerged in water, such as in the San Francisco Bay, a cofferdam is installed at low tide to allow access to the foundation footing. The wood cofferdam is built around the footing to be repaired and is used to isolate the footing from the water. The mud is removed by hand, and the dam is pushed down to the required depth to expose the solid piling, usually 3 feet below the mud line. Typically, the mud is placed in bags and taken to a landfill. If there is little mud collected, then it is returned to the base of the footing after the cement is poured. The material is staged by helicopter or barge, or a combination of both. The old concrete pier is chipped away to expose the pile. New pins are inserted, a new rebar cage is installed around the pile, and the concrete is replaced. The cofferdam then is removed by excavating around the outside and hoisting it from the tower.

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 lot of material is needed at the job site, PG&E builds a temporary section of boardwalk laterally from the existing boardwalk. A helicopter is then used to place the material on the temporary boardwalk, and workers move the material to the work site by hand or wheelbarrow.

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

Strengthening Tower Superstructures. Superstructures typically are strengthened by replacement, modification, or addition of pieces of steel lattice, as determined by engineering analysis specific to each tower. Other minor repairs that require accessing facilities are replacing fuses, breakers, relays, cutouts, switches, transformers, and paint.

E6b. Access Boardwalk Repair and Replacement

PG&E has many miles of boardwalks that service transmission facilities in the vegetated margins of the San Francisco Bay. The boardwalks typically extend from levees and provide access across marsh and salt ponds to transmission tower footings. These boardwalks have a 15- to 20-year life and require repair and replacement. Approximately 15 times per year, 1,500 feet of boardwalk are repaired or replaced, which consists of installing replacement piles (spaced approximately 100 feet apart) and replacement planks. PG&E crews perform boardwalk maintenance and construction activities using hand tools and gas-powered tools such as drills and saws. Replacement piles are pushed into the ground using a steel bar for leverage and the weight of four people. The planking is transported along the boardwalk on special hand-dollies. Planking is slid into place, drilled, and bolted. If the boardwalk is not too degraded (i.e., still walkable), crews do much of the work from the boardwalk and some from adjacent to the boardwalk where piles are being replaced. If PG&E is raising the height of an existing boardwalk, crews do the work from the boardwalk. If the boardwalk is substantially degraded, crews do the work within a 10-foot corridor around the boardwalk being replaced. When a 10- by 10-foot work area is required, soil excavation and soil stockpiling disturb vegetation.

E7. Facility Installations (Shoo-Flies)

PG&E needs to replace or repair poles/towers and equipment (e.g., anchors, cross arms, insulators, wires, cables, guys, switches) when they fail or become unsafe. New additions to existing transmission line facilities or tap lines from the old facilities may require installation of a shoo-fly.

Shoo-fly installations involve adding temporary poles or structures around existing permanent facilities to limit service interruptions until work crews can make permanent repairs. Shoo-flies consist of a number of poles and anchors supporting conductors to bypass facilities needing repairs or upgrades. In some cases, existing conductors are removed from the old poles or structures and reattached to the shoo-fly structures. In most cases, this is accomplished with one or two poles for every circuit attached to the structure being shoo-flied. For example, one double-circuit 115 kV tower (six wires attached) requires a minimum installation of four poles. Shoo-fly supports are removed when the repair or construction work is complete. Shoo-fly installations occur approximately 100 times per year. A work area of approximately 25 by 100 feet is frequently required.

E8a. Pole Equipment Repair and Replacement

PG&E repairs or replaces pole equipment (e.g., cross arms, insulators, pins, transformers, wires, cables, guys, anchors, switches, fuses, and paint) when it fails, becomes unsafe, outlasts its usefulness, or is identified for replacement. Replacement and repair of pole equipment typically are performed with the pole in place, using a line truck. Such repairs and replacements take place approximately 500 times per year.

E8b. Utility/Wood Pole Replacement

When replacing a PG&E distribution or transmission pole, the new pole is framed (i.e., cross arms, pins, insulators, grounds, bonding, markers, and any equipment are installed) on the ground adjacent to the existing pole prior to setting the pole in the ground. To replace a pole, the line is typically de-energized. A line truck augers a hole, the new pole is moved into the new hole, the conductors are moved from the old pole to the new pole, the old pole is typically removed, and the old pole site is backfilled with the augured soil. Existing wood poles may be replaced with new wood poles or light-duty steel poles. PG&E pole replacements take place approximately 500 times per year, requiring a 10-foot-long by 7-foot-wide work area.

E9. Line Reconductoring

PG&E replaces conductors (wires) once the wires have outlasted their usefulness. Work crews install replacement conductors by temporarily splicing them to the ends of the existing conductors and pulling them through travelers (pulleys) attached to the arms of the towers or pole cross arms. Travelers are installed at each tower or pole using a boom truck. Where a boom truck cannot be used, a winch is used to install the travelers. In some cases, a helicopter is necessary to install the travelers and conductors.

Reconductoring typically is done in 2- to 3-mile sections with the use of pull and tension sites (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 may also be used to stage materials and provide work areas for tower or pole work. 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 (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 onsite, typically deliver and remove the reels. Onsite cranes move the conductor reels on and off of the semi-trucks.

Pull sites are generally rectangular and vary in size, from approximately 50 to 350 feet wide for small pull sites and approximately 100 to 1,250 feet long for large pull sites. Distances between pull sites vary, but on average, approximately 2.7 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.

Before pulling the conductor, PG&E crews install clearance structures at road crossings and other locations (where necessary) to prevent conductors from contacting existing electric or communication facilities or passing vehicles. These temporary structures consist of wood poles. After the conductors are pulled into place, they are tensioned by pulling them to a predetermined sag and tension. The conductors are then permanently attached to the insulators and existing conductors.

Electric distribution reconductoring takes place approximately 250 times per year, and electric transmission reconductoring takes place approximately 10 times per year. One-third of all reconductoring work requires a pull site; the remaining reconductoring work requires installation and removal of travelers on a two-circuit line, resulting in disturbance. Electric transmission reconductoring also requires a 25- by 25-foot work area. Reconductoring and new substation construction sometimes require separate CEQA review by the CPUC and issuance of a Permit to Construct (PTC) for substations and electric lines of less than 200 kV and a Certificate of Public

Convenience and Necessity for major transmission line projects of more than 200 kV. However, CPUC G.O. 131-D contains exemptions from the formal permit requirements for many activities.

E10. Vegetation Management

PG&E performs routine vegetation management on all of its overhead electric distribution and transmission facilities to maintain compliance with Public Resource Code Section 4293, CPUC G.O. 95, Rule 35, the California Independent Systems Operator (CAISO) Transmission Maintenance Agreement, and Northern American Electric Reliability Corporation's (NERC) FAC-003-01 and 02.

The clearance regulations identify, by voltage, specific clearance distances that PG&E must maintain between vegetation and energized conductors. Minimum clearance distances range from 18 inches to 20 feet.² Vegetation removals for routine maintenance and reliability work generally involve individual trees or small groups of trees encompassing less than 0.1 acre (66 by 66 square feet) per event on an annual basis.

E10a. Routine Maintenance

Routine Maintenance. Routine vegetation management includes an annual patrol of vegetation growing near overhead distribution and transmission facilities. It also includes pruning or removal of trees that will not remain outside of required clearance distances or that may pose a hazard to electric facilities before the next year's patrol. Approximately 80% of the routine maintenance is pruning the trees to a clearance level dependent on voltage and regulations, and approximately 20% is removal of small in-growth or hazard trees.

This activity focuses on tree work outside of the minimum clearance distances on distribution line sections that have a history of high numbers of tree-related outages. This activity affects larger portions of the tree than other routine vegetation maintenance work. The goal is to increase public safety and reliability by reducing the number of outages by preventing power line contacts from tree or branch failures. PG&E prioritizes the distribution line sections that have the worst performance, as measured by either a high number of customers who have been without power or a high number of repeat outages. Once a line section is prioritized, personnel analyze the outage data to determine the pattern of tree decay that has historically caused vegetation-related outages and a vegetation-specific management prescription is written for trees along those line sections.

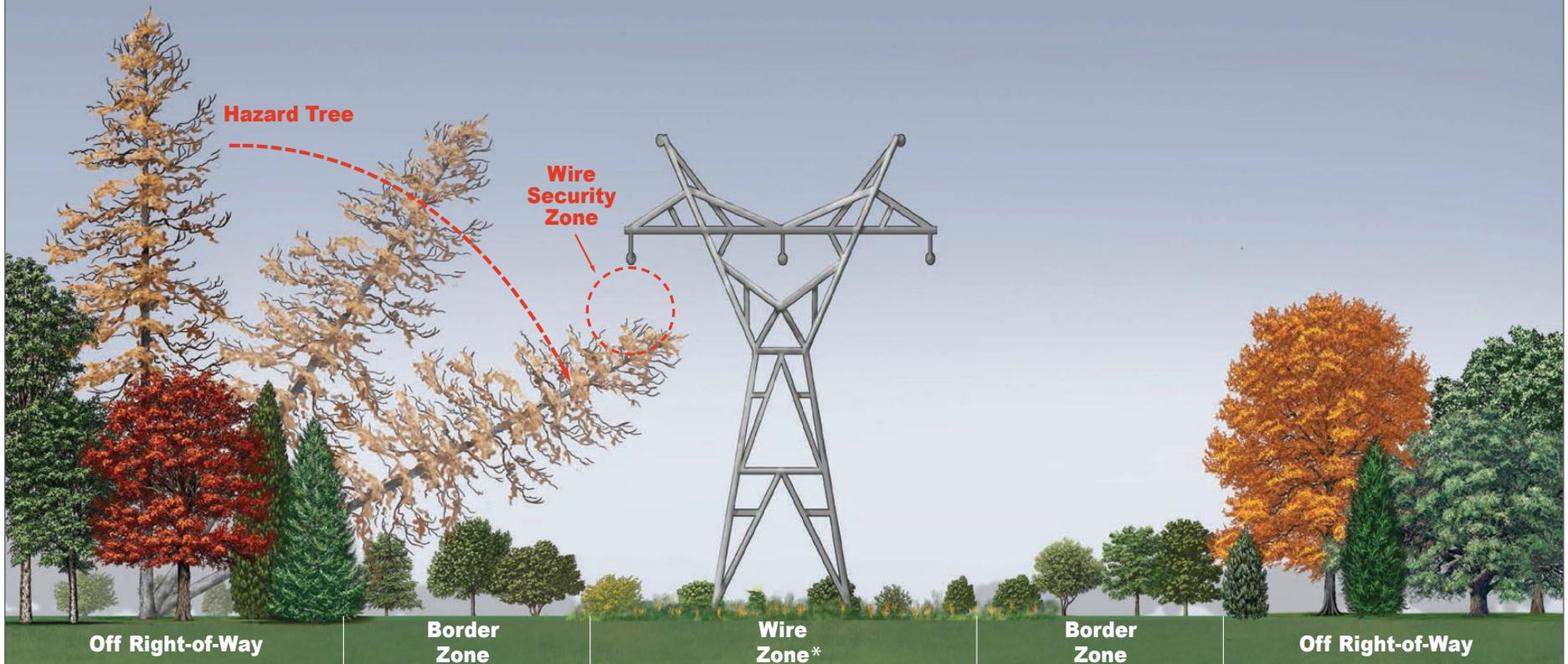
Enhanced Vegetation Management. This activity is currently focused on lines within high fire-threat areas, which are those noted as tier 2 or tier 3 on the CPUC fire threat maps. Work includes maintaining expanded clearances, eliminating overhanging branches, and removing hazard trees to reduce fire risk and ensure system reliability, as well as creation of fire defense zones in partnership with customers.

E10b. Pole Clearing

PG&E performs pole clearing around subject poles on its overhead distribution and transmission facilities to maintain compliance with Public Resource Code Section 4292.

² General Order 95, Rule 35, including associated exhibits. Further, clearance distances take into account the growth rate of the vegetation in a year's time. So that PG&E has to perform maintenance only annually, pruning clearances include the average growth rate in the clearance calculations. For example, for vegetation with a clearance distance of 4 feet and tree and a growth rate of 8 feet in 1 year, PG&E will clear 12 feet so that the clearance distance will be maintained after 1 year of growth.

Wire Zone - Border Zone



Industry best practice developed in the 1980s, based on over 50 years of university research, and endorsed by NERC* and FERC** following the August 2003 blackout.

NERC: North American Electric Reliability Corporation
FERC: Federal Energy Regulatory Commission



* The wire zone is typically the right-of-way and is wide enough to include the wire security zone.

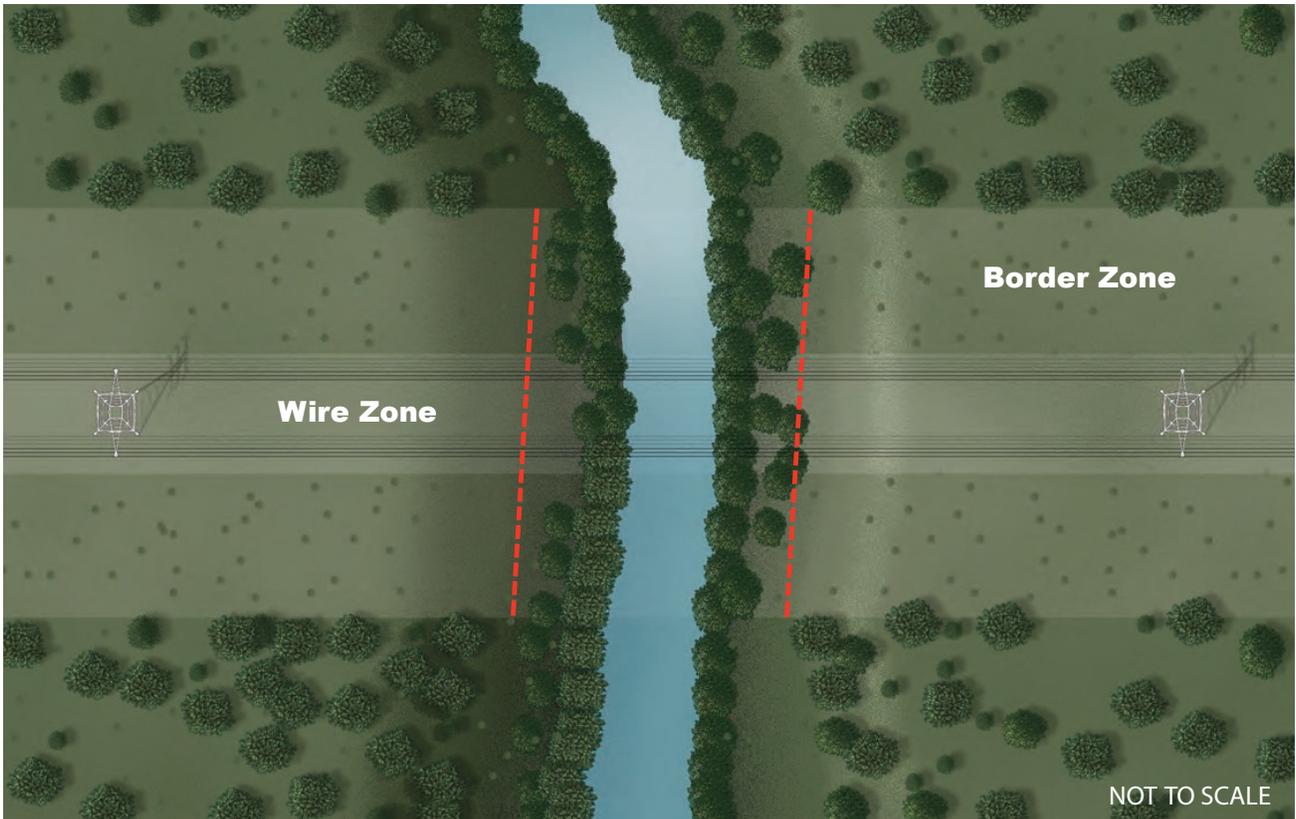
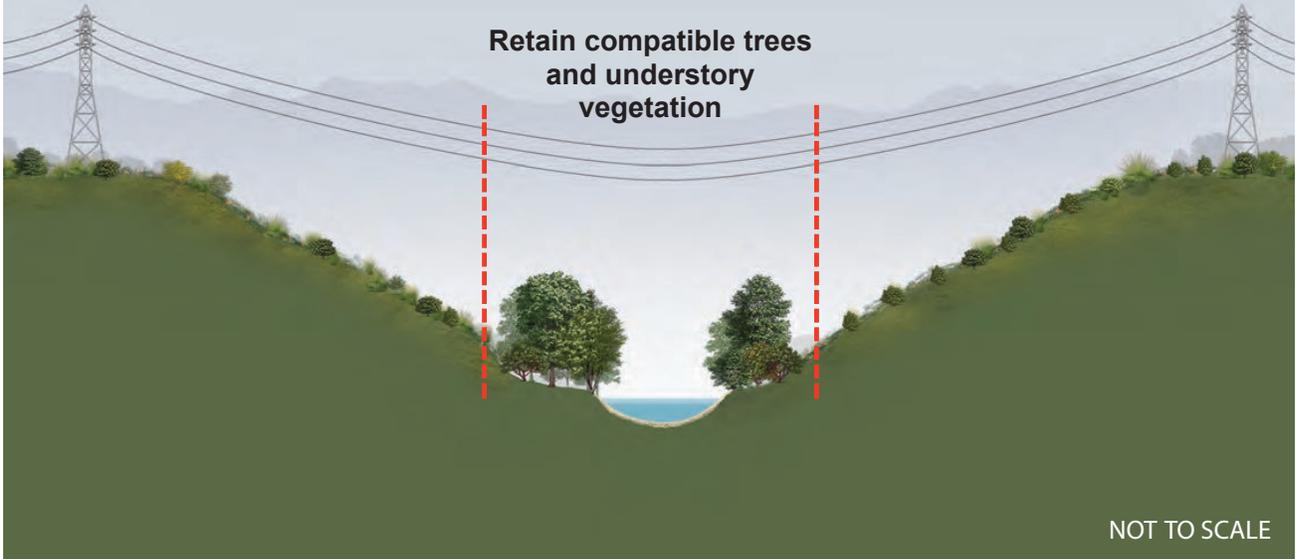
NOT TO SCALE

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Figure 2-3
Wire Zone/Border Zone ROW Management Concept

Riparian Areas in Transmission Rights-of-Way



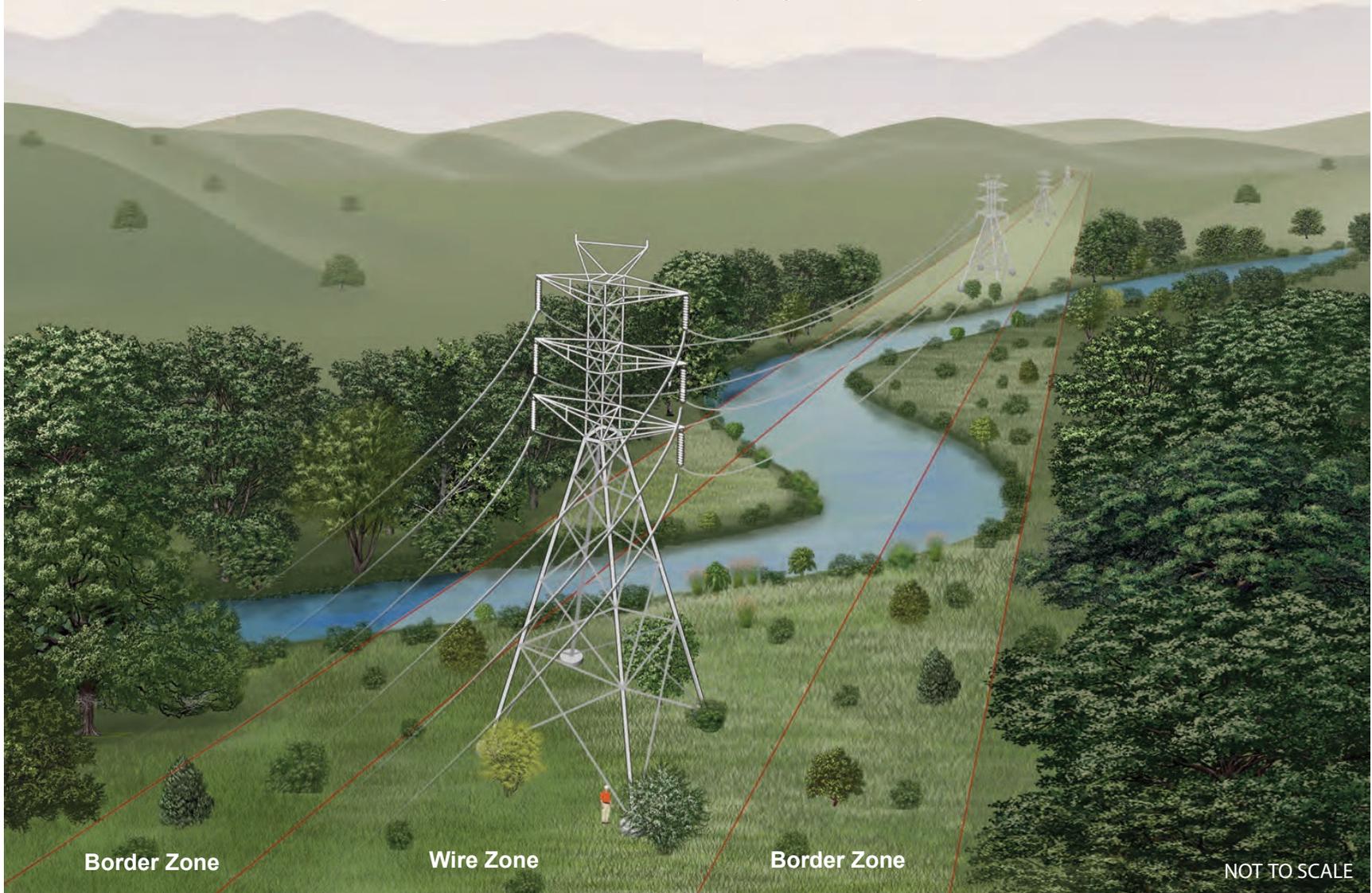
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Figure 2-4
Vegetation Management for Transmission Lines
Perpendicular to Riparian Areas

Riparian Areas in Transmission Rights-of-Way

Retain compatible trees and understory vegetation in riparian areas.



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Figure 2-5
Vegetation Management for Transmission Lines
Parallel to Riparian Areas

There are two subcategories of pole clearing: maintenance of previously cleared poles and maintenance of new poles that have never been cleared of vegetation. PG&E implements both subcategories of clearing annually. Vegetation clearing for existing poles applies to vegetation that has grown over the course of the year (e.g., grasses, forbs, saplings, and branches). Vegetation clearing for new poles requires the removal of all vegetation within 10 feet of a pole that could propagate a fire.

Approximately 100 new subject poles are cleared of vegetation in a 10-foot radius around the pole annually in natural vegetation.

E10c. Tree Removal—Small Groups

When appropriate—considering tree species, growth rates, site conditions, landowner notification, and appropriate permits—PG&E removes small groups of trees growing below overhead transmission and distribution facilities while conducting routine maintenance activities (E10a). Trees are removed in groups affecting approximately 0.1 acre (4,350 square feet) at approximately 25 locations each year. Trees are cut off at ground level, with the roots and stump left in place.

E10d. Tree Removal—Transmission ROW Clearing

PG&E uses an integrated vegetation management program to manage incompatible vegetation (tall-growing plant communities) and maintain low-growing diverse plant communities that are compatible with transmission ROWs. Properly maintained ROWs are essential for ensuring the safety of the public and workers, minimizing vegetation-related outages, providing access for the inspection and maintenance of facilities, and ensuring the timely restoration of service during emergency conditions. PG&E vegetation management staff prioritizes lines and line sections to be worked annually. Prioritization is based on a NERC-regulated line, line criticality, level of risk of an outage, vegetation density, and property ownership. Goals of transmission ROW vegetation management also include protecting the transmission system in the event of a fire, as well as preventing vegetation-caused fires.

NERC requires transmission owners to have a documented Transmission Vegetation Management Plan (TVMP). The TVMP needs to describe how transmission owners conduct work on their applicable active transmission line ROWs to prevent sustained outages due to vegetation coming into contact with conductors and causing vegetation-related outages leading to blackouts or cascading outages (Standard FAC-003-2). Compliance with the standard is mandatory, and if a transmission owner allows vegetation to encroach into the Minimum Vegetation Clearance Distance (imminent threat), steep fines can be levied. PG&E's TVMP is associated with ROWs for its critical transmission lines, which operate at 200 kV or more, and for some transmission line ROWs, which operate at less than 200 kV.

The first step of the integrated vegetation management program is to clear the ROW of incompatible vegetation (e.g., any vegetation growing within the ROW that has the potential to grow or fall into PG&E minimum clearance distances). ROW clearing typically is accomplished either mechanically or manually. However, because cutting or mowing can stimulate resprouting of incompatible vegetation, PG&E vegetation management staff monitors the ROW for resprouting and reinvasion by incompatible vegetation. When resprouting and reinvasion does occur, staff manages the ROW to achieve the desired outcome. A number of factors are considered in selecting and implementing the appropriate management method or methods.

This covered activity is defined by those instances in which vegetation management is necessary as a distinct and separate action. The long-term goal of an integrated vegetation management program in the transmission ROW is to convert tall-growing plant communities to low-growing communities. Low-growing shrubs, grasslands, or plants are preferred at the belly of the span, which is the middle 50% of the line between towers or poles. Vegetation may be taller near towers. Management toward low-growing communities can be accomplished over a period of many years by selectively controlling incompatible plants while preserving low-growing shrubs, grasses, and plants. With proper management, the low-growing vegetation eventually can dominate the ROW and suppress the growth of the tall-growing vegetation, thereby reducing the need for future treatments.

ROW management is based on the concept of creating wire zones and border zones. The *wire zone*, which comprises the ROW area beneath the transmission wire plus 10 feet on either side, is managed for low-growing shrub-forb-grass plant communities (early successional). The *border zone*, which extends from the wire zone to the edge of the ROW, is managed for taller shrubs and brush communities (transition zone). This management concept is depicted in Figure 2-3.

At approximately 10 locations per year, PG&E removes 1 mile of vegetation in a 25-foot-wide area under the belly of the span and prunes the remaining vegetation in a 75-foot-wide area along all transmission lines from 115 kV to 500 kV. This estimated area is based on an assumption that PG&E removes most trees from under the belly of the span, and, depending on clearance requirements, leaves the trees near towers. In riparian areas, vegetation management is anticipated to be more targeted. Riparian vegetation clearing is not expected to extend beyond 1,000 feet in one continuous area, and 1,000 feet of clearing is anticipated only once every 3 to 5 years. Riparian removals for this activity are illustrated in Figure 2-4 and Figure 2-5. Low-growing trees that stay below the clearance distance height are compatible and are retained. If the trees are incompatible then they will be removed; however, the compatible understory vegetation will be retained.

E10e. Tower Cage Clearing

PG&E performs vegetation management around poles and towers on its overhead transmission facilities to maintain the visibility necessary to inspect the footings for structural integrity as required by the CAISO Transmission Maintenance Agreement. Managing vegetation around poles and towers also keeps the interior of the tower clear of woody vegetation. Vegetation management includes patrol of poles and towers and removal of all trees, tree seedlings, and any material that obstructs the ability to visually inspect the tower and pole footings. The work is scheduled throughout the year and the work type depends on the plant material to be removed. Vegetation management involves cutting vegetation with string trimmers or chainsaws, and treatment with herbicides to prevent regrowth, where appropriate. PG&E performs this activity approximately 80 times per year. Approximately 10% of the time (eight times annually), vegetation is pruned or removed within a 1,600-square-foot area.

E10f. Fee Strip Maintenance

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

E11. Wood Pole Test and Treat

E11a. Inspection and Maintenance

PG&E identifies the line segments for inspection and testing based on age and condition of the utility assets. Staff evaluates all transmission and distribution wood poles that are at least 10 years old to determine whether they are suitable candidates for replacement, trussing, stubbing, or fiber-wrapping. Within a 3-foot radius around the pole, construction crews excavate 20 inches of soil and bore a minimum of three $\frac{9}{16}$ -inch holes at 45° angles to the axis of the pole. Each successive boring is 120° to the right and 12 inches above the previous bore. The shell thickness and circumference of the pole are used to determine whether the pole is a candidate for replacement or reinforcement. Inspection and maintenance takes place frequently, approximately 60,000 times per year. Approximately 10% (6,000) of these poles are in nonurban areas. The excavation of soil within the 3-foot radius of the existing pole results in minor disturbance.

E11b. Reinforcement

Approximately 180 poles (or 3% of the 6,000 wood poles in non-urban areas) that PG&E inspects will need reinforcement. Staff determines the type of reinforcement method—stubbing or trussing—after reviewing the testing results of an inspected line segment. Stubbing and trussing entail driving or setting a short steel truss or wood pole into the ground and attaching it to the existing pole to provide the support originally afforded by the pole butt. Fiber-wrapping is performed on poles that are not candidates for trussing or replacement. This entails 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. Excavation of soil within the 6-foot radius of the existing pole results in minor disturbance.

2.7.2.2 Minor New Construction Activities for the Electric System

E12. New Distribution and Transmission Line Construction

To provide additional service to residential or commercial customers, up to 2-mile extensions of distribution and transmission lines on new wood poles or light-duty steel poles are installed approximately twice per year. Each line extension requires the following.

- Typically, approximately 15 wood or direct-embedded light-duty steel or self-supporting steel poles per mile. Each work site is approximately 10 by 10 feet.
- A pull site of approximately 50 by 50 feet, or similar to the site necessary for electric line reconductoring.
- A staging area of approximately 75 by 75 feet.

Access to the new transmission or distribution section may require construction of a new 10- by 1,000-foot unsurfaced access road. Degraded or eroding access roads may need to be repaired or replaced. Once construction crews survey and stake the centerline for the new line, pole sites, pull sites, access roads, and laydown areas are cleared, if necessary. PG&E uses a machine auger to excavate the site of the new pole and any necessary anchor holes. The width and depth of the setting hole depend on the size of the pole, soil type, span, and wind loading. Typically, minimum pole-setting depths range from 4 to 14 feet. Poles are framed (cross arms, pins, insulators, grounds,

bonding, markers), and any equipment is installed. Any anchors and guy wires are installed before the pole is set. After the pole is set, conductors are strung.

Some distribution and transmission line construction is exempt from ordinary CPUC environmental review requirements for issuance of a PTC or Certificate of Public Convenience and Necessity. For example, a PTC is not required for construction of power line facilities or substations that would be located in existing franchise or on company-owned property, respectively.

E13. Tower Line Construction

To provide additional service to commercial or industrial customers, approximately twice per year during the permit term, PG&E may obtain coverage under the ITP for up to 2 miles of new transmission lines in undisturbed, natural vegetation as an extension from existing transmission lines. These new lines are supported by steel-lattice towers, light-duty steel poles, or TSPs with concrete foundations. Each line requires the following.

- A new ROW (maximum of 200 feet wide) no longer than 2 miles.
- Approximately 10 towers or poles, each requiring an approximately 25- by 100-foot work site.
- Three pull sites with an average size of 50 by 150 feet.
- A laydown area of approximately 100 by 100 feet.

Once land survey crews survey and stake the centerline for the new line, tower sites, pull sites, access roads, and laydown areas are cleared, if necessary. Crews excavate an area 25 by 100 feet for the foundation and concrete footings are poured. A crane or helicopter is used to erect the towers, depending on the tower type. After towers are erected, conductors are strung. Environmental review by the CPUC is generally not required for tower line construction in existing franchise or for other work that is exempt under CPUC G.O. 131-D.

E14. Minor Substation Expansion

Substations typically are constructed close to residential, commercial, or industrial development but may be located in areas surrounded by agricultural or natural vegetation. Although this activity is infrequent, PG&E estimates up to 3 acres of permanent potential habitat loss per substation expansion attributable to the substation footprint. This construction footprint may be required for additional transformers, fencing, and new distribution line outlets. The expansion area also may be used for setbacks, landscaping, and access. PG&E grades, paves, or surfaces the substation sites and fences the area for safety and security reasons. This EIR assumes ITP coverage for five electric substation expansions over the 30-year permit term. Permitting and environmental review by the CPUC is not required when PG&E already owns the property or where the high-side voltage does not exceed 50 kV.

E15. Underground Line Construction

Underground line construction is conducted predominately in urban settings. For both transmission and distribution lines, underground cable installation is accomplished using a cut-and-cover construction method (open trenching) for the underground power line, duct banks, and splice vaults. For this activity, the construction specifications for a 115 kV transmission line were considered as the average size; however, construction area dimensions vary with the voltage capacity of the line and are frequently smaller than those necessary for constructing a 115 kV line.

Although this width varies, typically, a minimum access width of 65 feet is required to allow for the trench excavation and construction of the duct bank. The activity construction area length varies based on the length of the line. During construction, trench excavation spoil is removed and stored. If hazardous material is present, construction crews haul the material offsite and dispose of it appropriately. PG&E constructs underground lines within undisturbed natural habitat about once every 10 years. Under CPUC G.O. 131-D, environmental review by the CPUC is not required for conversion of existing overhead lines to underground facilities, for similar work in existing franchise, or for other work that is exempt under CPUC G.O. 131-D.

Duct Bank Installation

As the trench for the underground cable is completed, the crew installs the cable conduit, reinforcement bar, ground wire, and concrete conduit encasement duct bank. The duct bank typically consists of polyvinyl chloride (PVC) conduits that contain the underground cables.

The typical trench dimensions for installation of a single circuit are approximately 3 feet wide by 5 feet deep; however, trench depths vary, depending on soil stability and the presence of existing substructures. Dewatering, if necessary because of a high groundwater table, is conducted using a pump or well-pointing to remove water from the trench. Construction crews then pump the water into baker tanks and haul it away for proper disposal. Once the PVC conduits are installed, thermal-select or controlled backfill is imported, placed, and compacted. A road base backfill or slurry concrete cap then is installed.

Vault Installation

Vaults are installed in urban areas within public utility easements at intervals that vary with the voltage capacity of the conductor. The vaults are used initially to pull the cables through the conduits and splice cables together. During operation, vaults provide access to the underground cables for maintenance inspections and repairs. Vaults are constructed of prefabricated steel-reinforced concrete and are typically about 20 feet long, 10 feet wide, and 8 feet deep. The total excavation footprint for a vault is typically about 22 feet long, 12 feet wide, and 10 feet deep.

Cable Pulling, Splicing, and Termination

After installation of the conduit, cables are installed in the duct banks. Each cable segment is pulled into the duct bank, spliced at each of the vaults along the route, and terminated at the bus structures (switchboard) inside the switchyards. To pull the cable through the duct bank, a cable reel is placed at one end and a pulling rig is placed at the other. With a fish line, a larger wire rope is pulled into the duct. The wire rope is then attached to cable-pulling eyes for pulling. To ease pulling tensions, a lubricant is applied to the cable as it enters the duct. Cables are spliced at vaults after they are completely pulled through the ducts. A splice trailer is positioned directly above the vault manhole openings for each access. At each end, cables will rise out of the ground on a transition pole and terminate at a bus structure in the switchyards.

Special Construction Methods

To minimize surface disturbance, horizontal directional drilling is the preferred method for conduit installation.

2.7.3 Habitat Conservation, Management, and Enhancement

As part of its conservation strategy, PG&E will conserve, manage, and enhance habitat for covered species. PG&E will provide an endowment for mitigation lands to address the management needs of conserved properties. Activities required for land management typically include vehicles use in or near upland habitat, regular pedestrian surveys or sampling, installation and maintenance of fencing, and use of handheld equipment to manage vegetation and invasive species and otherwise enhance or restore habitat. Where possible, PG&E will identify opportunities to enhance conservation lands for the benefit of the covered species. In the course of acquiring, managing, monitoring, or enhancing mitigation lands consistent with a CDFW-approved management plan, take of covered species could result. The ITP is intended to cover habitat management, monitoring, and enhancement activities carried out by PG&E and by independent land managers with whom PG&E has contracted to perform such activities, so long as the activities are consistent with the approved management plan.

2.8 Work Methods and Techniques

2.8.1 Natural Gas System Work Methods and Techniques

2.8.1.1 Access

Generally, facilities are located in areas where PG&E crews can use existing public and private roads to access the facilities' ROWs. Typically, pickup trucks or small sport utility vehicles (SUVs) are used to access the facilities. Rural private roads may be dirt or gravel and may require repair or improvements in order to make ready for use by heavy equipment vehicles. In the event that no road exists or an emergency arises, off-road travel or construction of a new temporary access road may be necessary. PG&E restricts speed limits to those deemed safe for site-specific driving conditions—typically not faster than 15 miles per hour—and may further restrict speeds if necessary. PG&E periodically creates temporary access roads when access to an O&M activity site is not readily available. Temporary access roads are typically required for larger-scale activities, such as installing new gas pipelines. Currently, PG&E does not know where all temporary roads would be located. However, as appropriate, PG&E's environmental staff sites all roads to minimize impacts on sensitive species and their habitats through PG&E's environmental screening process and implementing prescribed FPs, AMMs, and BMPs to protect sensitive species and their habitats. PG&E creates temporary roads within a minimum impact area and may ultimately decommission them, restoring the area at the completion of the O&M activity. In some instances, however, temporary roads may be left in place on a permanent basis to provide site access for annual patrols or inspections. The O&M activity descriptions include discussion of construction of temporary access roads, as appropriate.

2.8.1.2 Staging

A staging area is typically required for large-scale O&M activities, such as pipeline replacement. PG&E determines the location of the proposed staging areas during the early planning stages of a project and strives to locate staging areas on developed or disturbed areas to avoid and minimize impacts on sensitive resources. If sensitive resources such as water bodies, wetlands, or sensitive habitat are present, a biologist demarcates the sensitive resources with flagging or temporary

orange construction fencing before construction commences. PG&E typically uses larger trucks to transport pipes and equipment such as tracked vehicles (i.e., vehicles that run on continuous tracks instead of wheels). Crews park, store, and stage construction equipment in these designated staging areas. PG&E restores staging areas at the completion of the activity. The O&M covered activity descriptions discuss the specific sizes of the staging areas for each activity.

2.8.1.3 Clearing

Activities involving clearing, such as pipeline repairs, maintenance and replacement, are in keeping with PG&E's land rights (e.g., easement) and involve landowner notification. Additionally, in some circumstances, authorizations may be required from land management agencies. After staking the work area, maintenance personnel remove trees and brush (clear and grub such obstacles as rocks or tree stumps by mechanical means) within the ROW to the extent necessary to allow safe and efficient use of construction equipment.

2.8.1.4 Grading

PG&E limits grading to the area necessary to ensure the safe movement of construction equipment in the ROW and designs its O&M activities that involve grading to minimize impacts on natural drainage and slope stability. Construction footprint calculations include acres of potential impacts from grading. Where steep terrain requires the ROW to be graded at two elevations (cutting an upper elevation and filling a lower elevation, called *two-toning*), PG&E recontours such areas after construction to approximate pre-construction topographic conditions and implements erosion control measures to prevent runoff. If the disturbed area is greater than 0.1 acre of grassland habitat, PG&E crews also mulch, reseed, and fertilize the area.

Sometimes PG&E must temporarily install prefabricated bridges or culverts in the ROW or in access roads 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 onsite 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.

During the grading phase, PG&E segregates topsoil from subsoil and windrows the topsoil within the designated work site. During periods of rain, soil piles are covered, consistent with applicable stormwater permits; PG&E also develops site-specific erosion and sediment control plans as necessary. The soil is typically covered with plastic sheeting secured with gravel bags or other weights no more than 10 feet apart to minimize the potential for erosion. Surface rocks, where present and useful for reclamation, are set aside with the topsoil windrow. If not reclaimed, the rocks are taken to a landfill. PG&E covers the pipeline by placing the subsoil over the pipe first and then spreading the preserved topsoil evenly over the graded area.

2.8.1.5 Erosion Control

PG&E reviews various types of erosion control and implements applicable BMPs identified in the *California Stormwater Best Management Practices Handbook* published by the California Stormwater Quality Association in 2015. For example, PG&E employs erosion control techniques to preclude pipeline washout, gully development, and sedimentation of local drainages. Standard erosion control measures may include installation of water bars along temporary or dirt roads, diversion channels and terraces to reduce erosion and runoff, ditch plugs installed in ditches to prevent

washout, and other soil stabilization practices such as jute mats, wood mulching, straw mulching, and other methods described in the handbook. The methods selected depend on the situation and the condition of the site. PG&E uses permanent articulating cement ground mat systems (i.e., erosion control or *Ercon* mats) and riprap infrequently—on less than 100 linear feet of stream each year in the Bay Area—and only when other biomechanical methods cannot be used or when repairs are made to existing riprap structures. If biomechanical methods cannot be used or repairs to existing riprap are needed, PG&E uses the minimum riprap necessary to accomplish the activity and so that it will not exceed a total of 100 linear feet per location. PG&E does not undertake vegetation removal, grading, or substantial alteration of drainage conditions when performing erosion control work.

2.8.1.6 Trenching and Excavating

The process of excavating the pipeline trench varies according to location, soil type, and terrain. PG&E conducts trenching and excavating in accordance with California Occupational Safety and Health Administration (Cal/OSHA) requirements for employee and public safety. Self-propelled trenching machines, hydrovacuuming equipment, or backhoes are used for trench excavation on moderate terrain. Trenches crossing waterways are excavated using a backhoe, dragline, or clamshell. PG&E typically schedules trenching for the summer, when perennial creeks are dry; otherwise, a tunneling method such as jacking and boring or horizontal directional drilling (described below) is used. In rare occasions when rock or rocky formations are encountered, tractor-mounted mechanical rippers are used to expedite excavation. In areas where mechanical rippers are not practical or sufficient, rock trenching equipment may be employed. The width and depth of the trench depend on the diameter of the pipe, soil type, terrain, and minimum depth requirements. Typically, the trench is 12 inches wider than the diameter of the pipe. The trench must be deep enough to achieve adequate soil cover over the pipe. The following minimum soil covers apply to the described areas.

- Uncultivated areas: 2.5 to 3 feet.
- Cultivated areas: 3 to 6 feet.
- Rocky areas: 1.5 to 2 feet.

In areas where it is necessary to trench through topsoil and subsoil, a two-pass trenching process is used. The first pass removes topsoil, and the second pass removes subsoil. Removed soils (*spoil*) from each excavation are stored in separate rows. This technique allows proper soil-profile restoration after backfilling. Windrows contain gaps at appropriate locations to prevent stormwater runoff from ponding. Bank stabilization methods depend on site-specific conditions, but work materials and methods are consistent with species conservation needs and in accordance with any acquired USACE CWA Section 404 and CDFW permits or agreements.

PG&E field crews implement other BMPs as needed to provide erosion control and to prevent construction runoff from entering nearby streams. In cultivated and improved areas and areas with thin layers of topsoil, it is sometimes necessary to remove and stockpile topsoil within the ROW until the trench is backfilled. This effort could last up to 3 weeks. The stockpiled topsoil then is distributed evenly across the disturbed portion of the ROW during cleanup.

PG&E crews clear the trench of loose rocks and, when necessary, provide imported material or other suitable bedding material as a cushion for the pipe. Backhoes are used to clean the trench after ripping, or, in extremely rare circumstances, blasting is implemented after other alternatives, such

as rerouting, are exhausted. PG&E minimizes the length of exposed trench to the extent possible and provides access across the trench at convenient intervals for public safety.

2.8.1.7 Crossings

Boring and open trenching are typical construction methods for crossings (crossing types are described below). PG&E typically uses boring when crossing active waterways, railroads, and major roadways. The three most common boring methods are jack-and-bore, horizontal directional drilling, and microtunneling. The method selected is based on the crossing type, soil type, terrain, and type of facility being installed. PG&E generally avoids open trenching across a waterway unless the waterway is a dry or ephemeral stream.

Jack-and-bore. PG&E often uses this boring method (also referred to as *dry bore*) to cross major highway systems (all federal and state highways) and railroads, as well as places where open cuts are infeasible. Crews excavate each side of the crossing to accommodate the equipment (a boring auger). The displaced fill is either stockpiled or removed, depending on whether the area will be permanently affected or if PG&E will restore it following a temporary disturbance. Stockpiling is done within the ROW. The bore could be for a pipe ranging from 2 to 24 inches in diameter. Sacrificial pipe, the same size as the pipe being installed, typically is used as a sleeve for the boring auger. This sleeve is pushed under the crossing as the auger drills through the soil. The permanent gas pipe is then pushed through and attached to the sacrificial pipe. The pipe is cut in short lengths to accommodate the limited excavation area then welded to the inserted piece ahead of it and jacked into place. The average size of the excavation or trenching is 10 feet wide by 40 feet long. PG&E uses the same method if casing pipe is necessary. The casing pipe, sized larger than the carrier pipe, is installed as a sleeve for the boring auger. The gas pipe then is installed through the casing. Cased crossings have vent pipes that extend above ground, have cathodic protection, and are appropriately marked.

Horizontal directional drilling. Longer distances, typically more than 120 feet, can be drilled using this method rather than the jack-and-bore method. Directional drilling, which PG&E most often uses to cross large waterways, is the preferred method for conduit installation to minimize surface disturbance. The only excavations required are for mud pits” at the drilling entry and exit points. Mud pits are approximately 6 feet wide by 6 feet long by 3 feet deep. The tunnel is drilled from surface to surface, and a registered engineer determines the pipe’s maximum angle of deflection. Workers set up a drilling machine on one side of the crossing at the appropriate location. The auger drills at a predetermined angle from the surface elevation toward the crossing; the angle is prescribed to attain the correct depth below the feature being crossed. During drilling, a mud solution, typically bentonite, is pumped into the tunnel along with other nontoxic additives to maintain the tunnel’s shape and integrity and to reduce friction during installation of the pipeline. Used or displaced mud solution is pumped out of mud pits and into collection tanks. After the drilling machine pulls the pipeline through the tunnel, the pipe is welded to pipe segments on each side of the crossing. PG&E contains the soil removed during drilling within the mud solution and tests it for contaminants prior to hauling the solution offsite and disposing of it at landfills that accept such material. When drilling under streams, “frac-out” response procedures, discussed below, are often utilized for water quality protection.

Drilling fluid fractures, commonly called *frac-outs*, occur when the pressure of the drilling lubricant escalates, fractures the soil, and allows the drilling fluids to escape the bore. PG&E crews design and direct the drilling operation to minimize the risk of spills of all types. PG&E utilizes standard frac-out

response procedures that outline standard precautionary measures to control and clean up escaped drilling lubricant. The frac-out response procedures include the following: a point-of-contact list in the event a frac-out or spill occurs, guidance for when drilling should occur (such as performing drilling during daylight hours so that the loss of bentonite or machine pressure can be visually identified), and a list of tools and equipment required onsite to clean up and remove the drilling fluid. The point-of-contact list also outlines the notification procedure to inform all agencies with jurisdiction of the waterway of the nature of the incident. In addition to permit conditions and frac-out response procedure guidance, projects that involve contingency planning for frac-outs may also involve preparation and implementation of a stormwater pollution prevention plan (SWPPP) that contains detailed methods and measures to avoid spills; in situations where a SWPPP is not required, PG&E implements BMPs as needed to provide erosion control and to prevent construction runoff from entering the streams.

Microtunneling. This is PG&E's preferred method for stream crossings. PG&E also often uses microtunneling in extremely wet conditions where it is necessary to control the amount of soil being removed as the boring head progresses. Each side of the crossing is excavated to accommodate the boring equipment (i.e., a jetting head and suction equipment). Microtunnel excavation can be a trench as small as 10 by 40 feet or as large as 50 by 50 feet, depending on the required depth. A jetting head containing multiple high-pressure water jets is attached to the pipe being installed. Crews use plumbed or tanked water—not water from adjacent streams or rivers. Water forced through the jets dislodges the soil as the head is pushed, and the pipe is installed behind it. Suction equipment controls the amount of soil being removed to accommodate the forward progress of the jetting head and pipeline. Only the soil displaced by the pipeline is removed. PG&E crews capture water used during this process in baker tanks and dispose of it according to state and federal water quality regulations.

Open-trench waterway crossings. PG&E rarely uses an open-trench waterway crossing and does so only when a waterway is very small or seasonal. If PG&E uses the open-trench technique for waterway crossings, a trench is opened in the streambed using backhoes, backhoes on barges, clamshells, or draglines, depending on the streamflow characteristics. Flow is maintained at water crossings during construction using bypass piping and temporary cofferdams. At large rivers, spoil removed from the trench is stockpiled out of the water within designated work sites but not where it can re-enter surface waters. The pipeline is placed at least 6 feet below scour depth. A plug of unexcavated soil is left at each bank of the stream or river crossing to preserve the integrity of the streambank. PG&E crews do not remove these plugs until necessary for installation of the pipe. The entire length of pipe for the crossing is assembled as a unit, tested, and then placed in the trench. After installation, crews backfill the trench and the streambank, stabilize the soil through compaction, and restore the area to approximate pre-construction conditions. PG&E's bank stabilization methods depend on site-specific conditions, but work materials and methods are consistent and in accordance with state and federal water quality regulations.

For safe construction, PG&E conducts hydrologic evaluations for any major planned crossings during the appropriate time of year, as required.

2.8.1.8 Crossing Types

River, stream, and backwater crossings. River crossing methods vary according to specific river characteristics, such as width, depth, flow, and riverbed geology. PG&E conducts construction in accordance with permits and agreements issued by USACE, CDFW, U.S. Fish and Wildlife Service

(USFWS) (see Table 2-5 in Section 2.10), and other appropriate regulatory agencies. Projects may require separate review and approval in accordance with the terms of the specific permits or agreements. Pipelines crossing major streams and rivers are coated with concrete prior to installation to provide negative buoyancy and protection from erosion. PG&E installs temporary vehicle crossings for construction traffic only if an existing crossing, such as a bridge, is not available in the vicinity. Temporary vehicle crossings consist of culvert bridges, Flexifloats, or portable bridges.

Fault crossings. Where geologic studies suggest a high potential for ground rupture, PG&E designs the fault crossing to avoid overstressing the pipe in the event of differential movement. Designs of fault crossings vary, depending on the type of fault and the likelihood, amount, and potential consequences of expected fault displacement. To address the potential for fault displacement, the pipeline trench is widened and deepened to accommodate the anticipated fault displacements. The pipeline in the fault zone is completely suspended in granular bedding material to minimize the resistance of the trench backfill to displacement of the pipe. This method allows the pipe to remain fixed relative to movement of the trench as fault displacement takes place.

Road, railroad, and utility crossings. PG&E uses the open-trench method when crossing roads with light traffic and where local authorities or owners of private roads permit this crossing method. PG&E provides a temporary road detour to the shoulder of the road or a construction bridge consisting of plating for trenched thoroughfares. Boring or manually exposing the pipe or cable are generally the methods used to cross below underground utilities. Jack-and-bore is the typical boring method used at railroad crossings.

Aqueduct and canal crossings. Site-specific circumstances determine the construction method PG&E uses for crossing aqueducts and canals. In most cases, boring is appropriate. Where required or necessary, crews construct an aerial suspension system for the pipeline.

2.8.1.9 Pipe Placement

Large trucks transport lengths of pipe, valves, and fittings to the ROW or work area, and PG&E crews unload the materials. Crews typically assemble sections of pipe requiring angle joints in the field using prefabricated elbow sections so that the pipe conforms to the contours of the terrain. The pipe joints are welded, X-rayed, inspected, and field-coated to prevent corrosion. The material used for field coating depends on the location of the pipe.

Large trucks or track-mounted equipment lower the pipeline into the trench. Work crews bring this equipment to the O&M activity site on a truck. Typically, the old pipe is filled with slurry and abandoned in place or cut and capped. The trench then is backfilled with the excavated material. If the excavated material has too much rock for placing around the pipe, a rock-free material is imported and placed around and over the pipe to a depth of 1 foot. Surplus material is used to form an earthen crown over the trench and allow for settling of the backfill. All excavations and trenches are compacted to be in adherence with the specific requirements at each location. The industry standard minimum compaction requirement for ROWs is 85%.

2.8.1.10 Pipeline Marking

PG&E crews install/replace identifying markers (i.e., paddles) over the centerline of the pipeline. These markers show the general location and direction of the pipeline, identify the owner of the pipeline, and convey emergency information in accordance with applicable regulations. Additional

markers (fence post-like structures with attached signs) are placed on streambanks, not in waterways, and on roads, fences, public access crossings, and edges of agricultural fields. The markers are installed in alignment with the active pipeline. Special markers providing information and guidance to aerial patrol pilots also may be installed.

2.8.1.11 Hydrostatic Testing

PG&E conducts hydrostatic testing to verify the integrity of existing pipeline, replaced pipeline segments, and new customer/business pipeline extensions. Testing complies with requirements of CPUC, California Department of Transportation, Regional Water Quality Control Boards, and Cal/OSHA. PG&E most commonly uses water as the test medium, but compressed air or compressed nitrogen gas occasionally are used for testing small-diameter pipes. Testing pressure and duration are determined by pipe size, pipe specifications, pipe-wall thickness, and elevation. Prefabricated test heads are installed on the section of line to be tested. The section is then filled with water from an available source, such as a fire hydrant. Water can also be transported to the site by water trucks or sent through temporary aboveground water lines. Once the pipeline is filled, a hydrostatic pump is used to increase the internal pressure to the designed test pressure, typically 1.5 times the system's maximum operating pressure. The amount of water used in a hydrostatic test depends on the diameter and length of pipe tested. For example, hydrostatic testing for a 1,000-foot segment of pipe with a 21-inch diameter may require up to 18,000 gallons of water.

Upon successful completion of the hydrostatic test, pressure is reduced, and the water is expelled from the pipeline into Baker tanks, for temporary storage, using air compressors and a cylindrical foam "pig." Water testing and other procedures are performed in accordance with the Statewide Natural Gas Utility Discharge Permit, prior to discharge of water to land or other permitted areas for beneficial use (e.g., dust control or irrigation). During discharge of water, PG&E also implements its water quality BMPs in a manner consistent with local water quality considerations.

Each segment of pipeline tested is approximately 2 to 4 miles in length; approximately 60 of those segments are in urban areas. The remaining 40 tests would be in nonurban areas at a rate of five per year over an 8-year period. Soil excavation, soil stockpiling, and the use of construction equipment at each end of the pipeline requires an approximate 20- by 50-foot work area. An additional 100- by 100-foot laydown area and a staging area are also required at each end of the pipeline. Hydrostatically tested pipelines may require a 100- by 100-foot staging area to position and store each baker tank.

2.8.1.12 Cleanup and Restoration

The final phase of pipeline installation involves cleanup and restoration of the ROW to achieve compatibility with preexisting vegetative conditions, in accordance with standard procedures approved by federal and state regulatory authorities. PG&E removes construction material and recontours disturbed areas to their pre-project grade. Depending on the nature of the site and the type of installation that took place, several tasks may be involved in the cleanup and restoration. For example, placement of a pipeline or other infrastructure in a trench results in surplus soil that cannot be returned to the trench. The surplus soil normally is distributed evenly over the disturbed section of the ROW. If a property owner objects to this approach, the surplus soil is deposited at a PG&E approved local disposal site. Restoration of the ROW surface involves smoothing it with motor graders or disc harrows. Restoration may also require stabilizing slopes by recontouring, creating slope breaks or diversion ditches, or using dirt, sandbags, or other materials to stabilize the soil and

direct runoff away from disturbed areas. On cultivated or improved lands, measures are taken to remove rocks and leave the ground surface in a condition satisfactory to landowners. If the disturbed area is greater than 0.1 acre of grassland habitat, crews also mulch, reseed, and fertilize, as needed and pursuant to landowner agreement. In the event a landowner does not agree to the proposed restoration, this impact would be considered permanent, and PG&E would provide mitigation. For some activities, restoration may not be implemented in certain areas, such as riparian areas, serpentine habitats, or blue oak woodlands where the ROW has become overgrown and operational requirements dictate that access to and through the ROW be maintained for annual patrols and inspections, especially at creek and river crossings. In those situations, PG&E would mitigate the impacts as permanent impacts if the impacts are within habitat for the species covered by the ITP.

2.8.2 Electric System Work Methods and Techniques

2.8.2.1 Access

Access to electric facilities is accomplished by using existing public and private roads to access the ROW to the maximum extent possible. However, PG&E must occasionally construct new temporary access roads when access to a work site is not readily available. As appropriate, PG&E's environmental staff sites all roads to minimize impacts on sensitive species and their habitats through early project planning efforts and through implementing prescribed AMMs to protect sensitive species and their habitats. PG&E constructs these roads within a minimum footprint area and frequently decommissions and restores these roads at the completion of the activity. In some instances, however, temporary roads may be left in place to provide permanent access for annual patrols or inspections. The O&M activity descriptions below include discussions of construction of permanent and temporary access roads, as appropriate.

2.8.2.2 Staging

A staging area is typically required for large-scale O&M activities, such as transmission line reconductoring. The specific O&M activity descriptions discuss the typical sizes of the staging areas.

2.8.2.3 Clearing

Activities involving clearing, when necessary, are in keeping with PG&E's land rights (e.g., easement) and involve landowner notification. Additionally, in some circumstances, authorizations may be required from land management agencies. Clearing for construction begins by staking the ROW. Maintenance personnel then clear vegetation, remove obstacles, and grade to the extent necessary to allow safe work practices and access. In the event that clearing of privately owned tree species is necessary, construction personnel remove and stack the trees in accordance with the landowner's preference. Stump profiles are left as low as required for safe work practices and access. Stumps may be removed where appropriate. Debris generated during clearing of the ROW is either chipped and left onsite or disposed of appropriately. In some instances, PG&E's easement documents dictate the methods for disposal.

2.8.2.4 Grading

PG&E performs grading to allow for safe work practices and access and to ensure the proper installation of electric facilities. PG&E also conducts grading to maintain the structural integrity of an electric facility that is being affected by soil movement. On steep terrain where the ROW must be two-tiered, PG&E restores the areas after construction to approximate pre-construction topographic contours.

PG&E segregates topsoil from subsoil and windrows the topsoil near the site to preserve topsoil. Surface rocks, if present and useful for reclamation, are set aside. PG&E collects unused rocks and hauls them offsite to a landfill. PG&E restores graded areas after construction to approximate pre-construction topographic contours where possible and, if the impact area is greater than 0.1 acre, PG&E revegetates the affected area. The construction footprint calculations include areas potentially affected by grading.

Sometimes PG&E temporarily installs prefabricated bridges or culverts in the ROW or in access roads to ensure safe access and reduce environmental impacts in accordance with state and federal regulations. If a bridge crossing is only needed for a few hours, then a portable bridge is pieced together onsite and secured with a crane to span the crossing. If a longer-term crossing is required, then PG&E installs a culvert after obtaining the requisite permits from the regulatory agencies.

2.8.2.5 Erosion Control

PG&E implements various types of erosion control and and/or measures identified in the *California Stormwater Best Management Practices Handbook* for gas and electric transmission and distribution facilities. Erosion control techniques are employed to preclude impacts on utility facilities (gas and electric) resulting from soil movement, gully development, and sedimentation of local drainages. PG&E uses standard erosion control measures that may include grading; installation of water bars along temporary or dirt roads, diversion channels, and terraces to reduce erosion and runoff; ditch plugs installed in ditches to prevent washout; riprap to repair or maintain bank stability; and other soil stabilization practices such as jute mats, wood mulching, straw mulching, and other methods described in the handbook. The methods PG&E implements depend on the situation and the condition of the site. Most erosion control work is small and contained within work sites. Larger erosion control efforts to repair or maintain bank stability, for example, are conducted on an infrequent, as-needed, basis. This work typically involves more extensive planning and permitting to gain the necessary approvals from relevant agencies. PG&E infrequently uses riprap and Ercon mats in the Bay Area—on less than 100 linear feet of streams each year—and only if other biomechanical methods cannot be used or when making repairs to existing riprap structures. The extent of concrete, Ercon mat, or concrete pillow system installation does not typically exceed 100 feet long or 50 feet wide on any stream. During such installation, PG&E complies with permits for work in waterways. PG&E installs concrete, Ercon mats, or concrete pillow systems at approximately one location per year. PG&E does not undertake vegetation removal, grading, or substantial alteration of drainage conditions when performing erosion control work.

2.8.2.6 Trenching and Excavating

The process of trenching or excavating for a new or existing underground electric line varies according to location, soil type, and terrain. PG&E conducts trenching and excavating in accordance

with Cal/OSHA requirements for employee and public safety. See the *Crossings* subsection for more details.

2.8.2.7 Crossings

Boring and open trenching are typical construction methods for crossings of underground electric line construction. PG&E typically uses boring when crossing active waterways, railroads, and major roadways. The three most common boring methods are jack-and-bore, horizontal directional drilling, and microtunneling.

2.8.2.8 Cleanup and Restoration

The final phase of large O&M activities, such as electric transmission reconductoring, involves cleanup and restoration of the project site. The goal of restoration is to achieve compatibility with preexisting vegetative conditions, in accordance with standard procedures approved by federal and state regulatory authorities. PG&E removes construction material and recontours disturbed areas to their pre-project grade. Depending on the nature of the site and the type of installation that took place, several tasks may be involved in the cleanup and restoration.

2.8.2.9 Vegetation Management

Vegetation interference with electric lines is one of the most common causes of electric outages throughout the United States. Electric outages may occur when trees or tree limbs grow, fall, or in other ways make contact with electric lines. Outages may also occur when electric lines sag into vegetation below the lines because of increased load or ambient air conditions (e.g., high air temperature or wind). Vegetation that comes into contact with electric lines can also start fires.

PG&E responds to numerous vegetation-related outages throughout its service area each year. To address this problem and minimize the threat to public safety and system reliability, PG&E's *vegetation management* refers to maintaining required clearances between vegetation and electric lines and equipment, removing hazard trees, and other vegetation clearing activities to ensure system reliability and reduce fire risk.

When pruning vegetation, there must be enough clearance at the time of the pruning to ensure that the pruned vegetation does not grow back into the electric lines before the vegetation maintenance crews inspect the line on the next cycle. Pruning prescriptions depend on the location of the vegetation in relation to the line. If the vegetation is located adjacent to the line, limbs can be pruned along one side of a tree (i.e., side pruning). Vegetation growing under the lines is pruned using targeted directional pruning to redirect future tree growth away from electric lines. Dead, diseased, or dying trees (hazard trees) or targeted tree species that are growing too close to the line and that pose a particular threat to a line are felled. Most low-growing species are retained, except in areas where poles are cleared as required by regulation. The vegetation management program operates under the following regulatory requirements.

NERC Standard FAC-003-01. Addresses all NERC-regulated overhead transmission electric lines.

NERC Standard Facilities Design, Connections, and Maintenance (FAC)-003-2. Addresses the requirements to improve the reliability of the electric transmission system by preventing

vegetation-related outages that could lead to cascading on critical electric lines operated at 200 kV or higher.

Public Resource Code, Section 4292. Addresses clearances for poles and towers with specific types of equipment (subject poles) on distribution and transmission overhead electric facilities in State Responsibility Areas (SRAs) and some select Local Responsibility Areas (LRAs) during fire season.

Public Resource Code, Section 4293. Addresses primary distribution and transmission overhead electric conductors in SRAs during fire season.

CPUC G.O. 95, Rule 35. Addresses requirements for all primary and secondary distribution and transmission overhead electric conductors. Additional detail for high-threat fire areas is provided in the specific tables of Case 13 and Case 14 described in this rule.

CPUC G.O. 95, Rules 37 and 43: Address the construction design (minimum ground-to-conductor clearances) of overhead electric facilities, and temperature and maximum electric loads, both of which effect maximum sag of the electric lines.

These regulations require compliance with varying line clearance distances and other construction and maintenance specifications. Prescribed clearance distances vary based on line rating, shrub and tree species composition, slope, regional fire risk/threat rating, and tree growth and movement, as well as sag and blow-out distances. *Sag* is the additional distance a line can sag toward the ground when it is carrying an electric load during hot weather. *Blow-out* is the additional distance a line can swing side to side under windy conditions.

PG&E also implements programs to reduce wildfire risk including enhanced vegetation management in CPUC-designated high fire-threat areas (tier 2 and tier 3) and creation of fire defense zones in partnership with customers.

2.8.3 Covered Activities Ground Disturbance Estimates

A summary of both gas and electric O&M and minor new construction activities and their average disturbance sizes is provided in Table 2-2. The alpha-numeric coding system for the various O&M activities listed in Table 2-2 coincides with the covered activities identified in Section 2.7, *Covered Activities*. The term *temporary impact* refers to impacts associated with PG&E's O&M and minor new construction activities that result in temporary alteration of existing vegetation, soils, topography, and hydrology for a period of days, weeks, or months, but no longer than 12 months. The discussion of temporary impacts in this chapter differs from the analysis of temporary impacts as defined in Section 3.4, *Biological Resources*.

Table 2-2. Operation and Maintenance and Minor New Construction Activities

Activity	Annual Frequency	Average Size—Temp. Disturbance per Activity (acres) ^a	Annual Temp. Disturbance (acres) ^a	Average Size—Perm. Disturbance per Activity (acres) ^a	Annual Perm. Disturbance (acres) ^a	Total Perm. Disturbance for 30-yr Permit Term (acres) ^a
Natural Gas^b						
Operation and Maintenance						
G1. Patrols ^c	1	0	—	—	—	—
G2. Inspections	1	0	—	—	—	—
G3a. Remedial Maintenance—Fencing	10	0.06	0.57	0.06	0.57	17.1
G3a. Remedial Maintenance—Ercon Mats	1	0.11	—	0.11	0.11	3.3
G3b. Internal Pipeline Inspection	50	0.06	2.98	—	—	—
G4. Compressor Station Upgrades and Maintenance	1	0.28	0.28	—	—	—
G5. Pipeline Electric Test System Installations	7	0.06	0.40	—	—	—
G6. Valve Maintenance - Recoating	5	0	—	—	—	—
G7. Valve Maintenance—Replacement or Automation	13	0.52	4.13	0.01	0.06	1.8
G8. Pipeline Cathodic Protection	5	0.02	0.11	—	—	—
G9. Pipeline Lowering	0.33	2.93	3.33	—	—	—
G10. Pipeline Coating Replacement	0.20	0.25	0.05	—	—	—
G11. Pipeline Replacement	13	2.44	31.12	4.24	14.84	445.2
G12. Telecom Site Maintenance	1	0.34	0.34	—	—	—
G13a. Pipeline ROW Vegetation Management	10	2.42	24.24	1.21	12.12	363.6
G13b. Pipeline Access Road Maintenance	5	0.01	0.05	—	—	—
Minor New Construction						
G14. Gas Pressure Limiting Station Construction	0.20	0.23	0.09	0.55	0.11	3.3

Activity	Annual Frequency	Average Size—Temp. Disturbance per Activity (acres) ^a	Annual Temp. Disturbance (acres) ^a	Average Size—Perm. Disturbance per Activity (acres) ^a	Annual Perm. Disturbance (acres) ^a	Total Perm. Disturbance for 30-yr Permit Term (acres) ^a
G15. New Customer/ Business Pipeline Extension	1	0.06	0.06	2.42	2.42	72.6
Subtotal Gas			68		30.2	906.9
Electrical						
Operation and Maintenance						
E1. Patrols	1	0	—	—	—	—
E2. Inspections	1	0	—	—	—	—
E3. Insulator Washing or Replacement	1	0	—	—	—	—
E4. Substation Maintenance	1	0.46	0.46	—	—	—
E5. Outage Repair	500	0.01	5.56	—	—	—
E6a. Tower Replacement or Repair (including Telecommunication Attachments)	360	0.02	8.26	—	0.41	12.3
E6b. Boardwalk Repair and Replacement	15	0.002	0.03	—	—	—
E7. Facility Installations (Shoo-Flies)	100	0.06	5.74	—	—	—
E8a. Pole Equipment Repair and Replacement	500	0	—	—	—	—
E8b. Utility/Wood Pole Replacement	500	0.002	0.80	—	—	—
E9a. Line Reconductoring—Transmission	10	21.52	215.22	0.036	0.36	10.8
E9b. Line Reconductoring—Distribution	250	0.002	0.57	—	—	—
E10a. Vegetation Management—Routine Maintenance	20	—	—	0.09	1.84	55.2
E10b. Vegetation Management—Pole Clearing	100	—	—	0.002	0.23	6.9
E10c. Vegetation Management—Tree Removal-Small Groups	25	—	—	0.1	2.50	75.0

Activity	Annual Frequency	Average Size—Temp. Disturbance per Activity (acres) ^a	Annual Temp. Disturbance (acres) ^a	Average Size—Perm. Disturbance per Activity (acres) ^a	Annual Perm. Disturbance (acres) ^a	Total Perm. Disturbance for 30-yr Permit Term (acres) ^a
E10d. Vegetation Management—Tree Removal-ROW Clearing	10	1.88	18.80	3.03	30.30	909.0
E10e. Tower Cage Clearing—Electric Transmission Structures	8	0.04	0.29	—	—	—
E10f. Fee Strip Maintenance—Electric Transmission Line ROW	1	3.03	3.03	—	—	—
E11a. Wood Pole Test and Treat—Inspection and Maintenance	6,000	0.0002	1.24	—	—	—
E11b. Wood Pole Test and Treat—Reinforcement	180	0.0008	0.15	—	—	—
Minor New Construction						
E12. New Distribution and Transmission Line Construction or Relocation	2	0.25	0.49	0.23	0.46	13.8
E13. Tower Line Construction	2	0.26	0.52	0.29	0.57	17.1
E14. Minor Substation Expansion	0.33	—	—	3	1.00	30.0
E15. Underground Line Construction	0.10	0.3	0.03	—	—	—
<i>Subtotal Electric</i>			<i>261</i>		<i>38</i>	<i>1,130.1</i>
Total Gas and Electric			329		68	2,037.0

^a These acreages are estimates based on average historical sizes for ongoing O&M activities. They do not represent caps on actual impact sizes. PG&E did not multiply temporary impacts over the duration of the permit because this calculation creates an incorrect impression of residual disturbance.

^b As of 2017, PG&E no longer splits out Community Pipeline Safety Initiative (CPSI) activities from regular natural gas O&M activities. As a result, impacts no longer match up exactly with the impacts shown in the *Bay Area Operations and Maintenance Habitat Conservation Plan*. For example, CPSI G16, Pipeline Replacement, is now part of G11, Pipeline Replacement; CPSI G17 is now part of G7, Valve Maintenance—Replacement or Automation; and G18, CPSI Hydrostatic Testing, is part of G9, Pipeline Lowering.

^c Patrols are performed at either 6-month or 12-month intervals. Patrols may be performed on foot, with aircraft, or with vehicles. The activity size calculation assumes that the entire gas pipeline is patrolled at a minimum of once per year.

2.9 Overview of PG&E's Environmental Review Process

PG&E employs a large and diverse staff of environmental and regulatory compliance professionals whose primary roles are to ensure that activities are completed in compliance with applicable environmental and natural resource laws and regulations. This process is followed for all PG&E projects, including O&M, minor new construction, and larger projects, although it may be truncated or delayed for emergency projects. Environmental staff screens and reviews projects and activities when natural resources could be affected, and staff routinely identifies and prescribes standard BMPs that are implemented during PG&E's routine O&M activities.

Activities that would be covered by the proposed ITP are not necessarily subject to review under CEQA. First, no discretionary permit may be required for the work. If there is discretionary permitting, the operation, repair, maintenance, or minor alteration of existing facilities is considered a Class 1 exemption under CEQA Guidelines Section 15301(b). Replacement or reconstruction of existing structures with no or negligible expansion is considered as a Class 2 exemption under CEQA Guidelines Section 15302(c). Much of PG&E's wildfire prevention work is covered by the emergency exemption under CEQA Guidelines Section 15369. When there are exceptions to exemptions under CEQA Guidelines Section 15300.2, then formal CEQA review will be required.

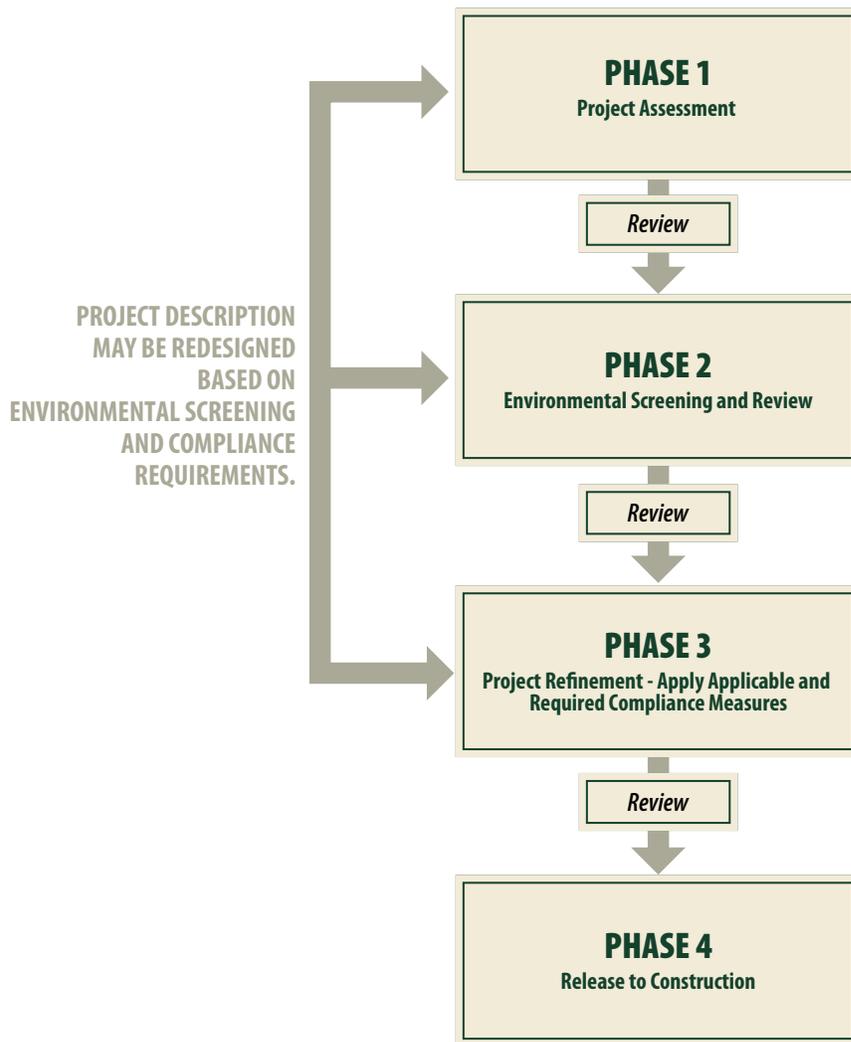
When required, environmental staff obtains ministerial and discretionary permits, and assists in implementing the corresponding permit conditions and BMPs. Sections 2.9.1 through 2.9.4 describe PG&E environmental staff practices for reviewing covered activities, with the goals of avoiding and minimizing effects on natural resources as a result of covered activities. To achieve these goals, PG&E's overall environmental screening processes can be categorized into four phases: project assessment, environmental screening and review, project refinement, and environmental release to construction (Figure 2-6).

2.9.1 Phase 1—Project Assessment

Covered activities arise out of an extensive multi-year planning process that factors in the age of the facilities, life of the equipment, equipment conditions, wear, outage history, and other considerations. During the first phase, PG&E land planners and engineers evaluate a given project and begin developing the project scope and description. The level of detail in the project description varies based on the activity size (e.g., less detailed for small projects and more detailed for large projects) and an initial assessment of the site conditions and constraints. Typically, a project description for a large capital improvement project, such as electric reconductoring or gas pipeline replacement project includes an evaluation of site access, temporary construction areas, construction footprint, construction schedule, and outage schedule, with the ultimate goal of assessing the environmental impacts and potential discretionary permits and environmental review requirements. The time required developing the project scope and description varies from 1 day to greater than 1 year, with some projects taking 2 years or more for assessment and design because of required field surveys.

2.9.2 Phase 2—Environmental Screening and Review

During the second phase, PG&E's staff of land planners, biologists, cultural resource specialists, vegetation management staff, and environmental field specialists conducts initial environmental screening and review of the proposed project and associated work activities. Multiple



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Figure 2-6
PG&E's Generalized
Environmental Screening Process

environmental screening processes are used by the various staff members supporting the project depending on the line of business and type of work. Land planners review ministerial and discretionary permits as well as land rights. Land planners, vegetation management inspectors, and biologists conduct riparian screening for vegetation management activities. During the screening process, projects and activities are evaluated for potential impacts on wetlands, on state and federal waters, on species protected by the CESA or federal Endangered Species Act and other special-status species, and on the habitats for these species. PG&E staff verifies that the necessary land rights are obtained for both temporary and permanent easements. The environmental permitting process may also begin in this phase. Table 2-5 outlines the anticipated permits and approvals that could be required. PG&E maintains a comprehensive geographic information system to evaluate projects, and routinely uses this system to evaluate all aspects of a project's scope or description.

PG&E's Environmental Team routinely evaluates the impacts of proposed projects and recommends the appropriate avoidance, minimization, or mitigation measures, based on best practices and permit requirements, as follows.

- For siting work locations, land use and planning practices to minimize impacts.
- Visual resource practices to lessen the visual impacts on a sensitive receptor.
- Biological resources evaluation and screening to minimize environmental impacts.
- Geology and soils practices to engineer facilities correctly and minimize erosion.
- Water quality practices to protect water quality.
- Cultural resources practices to protect cultural resources.
- Transportation and circulation practices to minimize traffic impacts.
- Noise and vibration practices to minimize noise and vibration impacts on sensitive receptors.
- Air quality practices to minimize air quality impacts and vehicle emissions.
- Hazardous materials practices to ensure the proper management, use, disposal, and storage of hazardous materials.
- Environmental justice practices to ensure minority communities are not adversely affected.
- Cleanup and restoration practices to ensure work areas are restored.

Detailed project measures PG&E uses to address these resources are described in Section 2.10, *Project Measures to Reduce Impacts*.

2.9.3 Phase 3—Project Refinement

During the third phase, based on the results of the environmental screening and review, PG&E staff (land planners, biologists, field crews, and other specialists) identify appropriate AMMs and BMPs to avoid and minimize impacts from the activity. These AMMs are added to the project work as required conditions. These AMMs include environmental protection measures, APMs, BMPs, FPs, and required compliance measures, such as permit conditions and mitigation measures. Based on this information and information from the second phase, the project may be refined or modified to minimize its impacts.

2.9.4 Phase 4—Environmental Release to Construction

The fourth phase is a release to construction review. PG&E staff implements an environmental release-to-construction (ERTC) process, or an equivalent procedure, to ensure projects and activities are reviewed for environmental constraints or restrictions, and all appropriate measures are included in the work plans. Work crews are given specific directions concerning permit conditions, BMPs, AMMs and other project requirements.

This screening process, in conjunction with PG&E's annual environmental awareness training and project-specific tailboard trainings, helps ensure that PG&E avoids and minimizes project impacts and complies with applicable environmental laws and regulations. Table 2-5 summarizes the range of permits and approvals that may be required for PG&E activities. While the ERTC process is primarily for large activities that would more likely have a potential environmental impact, many small activities are covered by PG&E's automated environmental assessment process or other line of business procedures.

PG&E frequently uses third party contractors to perform O&M and minor new construction work and is responsible for the performance of the work conducted by these contractors. PG&E requires third-party contractors to perform the following actions when applicable.

- Train employees and contractors performing O&M and minor new construction activities on the permit requirements that are applicable to their job duties and work.
- Enter into a new or revised contract with PG&E that contains enforceable provisions committing the third party to comply with provisions of the permit.

The ITP administrator would provide training and training materials for all PG&E crews and contractors to ensure compliance with environmental laws and regulations, including permit conditions associated with the ITP. The ITP administrator maintains a log of all personnel trained on the conditions of the ITP.

2.10 Project Measures to Reduce Impacts

PG&E implements a suite of measures to avoid and minimize its impacts. These measures consist of its general practices, including BMPs, the AMMs from its Bay Area O&M HCP, and requirements imposed by applicable federal, state or local laws. The general practices, including BMPs, and legal requirements are set forth in the applicable impact chapters. The AMMs from PG&E's Bay Area O&M HCP that are applicable to the ITP are below in Table 2-3. PG&E has also proposed APMs for this project, which are listed in Table 2-4. Finally, the project proposes to include one mitigation measure requiring compensatory mitigation for impacts on the covered species to ensure that any remaining impacts are less than significant under CEQA and to fully mitigate impacts on covered species under CESA.

Table 2-3. PG&E's Bay Area O&M HCP Avoidance and Minimization Measures Relevant to ITP

Field Protocols:	
FP-01	Annual worker training: Hold annual training on habitat conservation plan requirements for employees and contractors performing covered activities in the Permit Area that are applicable to their job duties and work.
FP-02	Vehicle parking: Park vehicles and equipment on pavement, existing roads, or other disturbed or designated areas (barren, gravel, compacted dirt).
FP-03	Access roads: 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	Off-road access and work sites: 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-05	Notice on conservation lands: Notify conservation land owner at least 2 business days prior to conducting covered activities on protected lands (state and federally owned wildlife areas, ecological reserves, or conservation areas); more notice will be provided if possible or if required by other permits. If the work is an emergency, as defined in Permittee's Utility Procedure ENV-8003P-01, PG&E will notify the conservation land owner within 48 hours after initiating emergency work. While this notification is intended only to inform the conservation land owner, PG&E will attempt to work with the conservation land owner to address landowner concerns.
FP-06	Pipe and culvert storage: Minimize potential for covered species to seek refuge or shelter in pipes and culverts. Inspect pipes and culverts, of diameter wide enough to be entered by a covered species that could inhabit the area where pipes are stored, for wildlife species prior to moving pipes and culverts. Immediately contact a qualified biologist if a covered species is suspected or discovered.
FP-07	Vehicle speeds: Vehicle speeds on unpaved roads will not exceed 15 miles per hour (mph).
FP-08	Prohibited activities at work sites: Prohibit trash dumping, firearms, open fires (such as barbecues), hunting, and pets (except for safety in remote locations) at work sites.
FP-09	Fire safety: During fire season in designated State Responsibility Areas, equip all motorized equipment with federally approved or state-approved spark arrestors. Use a backpack pump filled with water and a shovel and fire-resistant mats and/or windscreens when welding. During fire "red flag" conditions as determined by the California Department of Forestry and Fire Protection, curtail welding. Each fuel truck will carry a large fire extinguisher with a minimum rating of 40 B:C. Clear parking and storage areas of all flammable materials.
FP-10	Minimize work in potential habitat: Minimize the activity footprint and minimize the amount of time spent at a work location to reduce the potential for take of species.
FP-11	Erosion and control BMPs: Utilize standard erosion and sediment control best management practices (BMPs; pursuant to the most current version of Permittee's <i>Stormwater Field Manual for Construction Best Management Practices</i>) to prevent construction site runoff into waterways.
FP-12	Soil Stockpiles: Stockpile soil within established work area boundaries and locate stockpiles so as not to enter waterbodies, stormwater inlets, other standing bodies of water. Cover stockpiled soil prior to precipitation events.

Field Protocols:

FP-13	Open trenches or steel-walled holes: 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 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	Revegetating disturbed habitat: If the covered activity disturbs 0.1 acre or more of habitat for a covered species in grasslands, the field crew will revegetate the area with a commercial "weed free" seed mix.
FP-15	Refueling and spill prevention: 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. If refueling must be conducted closer to wetlands, construct a secondary containment area subject to review by an environmental field specialist and/or biologist. Maintain spill prevention and cleanup equipment in refueling areas.
FP-16	Buffer from water features: Maintain a buffer of 250 feet from the edge of vernal pools and 50 feet from the edge of wetlands, ponds, or riparian areas. 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 HCP administrator to minimize impacts by flagging access, requiring foot access, restricting work until dry season, or requiring a biological monitor during the activity.
FP-17	Tree removal: 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.

Hot Zone Species-Specific AMMs:

Hot Zone-1	California freshwater shrimp: Work will avoid pools and streams. Field crew will prevent any damage to the bank and streamside vegetation during placement or movement of materials on the stream banks. Streamside vegetation overhanging into pools or runs will, to the maximum extent practical, not be removed, trimmed, or otherwise modified.
Hot Zone-6	California tiger salamander: 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. Covered activities that cannot avoid vernal pool impacts will be completed when pools are clearly dry.

Species-Specific AMMs for Certain Activities:

Wetland-1	Vernal pools/species: Identify vernal pools and establish buffers. Maintain a buffer of 250 feet around vernal pools and vernal pool complexes. 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 biologist or HCP 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. Additional minimization measures may be implemented with prior concurrence from USFWS.
Wetland-2	Wetland, ponds and riparian areas/species: Identify wetlands, ponds, and riparian

Field Protocols:

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 biologist or HCP 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. Additional minimization measures may be implemented with prior concurrence from USFWS.

PG&E Vegetation Management Best Management Practices (BMPs)

BMP 1	Environmental orientation (FP-01): PG&E employees and vegetation management contractors performing Vegetation Management activities shall receive ongoing environmental orientation. Orientation shall include review of environmental laws and guidelines that must be followed by all PG&E employees and contract vegetation management personnel to reduce or avoid impacts on covered species during vegetation management activities.
BMP 2	Notice to land managers (FP-05): Notify federal and state land managers of pending work, and schedule annual meetings with these land managers, as requested. Notify local agency land managers of pending work as requested, or as sensitive issues arise.
BMP 3	Fire safety equipment in SRAs (FP-09): During fire season in designated State Responsibility Areas, motorized equipment shall have federally approved or state-approved spark arrestors; all vehicles shall be equipped with firefighting tools as appropriate and in accordance with all applicable laws, rules, regulations, orders, and ordinances.
BMP 4	Fire safety Project Activity Level: Contractor shall be responsible for checking the daily Project Activity Level (a measure of fire weather conditions that, at certain levels, restricts activities otherwise permitted) during fire season when working on U.S. Forest Service (USFS) property.
BMP 5	Smoking prohibited: Smoking shall not be permitted during fire season, except in a barren area or in an area cleared to mineral soil at least 3 feet in diameter. Under no circumstances shall smoking be permitted during fire season while employees are operating light or heavy equipment, or walking or working in grass and woodlands.
BMP 6	Work site prohibited activities (FP-08): Hunting, firearms, portable stoves, open fires (such as barbecues) not required for the vegetation management activity, and pets (except for safety in remote locations) shall be prohibited in vegetation management work activity sites. All trash, food items, and human-generated debris shall be properly contained and/or removed from the site.
BMP 7	Vehicle speed (FP-07): To avoid hitting or crushing wildlife in the roadway and to avoid generating dust, vehicles will not exceed a speed limit of 15 miles per hour on low-use unpaved roads such as agricultural field roads, transmission right-of-way roads, and non-system numbered USFS roads with locked gates. Travel on high-use unpaved roads such as USFS logging roads shall be as slow as local traffic conditions allow.
BMP 8	Damage repair: All roads, fences, and structures damaged as a result of vegetation management operations shall be repaired and reported to the work group supervisor and the PG&E vegetation management representative. All gates shall be left open if found open or locked if found locked.
BMP 9	Parking and access (FP-02, 03): Vehicles and equipment shall be parked on pavement, existing roads, and previously disturbed areas to the extent practicable.

Field Protocols:

	In environmentally sensitive areas, vehicle access to work sites shall be restricted to existing roadways.
BMP 10	Fueling and Spills (FP-15): When practical, fuel vehicles and equipment offsite. If it is necessary to fuel onsite the following precautions shall be taken: No vehicles or equipment shall be refueled within 250 feet of vernal pools, and 100 feet of a watercourse, ditch, wetland, or a pond, unless a bermed and lined refueling area is constructed. The fueling operator must stay with the fueling operation at all times. Do not top off tanks. Spill containment and cleanup materials must be available. Spills must be immediately cleaned up and contaminated materials disposed of properly. Fueling trucks and operators must have all necessary permits, licenses and training. Any spills must be reported immediately to supervisor and PG&E vegetation management representative.
BMP 11	Lop and scatter debris management: Debris that remains from lop and scatter operations shall be left at a height no greater than 18 inches.
BMP 12	Erosion control (FP-11): After vegetation management activities, if the amount of bare soil exposed in one location exceeds 0.1 acre, then erosion control measures shall be implemented. These measures may include straw mulching, seeding, and use of straw wattles. (No rice straw will be used around wetlands containing vernal pools.)
BMP 13	Vernal pool avoidance (FP-16, Wetland-1): Avoid operating vehicles and equipment within 250 feet (or the maximum distance practicable) of the edge of a vernal pool and, to the extent practicable, avoid walking through a vernal pool.
BMP 14	Elderberry longhorn beetle habitat: When routine vegetation management activities are conducted in an area of potential valley elderberry longhorn beetle habitat, a qualified individual will survey for the presence of elderberry plants within a minimum of 20 feet from the work site within the utility easement, ROW, franchise, or license, and shall note in vegetation management work request documents to avoid or minimize potential impacts on elderberry plants. If elderberry plants have one or more stems 1 inch or more in diameter at ground level, additional measures identified in the Valley Elderberry Longhorn Beetle Conservation Plan shall be implemented. Otherwise, no additional minimization, avoidance, or protective measures are required.
BMP 15	Northern spotted owl (FP-18): When vegetation management staff is aware of known active northern spotted owl nests through either the CNDDB viewer or property owner information, PG&E will implement the following. If the work is within 0.25 mile of a known active nest(s), the work will be performed either during a limited operating period of August 1 to January 31, or, if the work falls within the breeding period and is within 300 feet of the nest, the PG&E Avian Protection Program manager will be contacted for guidance and work will be performed as directed by the Avian Protection Program manager. If the work is scheduled during breeding season and if the work is 300 feet to 1/4-mile from the nest, work will be performed using hand tools (not chainsaws) or hydraulic pruners if the work is accessible from a regularly trafficked roadway. If the work cannot be performed with hand tools or hydraulic tools, then vegetation management staff will contact the Bird Program manager for guidance. In locations where known active nests occur, vegetation management staff will increase pruning distances from the conductors or pursue tree/brush removals in order to minimize the number of return visits to the area.
BMP 16	Migratory Birds: All PG&E employees and contractors shall follow the Vegetation Management Migratory Bird Process, when applicable to vegetation management activities, to comply with Migratory Bird Treaty Act.

Field Protocols:

BMP 17	Sudden Oak Death: When performing work in counties subject to the Sudden Oak Death quarantine, Vegetation Management Sudden Oak Death Protocols must be followed.
BMP 18	Environmental screening on non-EV activities: Vegetation management personnel shall verify that the environmental screening process was followed prior to conducting vegetation management activities associated with capital jobs and other non-vegetation management work. Vegetation management personnel shall follow any environmental protection measures identified for the job.
BMP 19	Cultural resources: If cultural resources are found (e.g., old bottles, cans, buildings), they shall be left in place and undisturbed. If it is necessary to move or disturb them to complete the work, or if human remains are found, stop work and contact the PG&E vegetation management representative.
BMP 20	Air Resources Board equipment permitting: All equipment shall be permitted by the Air Resources Board as required, including portable equipment or new stationary equipment with internal combustion engines greater than 50 Brake HP, (e.g., tow-behind generators, chippers, and truck- or trailer-mounted air compressors and pumps).
BMP 21	Vehicle idling: When working within 50 feet of residences or government or commercial buildings, engine idling, noise, and odor should be minimized to the extent practicable. Also adhere to the restrictions noted in the Commercial Vehicle Idling Tailboard when working on school grounds or within 100 feet of a school (K-12 and below, including play areas and sports fields, and day care facilities).
BMP 22	Contractor communication: Contractor shall have the ability to communicate quickly with their supervisor and/or PGE. This can be done by having a working cell phone or radio on the job site at all times or by identifying the closest area of cell phone reception or closest public telephone and familiarizing all employees with that location.
BMP 23	Accident response: If an environmental protection incident occurs, such as accidental introduction of substances into waterways or wetlands, accidental taking of an endangered species, or hazardous material spills, etc., call your supervisor and the PG&E vegetation management representative immediately.
BMP 24	Self-propelled mechanical equipment: Vegetation removal shall be completed without the use of self-propelled mechanical equipment (e.g., Hydro-ax, Brontosaurus, Slashbuster).
BMP 25	Work area vegetation (FP-10): The disturbance or removal of vegetation within the work area shall not exceed the minimum necessary to complete operations, subject to other public and health and safety directives governing the safe operations and maintenance of electric and gas facilities. Precautions shall be taken to avoid damage to non-target vegetation.
BMP 26	Vegetation debris disposal: Cleared or pruned vegetation, grass clippings and woody debris (including chips) shall be disposed of in a legal manner. All cleared vegetation and debris, grass clippings and woody debris (including chips) shall be removed from any wetland, ditch, pond, or stream and placed or secured where they cannot re-enter the watercourse.
BMP 27	Vegetation removal below conductors: Vegetation that at mature height does not pose a threat to the conductors shall not be removed, unless the removal is required to maintain compliance with California Public Resource Code Section 4292 (pole clearing).
BMP 28	Vehicle leak protection: Any vehicles driven and/or operated within or adjacent to

Field Protocols:	
	streams shall be checked and maintained daily to prevent leaks of materials that, if introduced to the water, could be harmful to aquatic life.
BMP 29	Vehicle access (Plant-02): Vehicle access to streams and wetlands shall be limited to existing roads and crossings.
BMP 30	Work activities near streams, wetlands, or on saturated soils: When possible, activities near streams, wetlands, or on saturated soils shall be conducted during the dry season (generally May 15–October 15) or during periods of minimum flow. If it is not possible to perform the work in the dry season, perform rainy season work during dry spells between rain events.
VM Herbicide BMPs	
BMP 31	Herbicides use (Plant-01): All herbicide applications performed by vegetation management contractors shall be made in compliance with label requirements as well as all appropriate federal, state, and local laws, rules, and regulations. Note: Use of herbicides and pesticides is not covered activities under the HCP.
BMP 32	Herbicides type: Only herbicides registered by the federal Environmental Protection Agency and California Environmental Protection Agency shall be applied.
BMP 33	County Agricultural Commissioner information: During the performance of Vegetation Management ROW Enhancement Operations, operator ID numbers and Site ID numbers shall be obtained for each facility as required by the County Agricultural Commissioner.
BMP 34	Pest Control Recommendations: Each application shall be covered by a written <i>Pest Control Recommendation</i> .
BMP 35	Pest Control Advisor oversight: A Licensed Pest Control Advisor shall oversee all herbicide and tree growth regulator applications. A qualified applicator shall supervise contractors making herbicide and tree growth regulator applications for vegetation management.
BMP 36	County Agricultural Commissioner inspection: County Agricultural Commissioners shall be invited to inspect the applicator and application operations when appropriate.
BMP 37	Herbicide use reporting: The Pest Control Business License holder (applicator) shall report herbicide use monthly to the County Agricultural Commissioner.
BMP 38	Annual worker safety training (clearing and herbicides): Contractor shall conduct annual worker safety training sessions for all contractor employees involved in the herbicide applications and manual/mechanical clearing. As requested, documentation of this training shall be on file with the PG&E representative who administers their contract.
BMP 39	Selective application of herbicides (Plant-01): Selective application techniques should be used for Vegetation Management ROW Enhancement Operations wherever practical so that desirable vegetation is not adversely affected.
BMP 40	Herbicide buffer widths: Buffer widths shall apply pursuant to <i>Vegetation Management Herbicide Buffer Widths to Protect Non-Target Organisms</i> as identified on product packaging.
BMP 41	Use in watercourse protection zones: Mixing and loading of herbicides is prohibited in watercourse protection zones (see BMPs 60 and 61 for watercourse protection zones).
BMP 42	Spill protection and cleanup: Applicator shall have a spill prevention and cleanup kit in their vehicle and at the job site.
BMP 43	Backpack or light-capacity power equipment: Backpack equipment or light-capacity power equipment shall be used for all directed foliar applications.
BMP 44	Disposal of empty herbicide containers: Empty herbicide containers shall be taken offsite, triple rinsed, and disposed of in a proper manner.

Field Protocols:	
BMP 45	Minimum operating pressures: Minimum operating pressures shall be used. Nozzle tips that produce a coarser droplet should be used to minimize drift.
BMP 46	Transport of pesticides: Pesticides shall not be transported in the same compartment with persons, food, or feed. Pesticide containers shall be secured to the vehicle during transportation in a manner that shall prevent spillage into or off the vehicle.
BMP 47	Contractor written training program: The contractor shall have a written training program for employees who handle pesticides. The written program must describe the materials and the information that shall be provided and used to train the employees.
BMP 48	Contractor employee training: Training must be completed before an employee is allowed to handle any pesticide and continually updated to cover any new pesticides that shall be handled. Training must be repeated at least annually thereafter.
BMP 49	Inclement weather precautions: These special precautions shall be observed during periods of inclement weather: <ul style="list-style-type: none"> • Applications shall not be made in, immediately prior to, or immediately following rain when runoff could be expected. • Applications shall not be made when wind and/or fog conditions have the potential to cause drift. • Basal bark applications shall not be made when stems are wet with rain, snow, or ice.
Other VM BMPs	
BMP 50	CNDDDB search: Prior to any ROW clearing project or any enhancement project, the CNDDDB shall be checked for any records of threatened, endangered, or sensitive species.
BMP 51	Flagging and avoiding CNDDDB resources: Any locations identified through the CNDDDB search shall be flagged and appropriate avoidance measures shall be put in place. Tailboards shall be held before work begins.
BMP 52	Flagging and avoiding sensitive habitats (Wetland-01, 02): Sensitive habitats such as meadows, riparian areas, wetlands, vernal pools, and serpentine outcrops shall be flagged and appropriate avoidance measures shall be put in place. Tailboards shall be held before work begins.
BMP 53	Existing roads: All existing roads shall be kept open and erosion control measures re-installed after the project is completed or during inclement weather.
BMP 54	Clearing under towers, poles and guy wires: Contractor shall clear all vegetation 10 feet around and under all towers/poles and guy wires. Only manual clearing work can occur within the above-mentioned 10 feet. No mechanical equipment shall be used within 10 feet of the above-mentioned structures. All vegetation cut under and within 10 feet of the towers shall be removed from the area and mulched to a depth not greater than 18 inches.
BMP 55	Mowing debris mulching: All debris that remains from mowing operations shall be mulched to a depth not greater than 18 inches.
BMP 56	Tree removal: Trees greater than 12 inches in diameter at breast height shall be hand-felled and then the top and limbs removed and the bole decked on the side of the ROW.
BMP 57	Flagging guy wires: Contractor shall flag all guy wires 200 feet in advance of working an area, using bright colored flagging (a minimum of three flags per wire).
BMP 58	Contractor water source: Contractor shall have a water source containing a minimum of 300 gallons of water and 250 feet of 1-inch hose onsite at all times during operation. The water source must either be selfpropelled or always attached to a vehicle capable of moving it to where it is needed. Where access/terrain allows,

Field Protocols:

	contractor's water source must always be within 500 feet of the mowing/cutting operation. Excess water shall be disposed of in accordance with all laws and regulations.
BMP 59	Fire extinguishers in mowers: Each mower shall have a minimum of a 10-pound, Class A, B, C fire extinguisher mounted in the cab.
BMP 60	<p>Fire safety measures: Contractor must stay onsite for one-half hour after mowing operations end for the day to ensure fire safety. When extreme fire levels are reached, the following extra precautions must be implemented immediately.</p> <ul style="list-style-type: none"> • An additional support person shall be dedicated to follow the mower with an Indian Back Pump and McLeod. • Mowing hours will be reduced to the hours of 5:00 a.m. through 12:30 p.m. • The use of a humidity meter shall occur. A reading of less than (<) 20% humidity shall stop the mowing operation for the day. Readings shall be taken every 3 hours during operation.
BMP 61	<p>Watercourse protection: Watercourse protection zones shall be marked by the PG&E representative in charge with brightly colored flagging prior to the start of any mowing/timber operation. Water classes are defined by the California Forest Practice Rules (14 California Code of Regulations Section 916.5). The following watercourse protection zone clearances must be maintained at all times.</p> <ul style="list-style-type: none"> • Class 1 and 2 watercourses with a slope < 30%: No heavy equipment within 50 feet. • Class 1 and 2 watercourses with a slope > 30%: No heavy equipment within 75 feet. • Class 3 watercourse: No heavy equipment within 25 feet. • Unclassified watercourses with a defined channel: No heavy equipment within 25 feet. <p>No mowing shall be allowed within the above distances. Trees within the above distances shall be removed manually. Brush and other small vegetation shall be left for a shade canopy on the watercourse. The actual width of the watercourse protection zone may vary based on a PG&E representative's judgment in the field. All impaired watercourses and their protection zone clearances shall be identified before the project begins.</p>
BMP 62	<p>Water quality, soil resources and riparian vegetation protection: The following protection measures are designed to prevent adverse impacts on water quality, help protect soil resources, and minimize the loss of riparian vegetation.</p> <ol style="list-style-type: none"> 1. Plants in watercourse protection zones that do not pose an imminent or clearly foreseeable future threat to conductors shall not be removed. 2. To help prevent erosion and soil displacement, exclusion zones may be increased in areas with steep slopes or highly erodible soils. 3. Leave at least 50% soil cover (i.e., mulch or vegetative ground cover) for erosion control in watercourse protection zones.

Note: The HCP identified in parentheses where PG&E field protocols or AMMs are similar or overlap. This list shows the same identification under the BMP number.

Table 2-4. Applicant Proposed Measures and Mitigation Measure

Mitigation Measure	
Aesthetics	
APM AES-1: Restore disturbed areas	Previously vegetated areas greater than 0.10 acre that are disturbed by the project will be recontoured to their approximate original conditions and reseeded with an appropriate native seed mix to minimize scarring.
APM AES-2: Protect scenic vistas and scenic highways	For minor new construction facilities larger than 1.0 acre that would have a substantial adverse effect on a scenic vista or views, a designated scenic highway or a scenic public viewpoint, the facility will be relocated to an area not visible from the scenic vista, designated state scenic highway, or scenic public viewpoint. If a reasonably feasible alternate location is not available, implement APM AES-5 or 6, as appropriate to the facility, to reduce substantial adverse effects to less-than-significant levels by design or screening measures. PG&E will consult with local jurisdictions and parks agencies as appropriate to discuss reasonably-feasible options regarding location and visual screening.
APM AES-3: Shield temporary construction lighting	If temporary construction lighting is required, PG&E will use shielded construction light fixtures, or otherwise screen or direct lighting away from nearby residences except in the cases of emergency.
APM AES-4: Apply minimum lighting standards	All artificial outdoor lighting will be limited to lighting for safety and security, and designed using Illuminating Engineering Society's design guidelines, International Dark-Sky Association-approved fixtures, or other industry standards that address lighting impacts. Lighting above ground level will generally be directed downward or inward, where consistent with safety concerns, and shielding will be utilized, where needed, to minimize light scatter off-site. Light fixtures will have non-glare finishes that will not cause reflective daytime glare. Lighting will be designed for energy efficiency, where feasible.
APM AES-5: Reduce visibility of new structures in sensitive landscapes	<p>Within sensitive landscapes, PG&E will design structures associated with minor new construction to minimize the impact on the existing visual character and quality associated with the introduction of new structures in sensitive landscapes, such as in, along, or near national, state, or local parks, recreation areas, forests, scenic routes, vista views, or similar. To the extent feasible and consistent with safety, visible pipelines, guardrails, and substation and switching station infrastructure within such areas will be of a non-reflective material that helps surfaces to blend better with the surroundings.</p> <p>In scenic or visually sensitive areas, PG&E will implement aesthetic design features in new concrete or shotcrete buildings that are visible to the public. These features may include mimicking natural material (e.g., stone or rock surfacing) or integral color, in the same theme as the surrounding area, to reduce visibility and to better blend with the landscape.</p>
APM AES-6: Implement landscape buffers or other screening for minor new construction	Landscaping treatments may be utilized to help to maintain the local character, improve aesthetics, create a visual buffer between sensitive viewers and minor new construction facilities, and diminish the visual scale of proposed features to reduce substantial adverse aesthetic impacts to a less than significant level. Other measures, such as installing prefabricated walls or fencing, may also be utilized to reduce the visual impacts of minor new construction that is visible to the public. Drought-resistant native trees, shrubs, and/or an herbaceous understory shall be used in such landscaping to preserve the visual integrity of the landscape, provide habitat conditions suitable for native vegetation and wildlife, and ensure that a maximum number and variety of well-adapted plants are maintained. PG&E shall adhere to the following practices in implementing landscape or other screening buffers for minor new construction

Mitigation Measure

where necessary to reduce substantial adverse aesthetic impacts:

- Design and implement low impact development (LID) measures that disperse and reduce runoff by using such features as vegetated buffer strips between paved areas that catch and infiltrate runoff, bioswales, cisterns, and detention basins. In addition, pervious paving shall be evaluated for use in the proposed project to improve infiltration and to reduce the amount of surface runoff from entering waterways and the stormwater system. However, LID measures shall not be used where infiltration could result in adverse environmental effects.
- Drought-resistant vegetative accents and screening shall be considered to aid in a perceived reduction in the scale and mass of large built features in visually sensitive areas, while accentuating the design treatments that shall be applied to built features. Plant selection shall be based on the ability to screen built features and provide aesthetic accents.
- The construction contractors shall use native grass and wildflower seed in erosion control measures where such a measure will improve aesthetics. Species shall be chosen that are native and indigenous to the area and for their appropriateness to the surrounding habitat. If not appropriate to the surrounding habitat, wildflowers should not be included in the seed mix.
- Under no circumstances shall any invasive plant species be used at any location.
- Maximize the use of planting zones that do not need irrigation, such as seeding with a native grassland and wildflower meadow mix, which reduce or eliminate the need for a permanent irrigation system.
- A prefabricated wall or fencing may be installed as appropriate to provide partial screening of the natural gas or expanded electric substation facilities. The design of the wall or fence will be comparable to or complement the existing substation screening or nearby land uses.
- No screening measures shall degrade or eliminate scenic vistas or be designed in a manner that negatively affects views from scenic roadways. In addition, these measures shall not be implemented where implementation would constitute an adverse effect upon sensitive habitats or sensitive species.

Agriculture and Forestry Resources

APM AG-1: Coordination with farmers, and ranchers regarding construction activities

Coordination shall include the following:

- Advance Notice: Prior to construction, PG&E shall give at least 30 days advance notice of the start of construction-related activities to farmers and ranchers. Notification shall be provided by mailing notices to all properties within 300 feet of the project route. The announcement shall (1) describe where and when construction is planned, and (2) provide a point of contact for complaints related to construction activities.
 - PG&E shall work with farmers and ranchers to schedule project work, to the extent feasible, around their harvest and planting periods in order to minimize disruptions to agricultural operations. If PG&E does not have specific access rights, access across active fields shall be negotiated with the farmer and/or landowner in advance of any construction activities. In areas containing permanent crops (i.e., grape vines, orchard crops, etc.) that must be removed to gain access to pole
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Mitigation Measure

sites for construction purposes, the PG&E shall provide fair market compensation to the farmer and/or landowner.

Air Quality

APM AG-1: Implement Dust Control Best Management Practices

PG&E will implement control measures to reduce construction-related fugitive dust. The following measures are based on BAAQMD's CEQA guidelines and are in conformance with fugitive dust control recommendations from the NSCAPCD and YSAQMD.

- All exposed surfaces will be watered at a frequency adequate to maintain minimum soil moisture of 12%. Moisture content can be verified by lab samples or moisture probe.
 - All haul trucks transporting soil, sand, or other loose material offsite will be covered.
 - All visible mud or dirt track-out onto adjacent public roads will be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
 - All vehicle speeds on unpaved roads will be limited to 15 miles per hour (mph).
 - All roadways, driveways, and sidewalks to be paved will be completed as soon as possible. Building pads will be laid as soon as possible after grading unless seeding or soil binders are used.
 - All excavation, grading, and/or demolition activities will be suspended when average wind speeds exceed 20 mph.
 - Wind breaks (e.g., trees, fences) will be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50% air porosity.
 - Vegetative ground cover (e.g., fast-germinating native grass seed) will be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.
 - The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time will be limited. Activities will be phased to reduce the amount of disturbed surfaces at any one time.
 - All trucks and equipment, including their tires, will be washed off prior to leaving the site.
 - Site accesses to a distance of 100 feet from the paved road will be treated with a 6- to 12-inch compacted layer of wood chips, mulch, or gravel.
 - Sandbags or other erosion control measures will be installed to prevent silt runoff to public roadways from sites with a slope greater than 1%.
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Biological Resources

APM BIO-1: Prevent or minimize spread of invasive weeds

The following would be implemented to prevent the spread of invasive weeds during all phases of covered activities, as appropriate:

- During covered activities involving ground disturbance, mud and/or accumulated soils would be removed from equipment and vehicles, to the extent feasible. Vehicles and equipment would be cleaned or washed before entering a new work site.
 - Vehicles would be stored in paved or cleared areas whenever possible.
 - Certified weed-free mulch, straw, hay bales, or equivalent materials would be used where necessary for covered activities.
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APM BIO-2: Protect covered wildlife encountered while performing covered activities	<p>Any covered wildlife species encountered during the course of a covered activity would be allowed to leave the area unharmed or, if conditions warrant, moved out of immediate danger. Encounters with a special-status species would be reported to a project biologist and/or PG&E Environmental staff. Project biologists/PG&E Environmental staff members would maintain records of all covered wildlife species encountered during permitted activities. Encounters with covered wildlife species would be documented and provided to CDFW in an annual report. If a project biologist encounters a covered wildlife species, the following information would be reported for each species:</p> <ul style="list-style-type: none"> • The locations (i.e., narrative, vegetation type, and maps) and dates of observations. • The general condition of individual health (e.g., apparent injuries). • If the species is moved, the location where the species was captured and the location where it was released.
APM BIO-3: Design and site minor new construction projects to avoid sensitive areas	<p>New, permanent facilities as part of minor new construction activities would be sited and designed to avoid impacts on sensitive vegetation types, sensitive natural communities, and unique plant assemblages, as well as occupied habitat and suitable habitat for special-status species. If impacts on these areas cannot be avoided, PG&E will determine if additional permitting is required to conduct the work and obtain the required permits (e.g., LSAA). If impacts are expected on covered species' habitat, Mitigation Measure BIO-1 (MM BIO-1) will be implemented to mitigate for habitat impacts.</p>
APM BIO-4: Avoid special-status plants	<p>Occurrences of special-status plant species would be avoided to the extent practicable and would include performance of project activities in special-status plant habitat after senescence. When special-status plant species cannot be avoided, PG&E will follow the requirements of California Fish and Game Code Sections 1913(b) and 1913(c) concerning notification to CDFW and providing an opportunity to salvage such species.</p>
APM BIO-5: Erect wildlife exclusion fencing	<p>Prior to construction or commencement of any activity that, in the absence of fencing, is likely to adversely affect covered special-status species, exclusion fencing for the species would be installed around the perimeter of the activity footprint,³ or otherwise to ensure species protection.</p> <p>Any exemption or modification of exclusion fencing requirements would be based on the specifics of the activity and the site-specific population or habitat parameters. Sites with low population density and disturbed, fragmented, or poor habitat would likely be candidates for fencing requirement exemptions or modifications. Substitute measures, such as onsite biological monitors in the place of the fencing requirement, would be performed as appropriate.</p> <p>Prior to fencing, the project biologist would ensure (to the extent possible) that covered special-status species are absent from the activity footprint. After an area is fenced, PG&E is responsible for ensuring that covered special-status species fencing is maintained and opened/closed appropriately during project activities and regularly inspected for damage, which would be repaired as soon as possible.</p>
APM BIO-6: Protect	<p>All vegetation clearing and ground-disturbing activities would be conducted outside of the nesting season (generally March 1 to August 31) to the extent</p>

³ An activity footprint is the area of ground disturbance associated with the pre-construction, construction, operation, implementation, maintenance, and decommissioning of an activity, including associated linear and non-linear components (e.g., staging areas, access routes and roads, gen-ties, pipelines, other utility lines, borrow pits, disposal areas). The footprint may also be considered synonymous with the covered activity site.

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nesting birds	feasible. If this is not feasible, a biologist or qualified ⁴ individual would determine if pre-construction surveys, nest buffers, and/or monitoring are needed. Nesting bird surveys would be conducted by a qualified biologist and would be scheduled to occur within a timeframe prior to construction that is suitable for the detection of recently established nests. If active nests containing eggs or young are found, the qualified biologist would establish an appropriate nest buffer in accordance with PG&E's Nesting Bird Management Plan. Nest buffers would be species-specific and can range from 15 to 100 feet for passerines and 50 to 300 feet for raptors, depending on the planned activity's level of disturbance, site conditions, and the observed bird behavior. Established buffers would remain until the young have fledged or the nest is no longer active. Active nests would be periodically monitored until the young have fledged or all construction is finished.
APM BIO-7: Protect breeding and pupping bats	When feasible, activities directly affecting bat roosting habitat would be conducted outside of the bat breeding/pupping season (generally, April through mid-September). If work that would affect known bat breeding sites must be done in the bat breeding/pupping season, PG&E would evaluate known or suspected breeding/roosting sites (e.g., bridges, mines, caves, trees with hollows, palm trees, snags, buildings, long and dark culverts, rock outcrops, dense tree canopies, and flaking tree bark). If roosting bats are detected, PG&E would avoid conducting construction activities that may directly affect the active roost site, including the following: <ul style="list-style-type: none"> As necessary, an exclusionary buffer would be maintained around active roosts. The size of the buffer may be modified at the discretion of the qualified biologist based on the species' sensitivity to disturbance from O&M activities and the status of the roost. As necessary, a qualified biologist would monitor active roost site buffers during O&M activities to determine if roosting activity is influenced by noise or vibrations until a qualified biologist has determined if the young bats are volant (i.e., able to fly).
APM BIO-8: Avoid Alameda whipsnake in core habitat	Prior to the start of construction in core habitat, the work area will be surveyed for Alameda whipsnakes by a biologist. If a whipsnake is encountered during construction, activities that present a risk to the snake will stop until the snake has moved out of the construction area.
MM BIO-1: Acquire, preserve, and/or enhance suitable habitat for mitigation	PG&E will acquire, preserve, and/or enhance potential habitat, or purchase bank credits for California freshwater shrimp, California tiger salamander, and Alameda whipsnake to fully mitigate for the potential take of these species. Habitat mitigation will be provided for covered species based on acreages of estimated and actual habitat losses in consistent with <i>jump start</i> ⁵ and <i>stay ahead</i> ⁶ mitigation approaches. Mitigation for habitat disturbance from temporary and permanent impacts would be provided at the following ratios: <ul style="list-style-type: none"> 3:1 ratio for permanent impacts on modeled habitat for California freshwater shrimp, California tiger salamander (both Central California and Sonoma County DPS), and Alameda whipsnake (3 acres mitigated for every 1 acre permanently affected).

⁴ A qualified individual would have experience conducting nesting bird surveys and would be able to accurately identify nesting behavior.

⁵ Land acquisition, preservation, and/or habitat enhancement efforts that are made in advance of permit issuance.

⁶ PG&E will "stay ahead" of its mitigation obligations by calibrating the mitigation credits that may be necessary for future years based on information from the Annual Report for the prior year.

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- 1:1 ratio for temporary impacts on modeled habitat for California freshwater shrimp and California tiger salamander (Sonoma County DPS).
- 1:1 ratio for temporary impacts on modeled breeding habitat for California tiger salamander (both Central California and Sonoma County DPS).
- 0.5:1 ratio for temporary impacts on modeled upland habitat for California tiger salamander (Central California DPS) (0.5 acres mitigated for every 1 acre temporarily affected) when mitigation is provided according to *jump start* and *stay ahead* provisions. For the first 5 years, mitigation that is not in place prior to any impacts will be at a 1:1 ratio.
- 0.5:1 ratio for temporary impacts on non-core (movement or dispersal) habitat for Alameda whipsnake (0.5 acres mitigated for every 1 acre temporarily affected) when mitigation is provided according to *jump start* and *stay ahead* provisions. For the first 5 years, mitigation that is not in place prior to any impact will be at a 1:1 ratio.

1:1 ratio for temporary impacts on Alameda whipsnake core or perimeter core habitat. By March 31 of each year, PG&E would submit an annual report to CDFW summarizing the mitigation ratios and credits that were debited from its mitigation credit portfolio for covered activities during the previous calendar year, as well as detailed information from APM BIO-2.

Cultural Resources

APM CR-1: Inventory, evaluate, and protect cultural resources

As part of the screening process described in Chapter 2, Project Description, PG&E will continue to review historical and archaeological resources that were previously recorded, as well as structures that meet the 50-year threshold throughout the 30-year duration of ITP. If any resources have the potential to be eligible for listing on the CRHR or NRHP, PG&E will determine whether project activities will affect the resources and, if the activities would cause a substantial adverse change in the resource, a qualified cultural specialist will coordinate with PG&E, the landowner, and California Department of Fish and Wildlife (CDFW) on the appropriate steps for evaluation, protection, documentation and/or preservation of the resource.

APM CR-2: Provide worker training

The following procedures will be implemented prior to commencement of any project-related construction activities:

All PG&E, contractor, and subcontractor project personnel will receive training regarding:

- Appropriate work practices necessary to effectively implement the APMs and to comply with the applicable environmental laws and regulations
- The potential for exposing subsurface cultural resources and paleontological resources
- How to recognize possible buried cultural and paleontological resources
- Site-specific physical conditions to improve hazard prevention and, if applicable, a review of the stormwater pollution prevention plan, which will also address spill response.

This training will include a presentation of:

- Procedures to be followed upon discovery or suspected discovery of historic
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APM CUL-3: Inadvertent discovery of previously unidentified cultural resources	<p>or archaeological materials, including Native American remains and their treatment</p> <ul style="list-style-type: none"> • Procedures to be followed upon discovery or suspected discovery of paleontological resources • Procedures to be followed for spill and other hazard prevention • Actions that may be taken in the case of violation of applicable laws <p>The following procedure will be employed if a previously undocumented cultural resource is encountered during construction:</p> <ul style="list-style-type: none"> • All work within 100 feet (30 meters) of the find will be halted or redirected by the construction foreman and protective barriers or flagging will be installed along with signage identifying the area as an “environmentally sensitive area.” Entry into the area will be limited to PG&E-approved/qualified CRSs, PG&E, and other authorized personnel. • PG&E and the CPUC will be notified immediately. • A qualified archaeologist will document the resource and coordinate with PG&E, the landowner, and the CPUC on the appropriate steps for evaluation and preservation of the find. The level of effort will be based on the size and nature of the resource, as determined by the archeologist and approved by the CPUC. • No work will occur within the environmentally sensitive area until clearance has been granted by the archaeologist or PG&E and the CPUC. Environmentally sensitive area flagging and signage will only be removed when authorized by PG&E or the archaeologist and the CPUC.
APM CUL-4: Discovery of human remains	<p>The following procedures will be implemented in the event of the discovery of human remains, in compliance with California law, including, but not limited to, the following provisions: CEQA Guidelines Section 15064.5(e); Public Resources Code Sections 5097.94, 5097.98, and 5097.99; and California Health and Safety Code Section 7050.5:</p> <p>Work in the immediate area of the find will be halted and the PG&E archaeologist, County Coroner, and CPUC will be notified immediately. Work will remain suspended until the Coroner can assess the remains. In the event the remains are determined to be prehistoric in origin, the Coroner will notify the NAHC, which will then identify an MLD. The MLD will consult with PG&E’s archaeologist within 48 hours of notification to determine further treatment of the remains.</p>
APM CUL-5: Undiscovered potential tribal cultural resources	<p>The following procedure will be employed (after stopping work and following the procedure for determining eligibility in APM CUL-2) if a resource is encountered and determined by the project’s qualified archaeologist to be potentially eligible for the CRHR or a local register of historic resources and is associated with a California Native American Tribe(s) with a traditional and cultural affiliation with the geographic area of the proposed project:</p> <ul style="list-style-type: none"> • The project’s qualified archaeologist will notify the CPUC for appropriate action. PG&E will assist the CPUC if needed to identify the lead contact person for the California Native American Tribe(s) potentially associated with the cultural resource and with a traditional and cultural affiliation with the geographic area of the proposed project. The CPUC will contact the lead

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contact person to set up a meeting with PG&E and the CPUC.

- The project's qualified archaeologist will participate with the CPUC in discussions with the California Native American Tribe(s) to determine whether the resource is a TCR as defined by Public Resources Code Section 21074, and the tribe(s)' preferred method of mitigation, if the resource is determined to be a TCR.

If no agreement can be reached for mitigation after discussions with the California Native American Tribe(s) or it is determined that the tribe(s)' preferred mitigation is not feasible, PG&E will consult with the CPUC and implement one of the example mitigation measures listed in Public Resources Code Section 21084.3(b), or other feasible mitigation.

Geology and Soils

APM GEO-1: Protect unanticipated paleontological resource discoveries

If potential paleontological resources are discovered during construction activities, work will stop within 100 feet and the project paleontologist will be contacted immediately. If the discovery is determined to be significant, PG&E will implement measures to protect and document the paleontological resource, as directed by the paleontologist in consultation with the landowner, PG&E, and California Department of Fish and Wildlife. Efforts will be made to retain and protect such resources in place. If recovery of those resources is required to prevent their destruction, the paleontologist will develop a recovery strategy at a level appropriate to the discovery and in accordance with industry practice. The paleontologist will supervise the recovery effort, which may include the following components as appropriate to reduce impacts to a less-than-significant level: establishing recovery standards, preparing specimens for identification and preservation, documentation and reporting, and securing a curation agreement from the approved agency. Work may not resume within 100 feet of the find until approval by the paleontologist.

Greenhouse Gas Emissions

APM GHG-1: Avoid and Minimize Potential Sulfur Hexafluoride (SF₆) Emissions

For substation expansions or modifications that includes new breakers insulated with SF₆, PG&E will continue to include the project substation equipment in PG&E's system-wide SF₆ emission reduction program, which includes inventorying and monitoring system-wide SF₆ leakage rates and employing X-ray technology to inspect internal circuit breaker components to eliminate dismantling of breakers and reduce accidental releases. New project breakers will have a manufacturer's guaranteed SF₆ leakage rate of 0.5% per year or less and will be maintained in accordance with PG&E's maintenance guidelines.

Hazardous Materials

APM HAZ-1: Spill Response

Emergency-spill response and clean up kits will be onsite where they are immediately available to respond to an accidental release of a hazardous fluid or material. If applicable, a Stormwater Pollution Prevention Plan (SWPPP) will be implemented, which will also address spill response and other site-specific physical conditions to improve hazard prevention.

APM HAZ-2: Vehicle Refueling

No vehicles or heavy equipment will be refueled within 100 feet of a wetland, stream, or other waterway, or within 250 feet of vernal pools, unless secondary containment is used. The fueling operator must always stay with the fueling operation. Tanks may not be topped off.

Hydrology and Water Quality

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APM HYDRO-1: Develop and Implement a frac-out plan for projects using horizontal directional drilling (HDD).

For all gas projects utilizing horizontal directional drilling (HDD), PG&E will store pertinent materials on site to quickly contain potential frac-outs, and these materials will be determined by conditions on the ground. At the entry or exit of the drill and for the duration of the drilling activity, PG&E will maintain a supply of sediment barriers (e.g., weed-free straw bales and silt fence), plastic sheeting, shovels and buckets, mud pumps and additional hose, mud storage tanks, and a vacuum truck. In addition, PG&E may store sandbags, floating booms or silt curtains, plywood, a small backhoe to dig a sump, and corrugated pipe.

In the event of a frac-out, the release will be assessed immediately and PG&E will take the following steps:

- Initiate immediate suspension of the drilling operation.
- Contain the frac-out with supplies and materials as appropriate.
- Verify that the drilling lubricant will not enter a jurisdictional water feature.
- Assess the containment structure and determine if additional supplies and materials are needed to prevent the spread of surfaced drilling lubricant.
- Determine if cleanup of the frac-out material is needed.

If a frac-out is identified in a jurisdictional water feature or other sensitive resource area, the following additional steps will be taken:

- PG&E will notify the appropriate agency authorities with jurisdiction (i.e., the USACE, CDFW, and RWQCB).
- The drill angle will be increased to move below the frac-out and to reduce the amount of drilling lubricant reaching the surface. The current drill profile will be evaluated; and drill pressures and pump volume rates will be adjusted, as needed.
- If standing water is present, hand-placed containment, silt curtains, or other containment techniques for water releases will be deployed if necessary. To the extent feasible, surface releases of excess drilling lubricant will be held in a contained area and removed using small collection sumps with portable pumps and hoses, and without undue disturbance to the banks and bed of the water feature.
- Frac-out cleanup will be conducted in a manner that avoids damage to existing and adjacent vegetation. Soils that come in contact with drilling lubricant will be removed to the extent feasible without causing excessive loss of topsoil or vegetation.

Once the frac-out is contained, drilling may resume upon approval from the appropriate agency officials and PG&E representatives. Frac-out material will be collected and stored in containers until it can be reused or disposed of in an approved disposal facility.

Noise

APM NOI-1: Restrict construction hours

Planned construction activities within 900 feet of occupied residential parcels that require the use of off-road construction equipment will be consistent with local noise ordinance guidelines, which typically limit construction noise to daylight hours, or a similar restriction. Should work in these locations be required outside of these hours due to safety or clearance requirements, construction would be limited to the minimum necessary and would proceed as expediently as safely possible to reach a safe and convenient stopping point.

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APM NOI-2: Limit noise during construction near occupied residences	When using off-road construction equipment to conduct construction activities within 250 feet of occupied residences, PG&E will use “quiet” equipment (i.e., equipment designed with noise control elements), standard equipment fitted with noise control devices (e.g., mufflers), or other noise-reduction measures as feasible to limit construction noise to within local noise ordinance limits.
Traffic	
APM TRA-1: Implement transportation best management practices	<p>PG&E will continue to implement the following transportation best management practices.</p> <ul style="list-style-type: none"> • Prepare and implement Traffic Control Plans as required by necessary encroachment permits to minimize disruption of roadways and of bicycle, pedestrian and transit routes to ensure the provision of adequate alternative access. • Provide through access for emergency vehicles at all times. If lane closures must occur during the course of construction, local fire and police departments will be notified to allow the design of alternative evacuation and emergency access routes. PG&E will make every effort to allow emergency service providers adequate lead time to ensure that emergency access and response times are maintained during work periods. • Maintain access for private roads. • Provide adequate off-road parking and staging for vehicles, equipment, and materials throughout the work period. • Restrict all construction parking and staging to ROW, utility-owned property and approved staging areas, and keep construction equipment in designated staging areas when not in use. • Post construction warning signs in advance of activities at the construction area and at intersections that provide access to the construction area. • Restrict all nonemergency construction traffic, including haul and delivery trucks, to normal daytime business hours, unless a local jurisdiction identifies a need for off-hours routing to avoid impacts on peak-hour commute traffic. • Avoid key commute routes and “rate-limiting” intersections during peak traffic periods, either by traveling different routes or by traveling during non-peak times as feasible, and by providing adequate parking for expanded facilities. <p>If temporary lane closures are required, use caution signs and/or flaggers to regulate traffic, cyclists, and pedestrians to maintain a safe transportation corridor.</p>
Wildfire	
APM FIRE-1: Construction Fire Prevention Practices	<p>PG&E will implement the following fire prevention practices at active construction sites.</p> <ul style="list-style-type: none"> • During Red Flag Warning events, as issued daily by the National Weather Service, all construction activities will cease, with an exception for transmission line testing, repairs, unfinished work, or other specific activities that may be allowed if the facility/equipment poses a greater fire risk if left in its current state. • All construction crews and inspectors will be provided with radio and cellular telephone access that is operational in all work areas and access routes to allow for immediate reporting of fires. Communication pathways and equipment will be tested and confirmed operational

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each day prior to initiating construction activities at each work site. All fires will be reported to the fire agencies with jurisdiction in the area immediately upon discovery of the ignition.

- Construction personnel will be trained in fire-safe actions, initial attack firefighting, and fire reporting. Construction personnel will be trained and equipped to extinguish small fires in order to prevent them from growing into more serious threats.
 - All construction personnel will carry a laminated card and be provided a hard hat sticker that list pertinent telephone numbers for reporting fires and defining immediate steps to take if a fire starts. Information on laminated contact cards and hard hat stickers will be updated as needed and redistributed to all construction personnel prior to the day the information change goes into effect.
 - Construction personnel will have fire suppression equipment on all construction vehicles and will be required to park vehicles away from dry vegetation. PG&E will coordinate with applicable local fire departments prior to construction activities to determine the appropriate amounts of fire equipment to be carried on vehicles and, should a fire occur, to coordinate fire suppression activities.
 - Water tanks and/or water trucks will be sited or available at active project sites for fire protection during construction.
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Table 2-51. Other Permits and Approvals that Could Be Required for Covered Activities

Agency	Permit/Consultation/ Approval	Jurisdiction/Purpose	Notes/Assumptions
Federal Agencies			
U.S. Army Corps of Engineers	Clean Water Act Section 404 nationwide permit	Fill of waters of the United States	Permits are generally issued 45 days from submittal of a complete application; however, compliance with Section 401 must be certified first, and review under Section 7 of the federal Endangered Species, Section 106 of the National Historic Preservation Act, and CEQA must be completed.
	Clean Water Act Section 408 permit	Alteration of civil works projects	U.S. Army Corps of Engineers has 90 days to render a decision or provide an estimated date of final decision.
U.S. Fish and Wildlife Service	Consultation under Section 7 of the federal Endangered Species Act (when activity has a federal nexus)	Activities that may affect federally listed species or their habitats	Consultation can take 135 days to 1 year from submittal of the consultation request to the lead agency.
	Consultation under Section 10 of the federal Endangered Species Act	Activities that may affect federally listed species or their habitats	PG&E has a Habitat Conservation Plan that addresses federally listed species in the Bay Area.
Advisory Council on Historic Preservation	National Historic Preservation Act Section 106 review	Activities on federal land that may affect cultural or historic resources	There is no regulatory timeline for Section 106 compliance; however, a minimum of 1 year is anticipated.
Federal Aviation Administration	Aeronautical Study under 49 United States Code Section 44718, Title 17 Code of Federal Regulations, Part 77	Determination of hazard to air navigation	PG&E must file Federal Aviation Administration Form 7460-02, Notice of Actual Construction or Alteration, with the agency at least 45 days prior to construction.

Agency	Permit/Consultation/ Approval	Jurisdiction/Purpose	Notes/Assumptions
State Agencies			
State Water Resources Control Board	National Pollutant Discharge Elimination System— Construction Storm Water Permit	Storm water discharges associated with construction activities disturbing 1 or more acre of land	Permits are generally issued 10 days following the submittal of the complete notice of intent.
	National Pollutant Discharge Elimination System—Order for Discharges from Natural Gas Utility Construction, Operations and Maintenance Activities	Discharges from natural gas utility construction and maintenance activities	Submittal of completed notice of intent at least 30 days prior to discharge.
Bay Conservation and Development Commission	Maintenance permit	Discharge of dredge or fill material into the San Francisco Bay or Delta	
Coastal Commission	Coastal Development Permit	Work in coastal zone; ensure scenic integrity of and access to coastal zone	Permits are issued by local governments with certified local coastal plans or the CCC.
California Public Utilities Commission	Advice Letter, Permit to Construct, or Certificate of Convenience and Necessity	Authorized construction of non-exempt electric power line or substations facilities	Approval timing varies with the level of permitting required.
California Department of Fish and Wildlife	California Fish and Game Code Section 1600 Streambed Alteration Agreement	Activities that substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake.	Agreements are generally issued 90 days after the submittal of a complete application.
	Individual California Endangered Species Act Section 2081 Incidental Take Permit	Activities that may affect state-listed species aside from California tiger salamander, Alameda whipsnake, and California freshwater shrimp	Permits are generally issued 90 to 120 days after the submittal of the complete application but can take up to 1 year.
Regional Water Quality Control Board	Clean Water Act Section 401 Water Quality Certification	Activities authorized by federal agencies that may affect state water quality	Permits are generally issued within several months of a complete application and completed CEQA.
	Waste Discharge Requirements	Discharge of trench water or hydrostatic test water that may affect waters of the state	Notice timing varies by activity and level of analysis needed.

Agency	Permit/Consultation/ Approval	Jurisdiction/Purpose	Notes/Assumptions
State Historic Preservation Officer	Consultation	Activities that may affect cultural or historic resources	The consultation timeline assumes there would be a potential effect on historic properties and a consultation period of at least 1 year.
California Department of Transportation	Encroachment Permit ^a	Construction of facilities within, under, or over state highway rights-of-way	Permits are generally issued 60 calendar days after the submittal of a complete application and in compliance with all other statutory requirements, including CEQA.
Local Agencies			
	Encroachment Permit ^a	Construction of facilities within, under, or over city or county road rights-of-way	--

^a The issuance of an encroachment permit is anticipated to require a Traffic Control Plan and a Traffic Management Plan.

2.11 References Cited

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3.1 Aesthetics

3.1.1 Existing Conditions

3.1.1.1 Regulatory Setting

Federal

Pacific Gas and Electric Company's (PG&E) facilities cross a variety of federal lands throughout the San Francisco Bay Area (Bay Area). These lands include lands owned by multiple federal agencies including the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service (USFWS), U.S. Bureau of Land Management (BLM), U.S. Bureau of Reclamation, National Park Service (NPS), and U.S. Coast Guard. There are no National Forest lands within the study area. The BLM and NPS, specifically, include measures to protect aesthetic and visual resources within their management plans.

Bureau of Land Management

The BLM has developed the Visual Resource Management (VRM) system that provides methods and protocols for assessing existing visual resource conditions and changes to the visual landscape. All BLM lands are assigned BLM VRM Class Objectives that serve for the basis of managing visual resources on BLM lands and assessing impacts on those lands. BLM VRM Class Objectives are contained within each Resource Management Plan prepared for recreational areas that are managed by the BLM.

National Parks

National Parks are required to prepare general management plans that “set long-term goals for the park and provide broad direction for resource preservation and visitor use,” which includes protecting scenic resources. In addition, National Parks are required to conduct a Visual Resource Inventory to “provide consistent evaluation of park visual resources by assessing the scenic quality and important characteristics of key views within and beyond park boundaries.” Visual Resource Inventories are intended to establish baseline visual conditions at the park for monitoring visual changes over time, a reference for evaluating visual impacts associated with a proposed project, the management and planning of visual resources in parks, and the means to engage in collaborative scenic conservation (National Park Service Park Planning 2020).

State

California Scenic Highway Program

The California Legislature initiated the California Scenic Highway Program (Streets and Highways Code Section 260 et seq.) in 1963, with the goal of preserving and protecting the state's scenic highway corridors from changes that would diminish their aesthetic value. The State Scenic Highway System consists of eligible and officially designated routes. A highway may be identified as

eligible for listing as a state scenic highway if it offers travelers scenic views of the natural landscape, largely undisrupted by development. Eligible routes advance to officially designated state scenic highway status when the local jurisdiction adopts ordinances to establish a scenic corridor protection program and receives approval from the California Department of Transportation (Caltrans).

Once a highway attains designated status, the corridor is monitored by the state and the designation may be revoked if a local government fails to enforce the provisions of the corridor protection program. While there are no restrictions on scenic highway projects, local agencies and Caltrans must work together to coordinate transportation and development projects and ensure the protection of the corridor's scenic value to the greatest extent possible. In some cases, local governments have their own land use and site planning regulations in place to protect scenic values along a designated corridor.

California State Parks

California State Parks must have an approved general plan before any major park facilities can be developed and must have policies in place to protect aesthetic and scenic resources. The Planning Handbook developed by the planning division of California State Parks requires general plans to contain a description and analysis of the sensory impressions that are considered significant to the visitor experience (California State Parks 2010). Individual state parks must provide protection to the following scenic resources: visual resources and scenic characteristics, distinctive park visual areas and viewsheds, designated scenic areas or routes, designated overlooks and viewpoints, and external views.

California Public Utilities Commission

Section 320 of the California Public Utilities Code requires all future electric and communication distribution facilities to be placed underground if they are proposed to be erected in proximity to any highway designated as a state scenic highway pursuant to Streets and Highways Code Section 260 of the California Public Utilities Code, and would be visible from such scenic highways if erected above ground, whenever feasible and not inconsistent with sound environmental planning. Any exceptions must be approved by the California Public Utilities Commission (CPUC).

Local

Because the CPUC has exclusive jurisdiction over project siting, design, and construction, the project is not subject to local discretionary regulations. For informational purposes and to assist with the California Environmental Quality Act (CEQA) review process, this section includes a discussion of local standards that concern the visual character of the study area.

General Plans

California law requires local jurisdictions (including counties and cities) to develop comprehensive, long-term general plans to guide their land use decision making and physical development (Government Code Section 65300). Of the seven required "elements," or chapters, in a general plan, several relate directly or indirectly to the aesthetic issues faced by a community as it manages its growth. For instance, the land use element identifies an appropriate balance and distribution of the various types of land uses (e.g., residential, commercial, industrial, recreational) present in a community. The conservation element establishes guidelines for the conservation and use of the

area's natural resources, including rivers, streams, and lakes; forest lands; soil resources; and mineral deposits. The open-space element contains goals and strategies to preserve open space for a range of purposes, including outdoor recreation. General plans may also contain additional elements on topics of concern to the local community; common themes that bear on aesthetics and visual resources include recreation and parks, community design, and heritage or cultural resources. Some communities also adopt ordinances or municipal code provisions in support of specific aesthetic or community design goals.

City and county general plans may include policies for protection of scenic resources, such as hillsides, natural areas, landmarks, roads, and historic districts. Such policies may restrict new development in areas that maintain scenic vistas or areas that contain important character-defining structures. Additionally, design guidelines established at the local level may establish specific standards for addressing development where local character and/or important visual resources may be affected.

PG&E is not required to comply with local aesthetic regulations because cities and counties do not have jurisdiction over PG&E's utility projects. The design, construction and operation of public utility facilities are within the exclusive jurisdiction of the CPUC. The appearance of electrical and natural gas infrastructure reflects its utilitarian power-delivery function, but electrical and natural gas facilities are common features in the visual landscape throughout the Bay Area. Although the safe and efficient function of utility facilities may necessarily take priority over aesthetic values, most operations and maintenance (O&M) and minor new construction activities produce no more than an incremental change to the existing visual environment. In addition, when locating certain electrical facilities, PG&E is required under General Order 131-D to consult with local jurisdictions concerning land use matters and provide notice for certain O&M and minor new construction activities. For both electric and natural gas projects, PG&E will obtain all applicable encroachment and other ministerial permits.

Open Space Easement Act of 1974

Cities and counties can use open space easements as a mechanism to preserve scenic resources if they have adopted open-space plans, as provided by the Open Space Easement Act of 1974 (Government Code Sections 51070–51097). According to this act, a city or county may acquire or approve an open-space easement through a variety of means, including use of public money.

3.1.1.2 Environmental Setting

Regional and Local Landscape Setting

The visual setting of the study area is characterized by the various land uses and environmental characteristics that exist across the nine Bay Area counties. Agricultural lands, open space, and the Pacific Ocean coastline provide some of the key aesthetic resources. The study area is composed of four general physiographic regions: coastal areas, uplands of the Coast Ranges, intermountain valleys, and the Sacramento–San Joaquin River Delta (Delta). In addition to the Delta, other major waterbodies in the study area include the Russian River and Napa River watersheds, San Pablo Bay, San Francisco Bay, and the Pacific Ocean. The land use types in the study area identified in Table 3.11-1 in Section 3.11, *Land Use*. As shown in this table, a majority (over half) of the study area is composed of forested lands and grasslands. However, the majority of PG&E facilities, as discussed in the Project Description, are located in urban areas (61%) and only 32% are in natural land cover

types and 7% are in agricultural areas. Natural land cover types, such as forested lands and grasslands, would be affected to a much lesser extent. Elevations in the study area range from at or below sea level at the Delta Islands near Brentwood and Oakley, to the 4,216-foot peak of Mount Diablo, the highest peak in the study area. The foothills have gently to steeply sloping topography that supports woodland and shrub land. Agricultural lands, including vineyards, row crops, and orchards, are found along the valley floors of Marin, Napa, Sonoma, Solano, and Santa Clara Counties.

Open space areas such as wildlife refuges, local community parks, and recreational areas are present throughout the study area. National parks, refuges, and wildlife areas present within the study area include: San Francisco Bay National Wildlife Refuge Complex (Alameda, Contra Costa, Napa, San Francisco, Solano, and Sonoma Counties); Muir Woods National Monument and Point Reyes National Seashore (Marin County); and Golden Gate National Recreation Area (GGNRA) (Marin, San Francisco, and San Mateo Counties). Other open-space areas include California Department of Fish and Wildlife ecological reserves and wildlife areas, such as the Albany Mudflats Ecological Reserve in Alameda County and the Petaluma Marsh Wildlife Area in Sonoma County, as well as numerous California State Parks such as Mount Diablo in Contra Costa County and Henry W. Coe in Santa Clara County.

Views along roads and highways in the study area vary from essentially undisturbed views of rural open space, the ocean, and coastal landscapes to crowded urban settings with limited distant views. PG&E facilities and infrastructure are located throughout the study area. These facilities are part of the existing visual setting of the area, and the visibility of the facilities varies depending on their locations and proximity to key viewpoints, such as scenic highways or overlooks. There are dozens of federal and state recreational facilities with frequent visitor usage and scenic resources throughout the study area.

Federal Lands and Facilities

Federal recreational lands and facilities in the study area are listed in Table 3.1-1 and shown on Figure 3.1-1.

Table 3.1-1. Federal Recreational Lands in the Study Area

County	Agency	Recreational Feature	Corresponding Feature Number on Figure 3.1-2	
Alameda	USACE	East Bay Gateway Shoreline	1	
	USFWS	Don Edwards National Wildlife Refuge	2	
Contra Costa	BLM	BLM	3	
	Reclamation	Contra Loma Regional Park	4	
	USFWS	Antioch Dunes National Wildlife Refuge	5	
	NPS		Eugene O'Neill Historic Site	6
			John Muir National Historic Site	7
Marin	Coast Guard	United States Coast Guard Park	8	
	USFWS	Marin Island National Wildlife Refuge	9	
		Golden Gate National Recreation Area	10	
		NPS	Muir Woods National Monument	11
		Point Reyes National Seashore	12	

County	Agency	Recreational Feature	Corresponding Feature Number on Figure 3.1-2
Napa	BLM	BLM	13
		Cedar Roughs Area of Critical Environmental Concern	14
		Quail Ridge Reserve	15
	Reclamation	Lake Berryessa	16
		Lake Berryessa Wildlife Area	17
		Reclamation	18
	USFWS	Reclamation	19
		San Pablo Bay National Wildlife Refuge	20
		San Francisco	BLM
Alcatraz Island	22		
Aquatic Park	23		
NPS	Baker Beach		24
	China Beach		25
	Crissy Field		26
	Fort Mason		27
	Fort Point National Historic Site		28
	Golden Gate National Recreation Area		29
	Presidio		30
San Mateo	BLM	BLM	31
	USFWS	Bair Island Ecological Reserve	32
		Don Edwards National Wildlife Refuge	33
		Golden Gate National Recreation Area	34
	NPS	Mori Point	35
		Rancho Corral de Tierra	36
		Sky Ridge	37
Santa Clara	BLM	BLM	38
	Reclamation	San Luis Reservoir Wildlife Area	39
	USFWS	Don Edwards National Wildlife Refuge	40
Solano	USACE	Little Holland Tract	41
	BLM	BLM	42
	USFWS	San Pablo Bay National Wildlife Refuge	43
Sonoma	USACE	Lake Sonoma Recreation Area	44
		Lake Sonoma Wildlife Area	45
		Sonoma Baylands	46
	BLM	BLM	47
		California Coastal National Monument	48
	USFWS	San Pablo Bay National Wildlife Refuge	49

Key scenic areas in the study area are described in the following subsections.

Golden Gate National Recreation Area

The study area encompasses the GGNRA, which spans the Marin Peninsula north to Point Reyes National Seashore and much of the northern and western coastline of the San Francisco Peninsula. The GGNRA is one of the largest urban parks in the world and contains Alcatraz Island, Crissy Field, the Presidio, the Marin Headlands, Muir Woods National Monument, and many other attractions including museums (National Park Service 2019a). The Golden Gate National Recreation Area/Muir Woods National Monument General Management Plan indicates that the purpose of the GGNRA is to “offer national park experiences to a large and diverse urban population while preserving and interpreting the outstanding natural, historic, scenic, and recreational values of the park lands.” Scenic beauty is identified as one of the GGNRA’s key resources and values, with the Plan noting that “the scenic beauty of the park include the extraordinary setting, which provides a dramatic contrast to urban environments and undeveloped spaces and the compelling historical background that contributes to understanding the history of the area” (National Park Service 2014). The recreation area affords its visitors expansive scenic vistas and views of the Pacific Coastline, San Francisco Bay, Golden Gate Bridge, San Francisco cityscape, and the many natural and historic areas associated with the recreation area.

Muir Woods National Monument

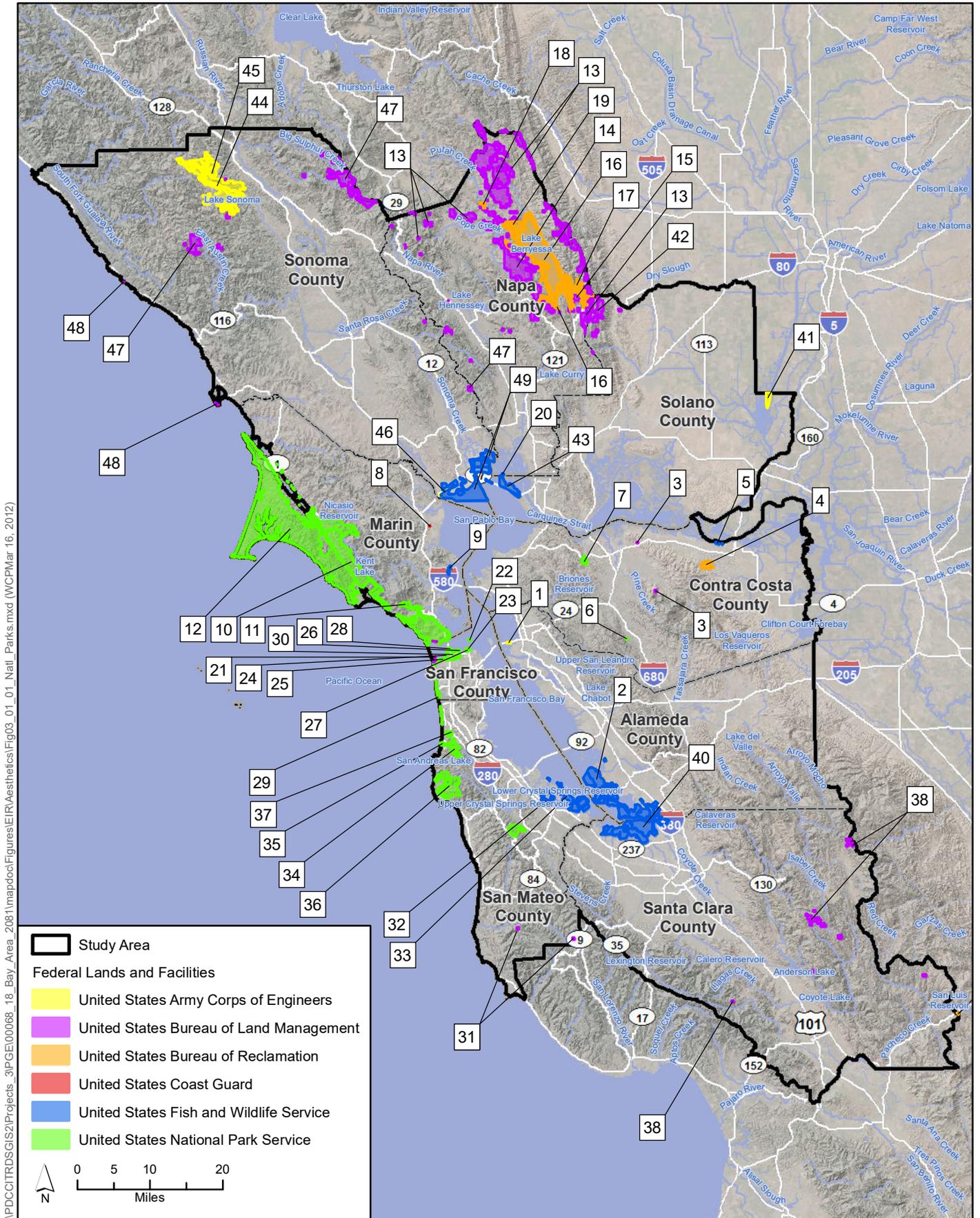
The Muir Woods National Monument is located within the GGNRA and is a primeval forest with old growth coast redwoods. The monument is managed under the Golden Gate National Recreation Area/Muir Woods National Monument General Management Plan that identifies that monument’s purpose as to “preserve the primeval character and ecological integrity of the old growth redwood forest for scientific values and inspiration” (National Park Service 2014). The park has 6 miles of trails that afford visitors views of the old growth coast redwoods, in addition to other flora and fauna of the forest. The park is also surrounded by, and many of its trails connect to, Mount Tamalpais State Park (National Park Service 2019b).

Point Reyes National Seashore

Point Reyes National Seashore is located west of the northernmost edge of the GGNRA and is bordered by the mainland, Pacific Ocean, Drakes Bay, Tomales Bay, Bolinas Bay, and Bolinas Lagoon. The Point Reyes National Seashore notes that “the unusual variety of scenic qualities and biotic communities that make the seashore attractive to scientists as well as recreationists will be aggressively maintained” because much of the national seashore is designated as wilderness (National Park Service 1980). Sweeping scenic vistas and picturesque views of the surrounding waterbodies and landscapes of the national seashore are afforded from Point Reyes.

Juan Bautista de Anza National Historic Trail

The study area encompasses a portion of the Juan Bautista de Anza National Historic Trail. The NPS is working toward establishing a continuous, 1,200-mile nonmotorized recreation trail that will roughly follow the historic route of the Anza Expedition of 1775–1776. Approximately 300 miles of recreation trail have been certified so far and each segment is independently operated (National Park Service 2017). The Juan Bautista de Anza National Historic Trail Comprehensive Management and Use Plan identifies that its management objective is to “protect a trail [right-of-way] ROW, to protect cultural and scenic resources along the trail, to foster public appreciation and understanding of the trail, to encourage facilities for resource protection and public information and use.” However, the plan acknowledges that many segments of the historic trail have been altered by the effects of



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**Figure 3.1-1
Federal Recreational Lands in
the Permit Area**

urbanization and changing transportation systems, which is characteristic of the trail within the study area.

Recreational trails, which are a part of the trail system, cross the study area including existing and planned segments of the San Francisco Bay Trail near Alviso Marina County Park and the Alameda Creek Trail. In addition, the Don Edwards San Francisco Bay National Wildlife Refuge is identified as an interpretive site for the trail (National Park Service 2016).

San Francisco Bay National Wildlife Refuge Complex

The San Francisco Bay National Wildlife Refuge Complex is a collection of seven national wildlife refuges administered by the USFWS. The study area encompasses five of the seven refuges: Antioch Dunes National Wildlife Refuge, Don Edwards San Francisco Bay National Wildlife Refuge, Farallon National Wildlife Refuge, Marin Islands National Wildlife Refuge, and the San Pablo Bay National Wildlife Refuge. The refuges were established to preserve habitat for migratory birds, endangered species, and other wildlife. Pertaining to visual resources, the National Wildlife Refuge System guiding principle is to preserve wildlife-dependent uses involving hunting, fishing, wildlife observation, photography, interpretation, and education (U.S. Fish and Wildlife Service 2020).

California State Parks

A total of 49 California State Parks are within the study area (Table 3.1-2 and Figure 3.1-2) (California Department of Parks and Recreation 2020).

Table 3.1-2. California State Parks in the Study Area

County	California State Park	Corresponding Feature Number on Figure 3.1-2
Alameda	Albany State Marine Reserve	1
	Bethany Reservoir State Recreation Area	2
	Emeryville Crescent State Marine Reserve	3
	Lake Del Valle State Recreation Area	4
	McLaughlin Eastshore State Park State Seashore	5
	Robert W. Crown Memorial State Beach	6
Contra Costa	Franks Tract State Recreation Area	7
	Marsh Creek State Park State Historic Park	8
	Mount Diablo State Park	9
Marin	Angel Island State Park	10
	China Camp State Park	11
	Marconi Conference Center State Historic Park	12
	Mount Tamalpais State Park	13
	Olompali State Historic Park	14
	Samuel P. Taylor State Park	15
	Tomales Bay State Park	16
Napa	Bale Grist Mill State Historic Park	17
	Bothe-Napa Valley State Park	18
	Robert Louis Stevenson State Park	19

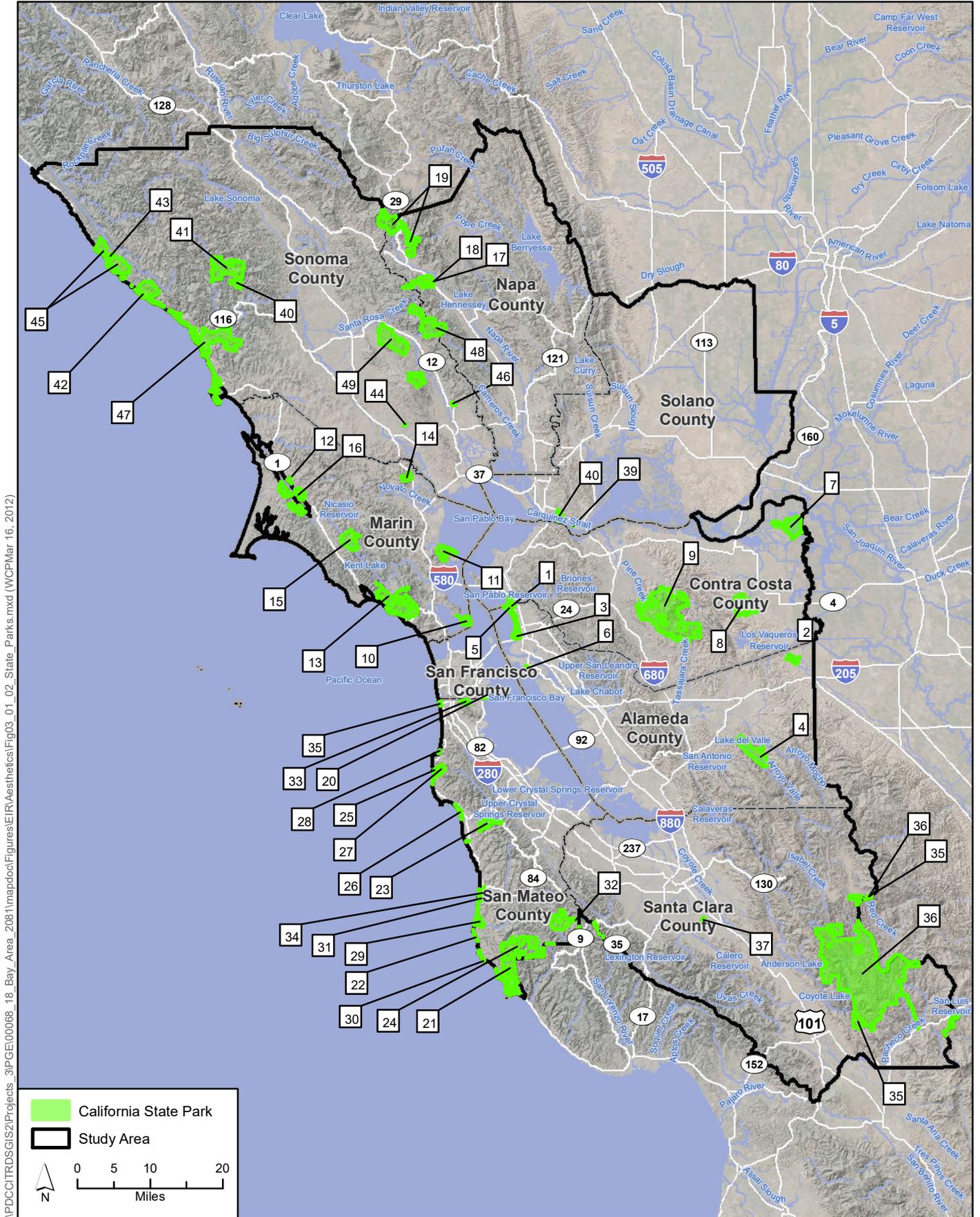
County	California State Park	Corresponding Feature Number on Figure 3.1-2
San Francisco	Candlestick Point State Recreation Area	20
San Mateo	Año Nuevo State Park	21
	Bean Hollow State Beach	22
	Burleigh H. Murray Ranch Park Property	23
	Butano State Park	24
	Gray Whale Cove State Beach	25
	Half Moon Bay State Beach	26
	Montara State Beach	27
	Pacifica State Beach	28
	Pescadero State Beach	29
	Pigeon Point Light Station State Historic Park	30
	Pomponio State Beach	31
	Portola Redwoods State Park	32
	San Bruno Mountain State Park	33
	San Gregorio State Beach	34
Thornton State Beach	35	
Santa Clara	Henry W. Coe State Park	35
	Martial Cottle Park State Recreation Area	37
Solano	Benicia State Recreation Area	38
	Benicia Capitol State Historic Park	39
Sonoma	Armstrong Redwoods State Natural Reserve	40
	Austin Creek State Recreation Area	41
	Fort Ross State Historic Park	42
	Kruse Rhododendron State Natural Reserve	43
	Petaluma Adobe State Historic Park	44
	Salt Point Park	45
	Sonoma State Historic Park	46
	Sonoma Coast State Park	47
Sugarloaf Ridge State Park	48	
	Trione-Annadel State Park	49

Source: California Department of Parks and Recreation 2020

Scenic Highways

Many of the highways in the Bay Area have been officially designated or determined eligible for designation as state scenic highways, as indicated in Table 3.1-3. These highways provide scenic views of the coast, ocean, open space, agricultural lands, and other visually appealing settings. No national scenic byways have been designated in the study area.

Table 3.1-3 identifies designated and eligible state scenic highways, as of September 2020, in the study area. All 34 of these highway segments, both designated and eligible, are considered in this analysis.



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Figure 3.1-2
State Parks in the Permit Area

Table 3.1-3. State Scenic Highways and Routes in the Study Area

Highway Segment ^a	Mileposts	Study Area Counties	Status
1 Santa Cruz County line to south city limit Half Moon Bay	0.0–26.2	San Mateo	Designated
1 SR 101 near Marin City to SR 101 near Leggett	0.0–105.6	Marin, Sonoma	Eligible
1 SR 35 in San Francisco to SR 101 near Golden Gate Bridge	1.9–7.1	San Francisco	Eligible
1 SR 101 near San Luis Obispo to SR 35 near Daly City	16.7–1.9	San Francisco, San Mateo	Eligible
4 SR 160 near Antioch to SR 84 near Brentwood	31.1–40.5	Contra Costa	Eligible
9 Santa Cruz County line to Los Gatos city limit	0.0–10.8	Santa Clara	Designated
12 Danielli Avenue east of Santa Rosa to London Way near Aqua Caliente	22.4–34.0	Sonoma	Designated
12 SR 101 near Santa Rosa to SR 121 near Sonoma	16.0–41.4	Sonoma	Eligible
17 SR 1 near Santa Cruz to SR 9 near Los Gatos	0.0–7.1	Santa Clara	Eligible
24 East portal of Caldecott Tunnel to Interstate 680 near Walnut Creek	0.3–9.1	Contra Costa	Designated
29 Trancas Street in Napa to SR 20 near Upper Lake	13.0–52.5	Napa	Eligible
29 SR 37 near Vallejo to SR 221 near Napa	4.7–8.7	Solano, Napa	Eligible
35 Santa Cruz County line to Half Moon Bay Road (SR 92)	0.0–23.0	San Mateo	Designated
37 SR 251 near Nicasio to SR 101 near Novato	0.0–11.2	Marin	Eligible
37 SR 101 near Ignacio to SR 29 near Vallejo	11.2–9.5	Marin, Sonoma, Solano	Eligible
80 Interstate 280 near First Street in San Francisco to SR 61 in Oakland	3.2–2.8	San Francisco, Alameda	Eligible
84 SR 238 (Mission Boulevard) to Interstate 680	10.8–17.9	Alameda	Designated
92 SR 1 to Interstate 280	0.0–7.3	San Mateo	Eligible
101 Opposite San Francisco to SR 1 in Marin City	0.0–4.1	Marin	Eligible
101 The vicinity of SR 37 near Ignacio	19.1–20.9	Marin	Eligible
116 SR 1 to south city limit of Sebastopol	0.0–27.8	Sonoma	Designated
121 SR 37 near Sears Point to SR 12 near Sonoma	0.0–7.5	Sonoma	Eligible
121 SR 221 near Napa Street to Trancas Street in Napa	6.0–9.4	Napa	Eligible
152 County line to county line	22.1–13.9	Santa Clara	Eligible
160 SR 4 near Antioch to Sacramento	0.0–36.0	Contra Costa	Eligible

Highway Segment ^a	Mileposts	Study Area Counties	Status
221 SR 29 at Soscol Road to SR 121 in Napa	0.0–2.7	Napa	Eligible
239 Interstate 580 west of Tracy to SR 4 near Brentwood	0.0–7.0	Alameda, Contra Costa	Eligible
251 SR 37 near Nicasio to SR 1 near Point Reyes	0.0-5.1	Marin	Eligible
280 Santa Clara County Line to north city limit of San Bruno	0.0–21.8	San Mateo	Designated
280 SR 17 to Interstate 80 near First Street in San Francisco	5.4–7.0	Santa Clara, San Mateo, San Francisco	Eligible
580 San Joaquin County line to SR 205	0.0–0.4	Alameda	Designated
580 San Leandro city limit to SR 24 in Oakland	34.5–45.2	Alameda	Designated
680 Mission Boulevard in Fremont to Contra Costa County line	6.4–21.9	Alameda	Designated
680 Alameda County line to SR 24	0.0–14.4	Contra Costa	Designated

Source: California Department of Transportation 2019

^a Portions of the scenic highway segment may extend beyond the study area.

SR = State Route

Several designated landscaped freeways within the study area are considered in this analysis. These include 208 road segments across the nine-county study area. These include portions of State Routes 1, 4, 13, 17, 24, 29, 37, 84, 85, 87, 92, 113, 237, 238, 242, 260, Interstates 80, 280, 380, 580, 680, 780, 880, 980, and U.S. Highway 101 (California Department of Transportation 2020).

Scenic Vistas

Scenic vistas in the Bay Area, such as vistas of the ocean, the Marin headlands, the East Bay hills including Mount Diablo, and San Bruno Mountain, are visible from hills and ridgelines surrounding San Francisco Bay and from many locations along the coast and throughout the nine counties in the Bay Area. Scenic vistas are also visible from waterbodies, such as from San Pablo Bay and San Francisco Bay, and include views of the water and surrounding shorelines, urban skylines, and foothills and mountains. Scenic vistas are also available along drainages and deltas, where levees allow for views out and over the landscape. In addition, scenic vistas may occur in rural, agricultural areas where flat terrain and a lack of obstructions often allow for expansive views toward the surrounding landscape.

Light and Glare

The study area is made up of many types of land use and environmental characteristics such as agricultural lands, urban areas, open space, and the Pacific Ocean coastline. There are numerous sources of light and glare. Urban areas are heavily lit due to commercial development including light from building interiors and exteriors, street lighting, landscape lighting, and vehicle lights. Remote and more rural areas generally contain fewer light sources.

Glare is caused by either direct light from the sun or moon, artificial light sources, or by a reflective surface. In rural and semi-developed areas, natural sources are the primary source of glare. Agricultural land cover produces varying levels of glare based on surface area, reflectiveness, and coloring. The San Francisco Bay and Pacific Ocean also are sources of daytime glare.

3.1.2 Environmental Impacts

3.1.2.1 Methods for Analysis

Typically, the analysis of impacts on aesthetics is based on three key parameters:

- The visual character and scenic quality of potentially affected visual resources at the project site, in the immediate project vicinity, and in the surrounding region.
- The visibility of the project site and vicinity to members of the public.
- Public viewer response to the potentially affected visual resources.

Although a majority of O&M activities and minor new construction activities would take place within or immediately adjacent to existing PG&E rights-of-way (ROWs), the precise locations of individual activities on these lands are not foreseeable at this time; therefore, it is not possible to identify either the specific views that would be affected or the likely viewer populations and their concerns. O&M activities currently occur at routine intervals and would continue to be temporary in nature. As a result, this analysis focuses on identifying the general types of visual changes that could result from the O&M activities and minor new construction activities and determining which changes could adversely affect visual resources or the viewer experience. Activities such as the construction of natural gas pressure limiting stations (PLSs), substation expansions, or new power lines have the potential to affect visual resources; however, because specific impacts (i.e., specific locations affected and the nature and extent of visual changes) cannot be identified at this time, this document focuses on identifying applicant proposed measures (APMs) that will provide an appropriate level of visual resources protection.

Impacts related to aesthetics or visual resources were assessed qualitatively based on professional judgment in light of the nature of the covered activities. The impact analysis in this chapter focuses on the potential for the O&M activities and minor new construction activities to substantially degrade or otherwise substantially adversely affect the visual setting or character of the study area, particularly in or near scenic areas. Because PG&E has conducted O&M activities in the study area for more than 30 years, ongoing O&M activity impacts described in this section represent baseline environmental conditions that would not change following approval of the Incidental Take Permit (ITP).

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures

As part of compliance with PG&E's *Bay Area Operations and Maintenance Habitat Conservation Plan* (Bay Area O&M HCP), PG&E would implement the following practices and field protocols (FPs) with regard to aesthetics and visual resources.

- 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-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: Minimize the activity footprint and minimize the amount of time spent at a work location to reduce the potential for take of species (which would reduce the area and duration of visual disturbances).
- 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-14: If the covered activity disturbs 0.1 acre or more of habitat for a covered species in grasslands, the field crew will revegetate the area with a commercial "weed free" seed mix.
- Conducting work in a manner that reduces the potential to damage adjacent trees, including affecting riparian and wetland areas (FP-16, FP-17, Hot Zone-1, Hot Zone-2, Wetland-1, and Wetland-2).
- Trash Abatement: PG&E will initiate a trash abatement program before starting covered activities and will continue the program for the duration of the project. PG&E will ensure that trash and food items are contained in animal-proof containers and removed at least once a week to avoid attracting opportunistic predators such as ravens, coyotes, and feral dogs.
- Good Housekeeping: PG&E will initiate general practices that keep a construction site clean and neat including storing building materials and equipment in construction staging areas or away from public view; and promptly removing construction debris at regular intervals.

In addition to PG&E's practices and FPs from PG&E's Bay Area O&M HCP, PG&E will implement the following APMs with regard to aesthetics and visual resources.

APM AES-1: Restore disturbed areas

Previously vegetated areas greater than 0.10 acre that are disturbed by the project will be recontoured to their approximate original conditions and reseeded with an appropriate native seed mix to minimize scarring.

APM AES-2: Protect scenic vistas and scenic highways

For minor new construction facilities larger than 1.0 acre that would have a substantial adverse effect on a scenic vista or views, a designated scenic highway or a scenic public viewpoint, the facility will be relocated to an area not visible from the scenic vista, designated state scenic highway, or scenic public viewpoint. If a reasonably feasible alternate location is not available, implement APM AES-5 or AES-6, as appropriate to the facility, to reduce substantial adverse effects to less-than-significant levels by design or screening measures. PG&E will consult with local jurisdictions and parks agencies as appropriate to discuss reasonably feasible options regarding location and visual screening.

APM AES-3: Shield temporary construction lighting

If temporary construction lighting is required, PG&E will use shielded construction light fixtures, or otherwise screen or direct lighting away from nearby residences, except in cases of emergency.

APM AES-4: Apply minimum lighting standards

All artificial outdoor lighting will be limited to lighting for safety and security, and designed using Illuminating Engineering Society's design guidelines, International Dark-Sky Association-approved fixtures, or other industry standards that address lighting impacts. Lighting above ground level will generally be directed downward or inward, where consistent with safety concerns, and shielding or other methods will be utilized, where needed, to minimize light scatter offsite. Light fixtures will have non-glare finishes that will not cause reflective daytime glare. Lighting will be designed for energy efficiency, where feasible.

APM AES-5: Reduce visibility of new structures in sensitive landscapes

Within sensitive landscapes, PG&E will design structures associated with minor new construction to minimize any impacts on the existing visual character caused by the introduction of new structures in sensitive landscapes, such as in, along, or near national, state, or local parks, recreation areas, forests, scenic routes, vista views, or similar. To the extent feasible and consistent with safety, visible pipelines, guardrails, and substation and switching station infrastructure within such areas will be of a non-reflective material that helps surfaces to blend better with the surroundings.

In scenic or visually sensitive areas, PG&E will implement aesthetic design features in new concrete or shotcrete buildings that are visible to the public. These features may include mimicking natural material (e.g., stone or rock surfacing) or integral color, in the same theme as the surrounding area, to reduce visibility and to better blend with the landscape.

APM AES-6: Implement landscape buffers or other screening for minor new construction

Landscaping treatments may be utilized to help to maintain the local character, improve aesthetics, create a visual buffer between sensitive viewers and minor new construction facilities, and diminish the visual scale of proposed features to reduce substantial adverse aesthetic impacts to a less-than-significant level. Other measures, such as installing prefabricated walls or fencing, may also be utilized to reduce the visual impacts of minor new construction that is visible to the public. Drought-resistant native trees, shrubs, and/or an herbaceous understory will be used in such landscaping to preserve the visual integrity of the landscape, provide habitat conditions suitable for native vegetation and wildlife, and ensure that a maximum number and variety of well-adapted plants are maintained. PG&E will adhere to the following practices in implementing landscape or other screening buffers for minor new construction where necessary to reduce substantial adverse aesthetic impacts:

- Design and implement low-impact development (LID) measures that disperse and reduce runoff by using such features as vegetated buffer strips between paved areas that catch and infiltrate runoff, bioswales, cisterns, and detention basins. In addition, pervious paving will be evaluated for use in the proposed project to improve infiltration and to reduce the amount of surface runoff from entering waterways and the stormwater system. However, LID measures will not be used where infiltration could result in adverse environmental effects.
- Drought-resistant vegetative accents and screening will be considered to aid in a perceived reduction in the scale and mass of large built features in visually sensitive areas, while

accentuating the design treatments that will be applied to built features. Plant selection will be based on the ability to screen built features and provide aesthetic accents.

- Use native grass and wildflower seed in erosion control measures where such a measure will improve aesthetics. Species will be chosen that are native and indigenous to the area and for their appropriateness to the surrounding habitat. If not appropriate to the surrounding habitat, wildflowers should not be included in the seed mix.
- Under no circumstances will any invasive plant species be used at any location.
- Maximize the use of planting zones that do not need irrigation, such as seeding with a native grassland and wildflower meadow mix, which reduce or eliminate the need for a permanent irrigation system.
- A prefabricated wall or fencing may be installed as appropriate to provide partial screening of the natural gas or expanded electric substation facilities. The design of the wall or fence will be comparable to or complement the existing substation screening or nearby land uses.
- No screening measures will degrade or eliminate scenic vistas or be designed in a manner that negatively affects views from scenic roadways. In addition, these measures will not be implemented where implementation would constitute an adverse effect upon sensitive habitats or sensitive species.

Significance Criteria

In accordance with Appendix G of the State CEQA Guidelines, the potential significance of impacts on aesthetics from the proposed project and implementation of covered activities was evaluated for each of the following criteria:

- A substantial adverse effect on a scenic vista.
- Substantial damage to scenic resources, including but not limited to trees, rock outcroppings, and historic buildings along a scenic highway.
- Substantial degradation of the existing visual character or quality of the site and its surroundings.
- Introduction of a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.

3.1.2.2 Impact Discussion

Impact AES-1: Potential to have a substantial adverse effect on a scenic vista (Less-than-Significant Impact)

O&M activities could result in short-term, temporary visual disturbance related to the following: ground disturbance or other earthwork; the presence of vehicles, personnel, and supplies in undeveloped areas; glare generated by reflections from metal and glass vehicle surfaces; and introduction of high-intensity nighttime construction lighting. O&M activities may also include tree pruning, minor vegetation clearing, and repair and replacement of transformers or other features at substations, and reconductoring. Although O&M activities may be visible to the public in certain portions of the study area, the activities are not expected to degrade the visual character in the area because O&M activities would continue to involve the maintenance of existing facilities, as has been

done for years. Because O&M activities are ongoing, any effects of O&M activities on a scenic vista are part of baseline environmental conditions.

Minor new construction activities could create both temporary and longer-term or permanent changes in the visual landscape. As described in Section 3.1.1.2, *Environmental Setting*, over half of PG&E existing facilities would occur in urban areas, and forested lands, grasslands, agricultural lands, wetlands, and shrublands would be affected to a much lesser extent. Temporary changes from minor new construction would include activities such as trenching or boring, grading, and creating temporary work areas and access roads. Such visual changes would generally affect limited areas within or adjacent to a PG&E ROW or utility property, but would be consistent with the general visual character of the area, which is typically dominated by existing power delivery infrastructure. The FPs from PG&E's Bay Area O&M HCP will also minimize temporary visual impacts by minimizing the construction footprint and by ensuring that trash is not left onsite and work areas are restored. Impacts from O&M activities would be short-term and less than significant. In addition, APM AES-1 would further reduce less-than-significant impacts on scenic vista views by ensuring that disturbed areas are recontoured and revegetated with a native seed mix. As discussed under Impact AES-4, it is anticipated that the need for nighttime construction would be minimal with minor construction activities and impacts would be less than significant. APM AES-3 would require nighttime construction lighting to be directed away from nearby residences, further reducing potential impacts.

Permanent visual changes associated with minor new construction would include new gas and electric line extensions, electric substation expansions, and new gas PLSs. These facilities could introduce new changes that could affect views within scenic vistas and, in particular, within scenic viewsheds associated with national parks and recreation areas and state parks. However, most aboveground structures would have relatively small footprints and would either be low profile (e.g., gas facilities) or be consistent with existing overhead utilities (e.g., electrical line extensions). Where there is a potential for significant impacts from these new facilities, APM AES-1 and APM AES-3 would reduce impacts by restoring disturbed areas and minimizing construction lighting. In addition, for highly visible new or expanded facilities within a scenic vista, PG&E has proposed additional APMs that would reduce potential substantial adverse effects from these covered activities. APM AES-2 would require relocation of such facilities where feasible and consultation with local jurisdictions and park agencies for input on minimizing visual impacts. APM AES-4 would require minimum lighting standards in facilities to minimize offsite illumination. APM AES-5 would ensure that new facility coloring reduces the visibility of new structures in or visible from sensitive landscapes, including national parks and recreation areas, state parks, and scenic vistas. APM AES-6 would require landscape buffers or other screening to minimize views of new or expanded facilities within sensitive viewsheds. Implementation of these measures would reduce the impacts on scenic vistas to a less-than-significant level.

Impact AES-2: Potential to substantially damage scenic resources along a scenic highway (Less-than-Significant Impact)

Several scenic highways are present in the study area (Table 3.1-3). CPUC regulations prohibit the installation of overhead distribution facilities in proximity to any officially designated state or county scenic highway if the facilities would be visible to travelers on that highway (California Public Utilities Code Section 320). Limited exceptions must be approved by the CPUC and would be subject to environmental review, which would be consistent with implementation of APM AES-2.

Although O&M activities are implemented throughout the Permit Area including areas adjacent to or in the viewshed of a state scenic highway, ongoing O&M activities are existing activities that are temporary and short term (i.e., lasting less than 3 months) and are part of environmental baseline conditions.

However, as described under Impact AES-1, minor new construction activities may expand facilities such as substations or result in new facilities that are visible from a scenic highway. Such changes could affect views associated with scenic highways. Similar to impacts described in Impact AES-1, impacts on scenic resources along a scenic highway could potentially be significant if minor new construction expands, extends or adds new facilities in a manner that detracts from views associated with scenic highways. However, FPs from PG&E's Bay Area O&M HCP would minimize temporary visual impacts by minimizing the construction footprint and ensuring that trash is not left onsite and work areas are restored. In addition, implementation of APMs AES-1 and AES-2 would reduce impacts on scenic highways by ensuring that areas disturbed by covered activities are restored and revegetated with native seed and that larger scale changes are evaluated under a separate visual impact assessment. Additionally, APM AES-5 would ensure that new facility coloring reduces the visibility of new structures in sensitive landscapes, such as views from scenic highways. APM AES-6 would require installation of landscape buffers to screen new or expanded facilities visible within scenic highway viewsheds. Implementation of these measures would reduce impacts on scenic highways to a less-than-significant level.

Impact AES-3: Degradation of the existing visual character or quality of the site and its surroundings in non-urbanized areas or conflict with applicable zoning and other regulations governing scenic quality in urbanized areas (Less-than-Significant Impact)

As discussed in Chapter 2, *Project Description*, 61% of PG&E's existing facilities are located in urban land cover types, 32% are located in natural land cover types and 7% are in agricultural land cover.

Current O&M activities would continue to be implemented in areas supporting existing utility infrastructure that have been subjected to prior ground disturbance. PG&E standard practices require work crews to follow good construction site housekeeping practices to minimize construction-related visual disturbance: maintaining sites in a clean, orderly condition; storing building materials and equipment in construction staging areas or away from public view; and promptly removing construction debris at regular intervals. Additionally, FP-14, from PG&E's Bay Area O&M HCP, will return or revegetate disturbed areas to their pre-disturbance conditions, which would ensure minimal alterations in the visual character over the long term. Impacts from these temporary construction activities would be less than significant.

Some O&M activities could result in changes to the type of structures used along an existing electric transmission or distribution corridor, such as upgrading wooden utility poles that are buried to tubular steel poles with a concrete foundation. Some of these existing lines could be associated with viewsheds in national or state parks and recreation areas. Such facility replacements could result in changes noticeable to some viewers. However, given that these existing utility lines would already be visible linear features in the area, the changes to the support structures would likely be incremental and would not constitute a substantial change to the existing visual character and quality of the landscape within sensitive viewsheds.

Many minor new construction projects would entail some vegetation clearing and some degree of earthwork at the work site and possibly also at a nearby construction laydown or staging area, if staging cannot be accommodated at the work site. Vegetation removal creates a temporarily

denuded surface that may contrast with the surrounding area in terms of color and visual texture. Grading further modifies the work site by producing barren cut-and-fill areas; it may also create slopes that are unnaturally steep or unnaturally flat compared with the surrounding area. Visual changes associated with vegetation removal and grading would begin early in the construction period. Depending on the nature of the surrounding vegetation (e.g., chaparral, woodland, landscaping), vegetation removal could continue to be apparent for some time; topographic alterations could remain for a longer term. In addition, permanent visual changes associated with minor new construction would include new gas and electric line extensions, electric substation expansions, and new gas PLSs. These facilities could visually degrade an area. Some minor new construction would result in expanded aboveground facilities larger than 0.10 acre and would have the potential to result in a substantial change to the existing visual character and quality of affected sites.

The severity of these impacts would be dependent on the nature of the surrounding viewshed and the characteristics of the viewing population. Most new aboveground structures would have relatively small footprints and would either be low profile (e.g., gas facilities) or be consistent with existing overhead utilities (e.g., electrical distribution line extensions). In general, new or modified facilities would be minor and are not expected to result in extensive disturbance or substantial alterations to the visual character of non-urbanized areas.

Implementation of FPs and APMs would reduce impacts on views by ensuring that areas disturbed by covered activities are restored and revegetated (FP-14) and (APM AES-1) and that larger scale changes are evaluated under a separate visual impact assessment (APM AES-2). Implementation of APM AES-5 would ensure that new facility coloring reduces the visibility of new structures in sensitive landscapes, such as views from residential areas or state parks, and APM AES-6 would require installation of landscape buffers to screen new or expanded facilities visible within sensitive viewsheds. Implementation of these measures would reduce impacts on the existing visual character and quality of views in non-urbanized areas to a less-than-significant level.

As described in Section 3.1.1.1, *Regulatory Setting*, PG&E is not required to comply with local aesthetic regulations because cities and counties do not have jurisdiction over PG&E's utility projects. The design, construction and operation of public utility facilities are within the exclusive jurisdiction of the CPUC. Because of the nature of much of PG&E's infrastructure, the appearance of electrical and natural gas infrastructure reflects its power delivery function. However, utility facilities are existing visual elements throughout the Bay Area. Implementation of APMs would reduce impacts on views, as described above, and reduce conflicts with regulations protecting aesthetic resources in urbanized areas. In addition, when locating certain electrical facilities, PG&E is required under General Order 131-D to consult with local jurisdictions concerning land use matters and provide notice for certain O&M and minor new construction activities. For both electric and natural gas projects, PG&E will obtain all applicable encroachment and other ministerial permits. Therefore, it is anticipated that such features will result in less-than-significant impacts in urbanized areas.

Impact AES-4: Introduction of a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area (Less-than-Significant Impact with Mitigation)

O&M activities involve existing facilities, and, therefore, would not result in any new light or glare. In addition, most O&M activities do not require artificial lighting. Because O&M activities are ongoing, any effects related to light or glare are part of baseline environmental conditions.

Minor new construction may result in the need for short-term and temporary night lighting for constructing at night (e.g., an extended tie-in operation). Implementation of APM AES-3 would ensure that night lighting would be directed at the construction activity and away from residences so that impacts associated with temporary construction lighting would be less than significant.

Facilities that would add pavement, cement block, metal, glass, painted wood, or other potentially reflective surfaces to the viewshed could increase reflective glare. Implementation of APM AES-5 would ensure the facilities are colored in a manner to reduce reflective glare. In addition, implementation of APM AES-6 would reduce reflective glare by requiring installation of a landscape buffer to help screen potential new sources of glare for sensitive viewers. These measures would ensure that impacts associated with daytime glare would be less than significant.

In general, PG&E does not install permanent lighting for new permanent aboveground facilities unless safety concerns mandate lighting. Some facilities may require security lighting to be upgraded or for nighttime security lighting to be installed. Implementation of APM AES-4 would reduce permanent lighting impacts by ensuring that lighting is directed downward or inward. However, depending on the design of new facilities and the nature of surrounding land uses, increases in glare or nighttime lighting could pose a concern for viewers in public spaces if proper shielding is not provided. Such impacts would be most pronounced in residential areas, where viewer sensitivity is particularly high. It could also be a concern in open space, where viewer sensitivity is high and there is additional potential to disturb sensitive nocturnal or crepuscular wildlife. Implementation of APM AES-4 would lessen the effects of light and glare by requiring that artificial outdoor lighting be limited to safety and security lighting designed using Illuminating Engineering Society's design guidelines, and in compliance with International Dark-Sky Association approved fixtures or other industry standards that address lighting impacts. With implementation of these APMs, potential impacts would be less than significant.

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3.2 Agricultural and Forestry Resources

3.2.1 Existing Conditions

3.2.1.1 Regulatory Setting

Federal

No federal regulations related to agricultural or forestry resources are applicable to the project.

State

Farmland Mapping and Monitoring Program

The California Department of Conservation, under the Division of Land Resource Protection, has established the Farmland Mapping and Monitoring Program (FMMP) to monitor the conversion of the state's farmland to and from agricultural use. The FMMP is a nonregulatory program that produces maps and statistical data for analyzing impacts on California's agricultural resources. Through this program, agricultural land is rated according to soil quality and irrigation status (Figure 3.2-1).

Forest Taxation and Reform Act

Commercial timberlands are afforded protection through the state's Forest Taxation Reform Act of 1976, which mandates the creation of timberland preserve zones (TPZ) to restrict and protect commercial timber resources.

Public Resources Code Section 51104(g) defines a *TPZ* as an area that has been zoned pursuant to California Government Code Section 51112 or 51113 and is devoted to and used for growing and harvesting timber and compatible uses. In this context, compatible uses include any use that "does not significantly detract from the use of the property for, or inhibit, growing and harvesting timber" (California Government Code Section 51104[h]).

Williamson Act

The California Land Conservation Act of 1965, commonly known as the Williamson Act (California Government Code Section 51200 et seq.), is designed to preserve agricultural and open-space land. It establishes a program of private landowner contracts that voluntarily restrict land to agricultural and open-space uses (Figure 3.2-2). In return, Williamson Act parcels receive a lower property tax rate consistent with their actual use instead of their market value. Lands under contract may also support uses that are "compatible with the agricultural, recreational, or open-space use of [the] land" subject to the contract (California Government Code Section 51201[e]).

Section 51238(a) provides that utility facilities are generally considered compatible uses:

(1) Notwithstanding any determination of compatible uses by the county or city pursuant to this article, unless the board or council after notice and hearing makes a finding to the contrary, the erection, construction, alteration, or maintenance of gas, electric, water, communication, or agricultural laborer housing facilities are hereby determined to be compatible uses within any agricultural preserve.

(2) No land occupied by gas, electric, water, communication, or agricultural laborer housing facilities shall be excluded from an agricultural preserve by reason of that use.

California Public Resources Code

The California Public Resources Code contains the following definitions for forest land, timberland.

Section 12220(g) defines *forest land* as:

land that can support 10-percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits.

Section 4526 defines *timberland* as:

land, other than land owned by the federal government and land designated by the [State Board of Forestry and Fire Protection] as experimental forest land, which is available for, and capable of, growing a crop of trees of any commercial species used to produce lumber and other forest products, including Christmas trees.

Local

Because the California Public Utilities Commission has exclusive jurisdiction over the siting, design, and construction of Pacific Gas and Electric Company (PG&E) electric and gas facilities, the project is not subject to local land use and zoning regulations or discretionary permits. The following discussion is provided for information purposes and to assist with California Environmental Quality Act (CEQA) analysis.

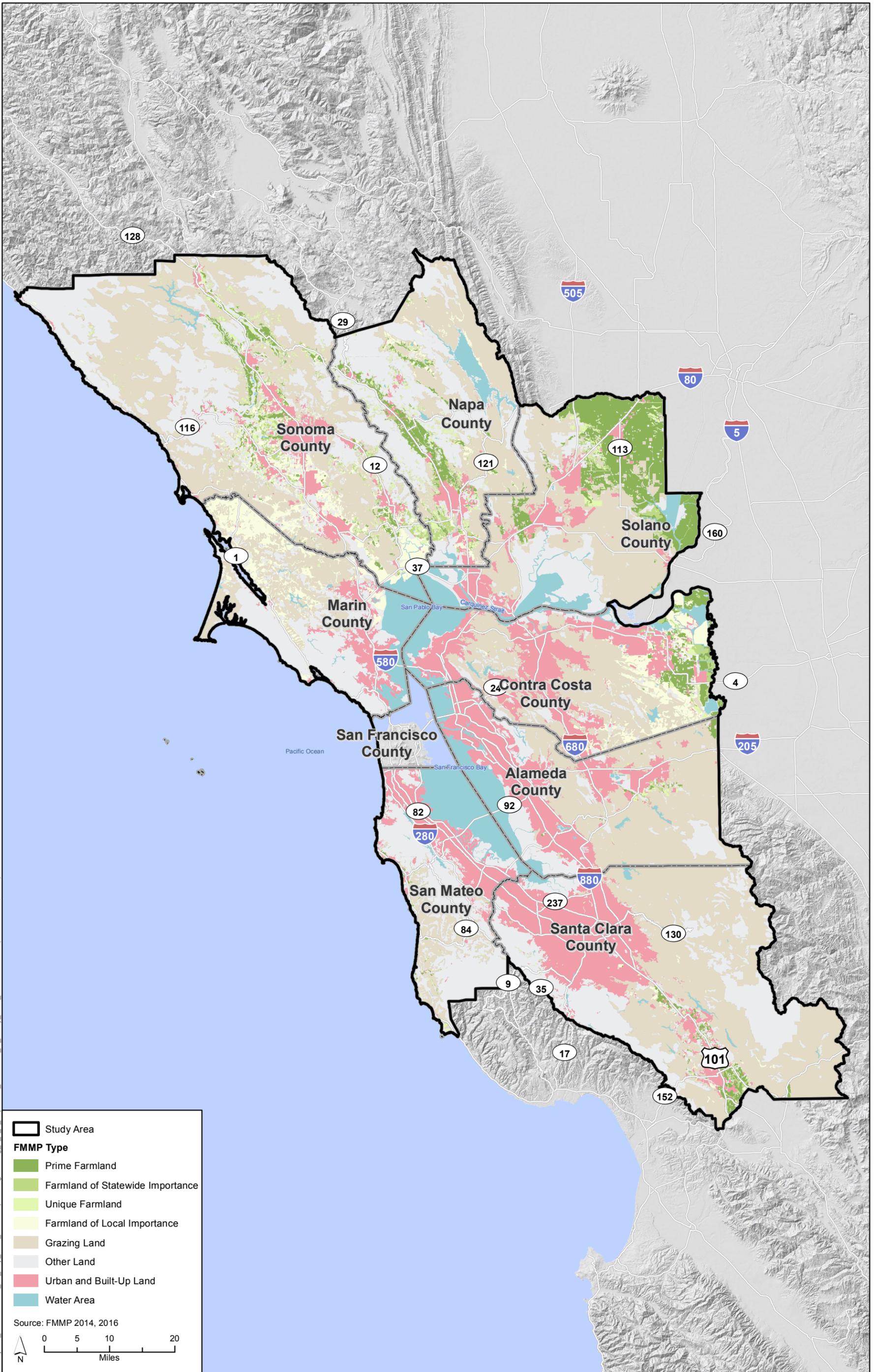
General Plans

California law requires counties and cities to develop comprehensive, long-term general plans to guide their land use decision making and physical development. Of the seven required “elements,” or chapters, in a general plan, several relate directly or indirectly to agriculture, primarily with regard to how local jurisdictions will manage growth. For instance, the land use element identifies an appropriate balance and distribution of the various types of land uses (e.g., residential, commercial, industrial, recreational) present in a community. The conservation element establishes guidelines for the conservation and use of the area’s natural resources, including rivers, streams, and lakes; forest lands; soil resources; and mineral deposits. The open-space element contains goals and strategies to preserve open space for a range of purposes, including agriculture. None of these elements are likely to be relevant to the proposed project.

3.2.1.2 Environmental Setting

Current and Historical Agricultural Uses

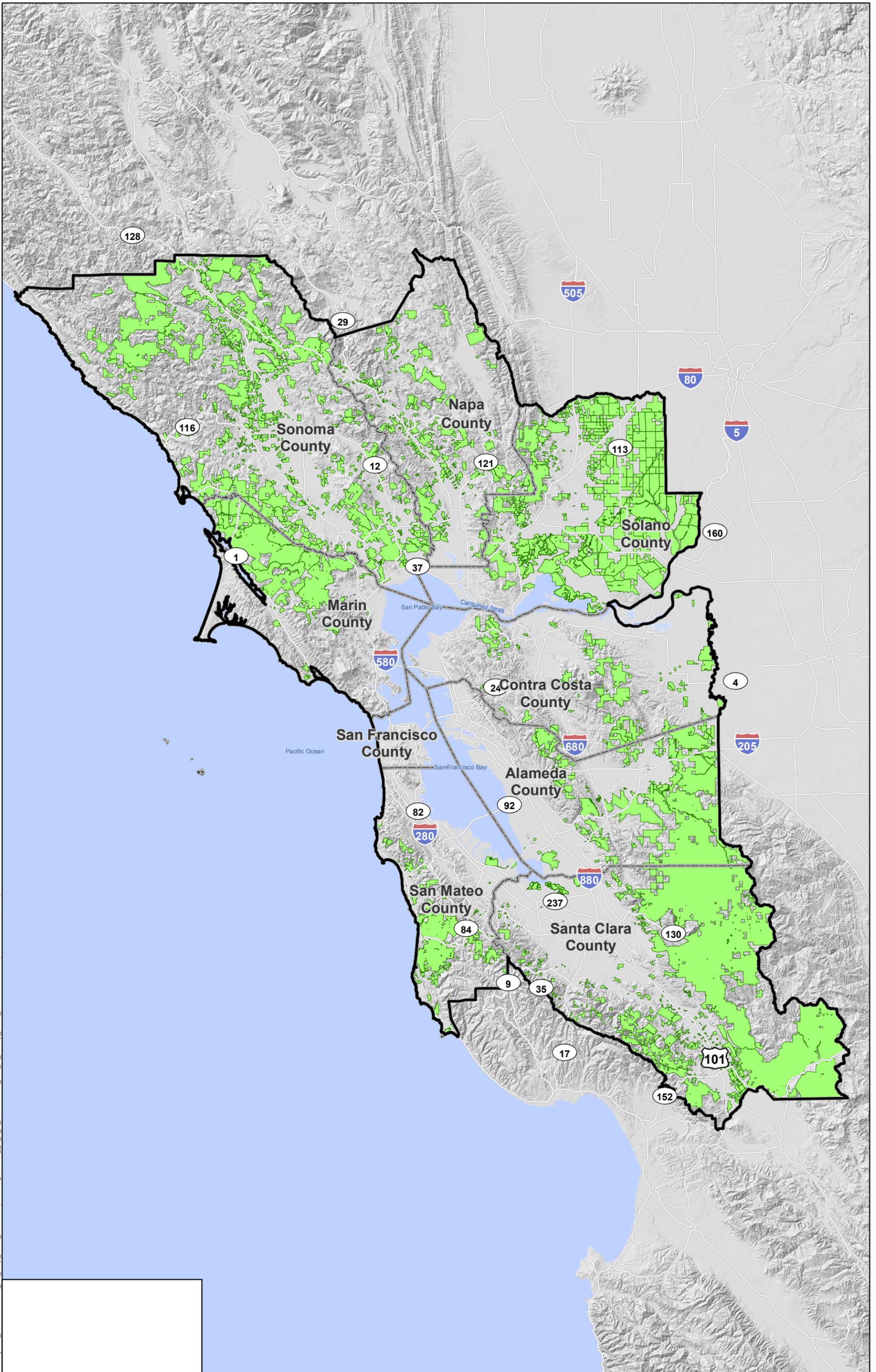
The study area has a significant amount of land in agricultural uses. Table 3.2-1 shows the acres of agricultural lands for each county in the region, excluding San Francisco County. In 2017, less than 50% of the region’s approximately 4.5 million acres were being farmed. Of the farmed land, 346,672 acres were harvested croplands and 315,133 acres were irrigated for crop production. The remaining 1,978,640 acres are designated as “land in farms,” which consists primarily of agricultural land used for pasture and grazing. Data from 2020 is not available because the census is conducted every 5 years.



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Figure 3-2.1
Important Farmland in the Study Area



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Figure 3-2.2
Williamson Act Contracts in the Study Area

Since 1984, a large amount of Important Farmland land in the study area has been converted to urban uses. According to the FMMP, approximately 101,852 acres of Important Farmland have been converted to nonagricultural use since 1984 (California Department of Conservation 2017).

Table 3.2-1. Study Area^a Agricultural Lands, 2017

	Alameda County	Contra Costa County	Marin County	Napa County	San Mateo County	Santa Clara County	Solano County	Sonoma County	Study Area
	Acres								
Land in Farms	183,282	155,572	140,075	255,778	45,972	288,084	342,593	567,284	1,978,640
Harvested Cropland	7,247	30,142	10,142	60,978	3,774	21,369	115,902	97,118	346,672
Irrigated Land	7,511	22,625	4,978	60,945	3,023	19,222	110,396	86,433	315,133

Source: U.S. Department of Agriculture 2017.

^a San Francisco County not shown because of its negligible acreages.

Williamson Act Lands

Agricultural land under Williamson Act contract includes both “prime” and “nonprime” lands. The California Land Conservation Act defines *prime agricultural land* as: (1) land with U.S. Department of Agriculture Class I or II soils; (2) land with Storie Index soil rating 80 to 100; (3) land that has returned a predetermined annual gross value for 3 of the past 5 years; (4) livestock-supporting land with a carrying capacity of at least 1 animal unit per acre; or (5) land planted with fruit or nut trees, vines, bushes, or crops that have a non-bearing period of less than 5 years and that will normally return a predetermined annual gross value per acre per year during the commercial bearing period (Government Code Sections 51200–51207). *Nonprime* lands include pasture and grazing lands and other non-irrigated agricultural land with lesser quality soils. Prime agricultural lands under the Williamson Act are defined differently than Prime Farmland under the Department of Conservation FMMP.

In the period 2014–2015, about 1.2 million acres of land were under Williamson Act contract in the San Francisco Bay Area (Bay Area). Of this, about 204,080 acres were Prime Farmland and 969,497 acres were nonprime. Study area lands under Williamson Act contract, therefore, are primarily used for pasture and grazing and not for the cultivation of crops. Nearly 72% of prime and nonprime lands under contract in the study area are in Santa Clara, Solano, and Sonoma Counties. Table 3.2-2 shows the number of acres of land under Williamson Act contracts in the Bay Area as of 2014.

Table 3.2-2. Williamson Act Contracts in the Bay Area, 2014–2015

County ^a	Prime Farmland	Nonprime Farmland	Total	Percent
Alameda	2,510	133,137	135,647	11.5%
Contra Costa	9,306	34,231	43,537	3.7%
Marin	0	80,853	80,853	6.9%
Napa	19,059	52,522	71,580	6.1%
San Mateo	No data ^b	No data	No data	No data
Santa Clara	9,668	295,546	305,214	26.0%
Solano	119,799	145,335	265,134	22.6%

County ^a	Prime Farmland	Nonprime Farmland	Total	Percent
Sonoma	43,738	227,873	271,611	23.1%
Region	204,080	969,497	1,173,576	100.0%

Source: California Department of Conservation 2016a.

^a San Francisco County is not shown due to its negligible acreages.

^b San Mateo County has not reported data for the past several years. Acreages for this county are not included in the total, but Williamson Act lands are shown for the county in Figure 3.2-2.

According to geographic information systems (GIS) mapping of the study area by ICF in 2018, PG&E has approximately 1,757 miles of electric distribution, 760 miles of electric transmission, 39 miles of gas distribution, and 198 miles of gas transmission in lands under Williamson Act contract.

Important Farmland

The FMMP maps agriculturally viable lands and designates a hierarchy of land quality in relation to agriculture. Land rated as Prime Farmland has the soil characteristics, growing season, and moisture supply necessary for sustained high yields. Farmland of Statewide Importance is similar to Prime Farmland but with minor shortcomings, such as steeper slopes or less ability to store soil moisture than Prime Farmland. Unique Farmland is of lesser soil quality. Grazing Land supports vegetation suitable for livestock grazing (California Department of Conservation 2008). The FMMP also recognizes Farmland of Local Importance, which is designated by a county board of supervisors.

According to GIS mapping of the study area by ICF in 2018, PG&E's electric and gas transmission and distribution facilities in the study area include 1,391 miles within Prime Farmland, 434 miles within Unique Farmland, and 323 miles within Farmland of Statewide Importance. The vast majority of PG&E's electric and gas transmission and distribution facilities, 37,324 miles, are within Urban and Built-up Land, followed by land designated Other Land at 4,533 miles.

The acres of Important Farmland in each county as well as the totals for each of type of land designation are presented in Table 3.2-3.

Table 3.2-3. Acreage of Important Farmland, 2016

County ^a	Prime Farmland	Farmland of Statewide Importance	Unique Farmland	Farmland of Local Importance	Grazing Land
Alameda	3,433	1,109	2,259	0	241,169
Contra Costa	25,502	7,436	3,543	52,431	167,567
Marin	0	141	280	63,345	88,806
Napa	30,619	9,593	16,803	18,326	179,202
San Mateo	1,946	141	2,149	716	49,122
Santa Clara	15,691	3,383	2,440	5,105	393,535
Solano	130,843	6,674	10,346	0	208,189
Sonoma	29,899	17,203	33,398	80,940	416,291
Totals	237,933	45,680	71,218	220,863	1,743,881

Source: California Department of Conservation 2016b.

^a San Francisco County is not shown because of its negligible acreages of farmland.

Forest

The Bay Area is home to a variety of forest types spread throughout the nine-county region. Forests are generally located at higher elevations of the Coast Ranges in areas with sufficient moisture. Forest land is a valuable environmental and aesthetic resource and a defining feature in many parts of the landscape in the Bay Area. Forest habitats include a wide range of woodland and forest species. Forests in California are protected by the California Department of Forestry and Fire Protection.

Most counties in the study area do not contain land zoned for forest land, timberland, or TPZ. San Mateo County has 31,055 acres of TPZ, and Sonoma County has 95,239 acres of TPZ. TPZ in the study area is shown on Figure 3.2-3.

3.2.2 Environmental Impacts

3.2.2.1 Methods for Analysis

The impact analysis in this section focuses on evaluating the potential impacts of PG&E's covered activities included in issuance of the Incidental Take Permit (ITP) that may result in the conversion of FMMP-designated agricultural lands to nonagricultural uses and to generate conflict with existing Williamson Act contracts in the study area. Potential impacts were evaluated qualitatively, based on professional judgment in light of the activities, methods, and techniques that are part of PG&E's Bay Area operations and maintenance (O&M) program. Because PG&E has conducted O&M activities in the study area for more than 30 years, the O&M impacts described in this section represent baseline environmental conditions that would not change following approval of the ITP.

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures

PG&E strives to avoid and minimize impacts on farmers, ranchers, and agricultural operations. PG&E works within its property rights and with farmers and ranchers to schedule project work, to the extent feasible, around their harvest and planting periods in order to minimize disruptions to agricultural operations. Access across active fields is negotiated with the farmer or landowner in advance of large maintenance and minor new construction activities. In areas containing permanent crops (e.g., grape vines, orchard crops) that must be removed to gain access to work locations, PG&E provides compensation to the farmer or landowner as needed.

PG&E will also implement the following applicant proposed measure (APM) to reduced impacts associated with minor new construction activities.

APM AG-1: Coordination with farmers and ranchers regarding construction activities

Coordination will include the following:

- **Advance Notice:** Prior to construction, PG&E will give at least 30 days advance notice of the start of construction-related activities to farmers and ranchers. Notification will be provided by mailing notices to all properties within 300 feet of the project route. The announcement will (1) describe where and when construction is planned, and (2) provide a point of contact for complaints related to construction activities.

- PG&E will work with farmers and ranchers to schedule project work, to the extent feasible, around their harvest and planting periods in order to minimize disruptions to agricultural operations. If PG&E does not have specific access rights, access across active fields will be negotiated with the farmer and/or landowner in advance of any construction activities. In areas containing permanent crops (e.g., grape vines, orchard crops) that must be removed to gain access to pole sites for construction purposes, the PG&E will provide fair market compensation to the farmer and/or landowner.

Significance Criteria

In accordance with Appendix G of the State CEQA Guidelines, the potential significance of impacts on agricultural and forestry resources resulting from the proposed project and implementation of covered activities was evaluated for each of the following criteria:

- Conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Important Farmland), as shown on the maps prepared pursuant to the FMMP of the California Resources Agency, to nonagricultural use.
- Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract.
- Conflict with existing zoning for, or cause rezoning of forest land (as defined in Public Resources Code Section 12220[g]), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104[g]).
- Loss of forest land or conversion of forest land to non-forest use.
- Other changes in the existing environment that, due to their location or nature, could result in conversion of Important Farmland to nonagricultural use or conversion of forest land to non-forest use.

3.2.2.2 Impact Discussion

Impact AG-1: Conversion of Important Farmland to nonagricultural use (Less-than-Significant Impact)

O&M and minor new construction activities currently take place under existing conditions. Although O&M activities could potentially disrupt the use of farmlands that are classified as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland, these impacts would be temporary and short term and would not convert farmland to nonagricultural uses. Further, O&M activities would generally affect relatively small areas at a time. Once O&M activities have been completed, disturbed areas would be restored.

Most covered activities associated with O&M of existing facilities and infrastructure would be implemented within existing PG&E-owned properties or rights-of-way (ROWs) and adjacent areas; therefore, no conversion of Important Farmland would result from these activities.

The principal potential for temporarily taking Important Farmland out of agricultural uses relates to facilities upgrades and expansions, and construction of minor new facilities. Some new or expanded facilities such as pipelines would be underground once construction is complete and would not result in the conversion of Important Farmland. Aboveground minor new construction of facilities such as electric lines are linear facilities that would be located in new ROWs, generally following the

edges of properties, that can usually continue to be used for agricultural purposes consistent with the electric lines and would not result in a material conversion of Important Farmland.

Substation expansions or gas pressure limiting stations could be constructed on lands owned by PG&E or on lands that require acquisition, potentially on agricultural land. Any such minor new construction on designated agricultural land may result in the conversion of small areas of Important Farmland to nonagricultural use. PG&E estimates that conversion of agricultural land would occur at a rate that averages approximately 1 acre per year throughout the study area over the 30-year term of the ITP, an amount so small that it would not affect agricultural production at any location. Such levels of land conversion are exceptionally minor compared with the total acreage of farmland in the study area.¹ As stated in Table 3.2-1, the study area contains approximately 1,978,640 acres of agricultural land, where about 700,000 acres were harvested croplands or irrigated for crop production and the remaining 1,978,640 acres consist primarily of grazing land. It is anticipated that approximately 30 acres of agricultural land would be lost over the 30-year term of the ITP, which comprises approximately 0.001% of the agricultural land in the study area. Additionally, in siting any new facilities, the company routinely consults with local jurisdictions to avoid or minimize conflicts with existing and planned land uses and may modify the proposed siting or design of new facilities based on such consultation, when feasible.

Additional agricultural land, up to 3 acres, may be converted to support habitat enhancement and management. However, this would primarily affect grazing lands, which, while used for agriculture, are not considered to be Important Farmland. Furthermore, most lands identified for conservation would likely continue to be grazed after acquisition, and the land use would not change.

In light of the small acreages of conversions anticipated and the ongoing nature of the O&M activities that currently are located within Important Farmland environments, direct and indirect impacts related to conversion of Important Farmland to nonagricultural uses would be less than significant. APM AG-1, which elaborates on PG&E's general practices concerning coordination with farmers and ranchers regarding construction activities, would further reduce less-than-significant impacts related to temporary construction activities.

Impact AG-2: Conflict with existing zoning for agricultural use or with a Williamson Act contract (Less-than-Significant Impact)

PG&E's utility projects are not subject to local zoning regulations and, in any event, are considered compatible with all zoning designations, including agricultural uses. Because the project would not conflict with existing zoning, there would be no impact.

Gas and electric facilities are considered a compatible use in agricultural preserves under Section 51238 of the California Government Code, and covered activities are unlikely to require cancellation of Williamson Act contracts. It is possible, however, that some activities such as those related to

¹ The California Public Utilities Commission (CPUC) has found less-than-significant impacts from projects up to 10 acres in size in Prime Farmland, which is larger than any planned minor new construction for this project. For example, the CPUC's Initial Study/Mitigated Negative Declaration for the Shepherd Substation Project (A.10-12 003) states: "The amount of Prime Farmland that would be converted to nonagricultural land is less than the significance threshold of 10 acres, which is noted in California Government Code §51222 as the size of a parcel large enough to sustain agricultural use in the case of prime agricultural land. The amount of Farmland of Statewide Importance, Unique Farmland, and non-Prime Williamson Act Lands is also less than the significance threshold of 40-acres as defined in Government Code §51222. The proposed project would, therefore, have a less-than-significant impact through the conversion of approximately 5 acres of Farmland to nonagricultural uses."

minor new construction might not be considered a compatible use under the Williamson Act contract. In addition, it is possible, although unlikely, that compensation lands could be identified on lands under Williamson Act contract, and acquiring or designating these lands for habitat enhancement and management could result in the withdrawal of lands from Williamson Act protection if the conservation use were not considered to be a compatible use under the Williamson Act contract. However, because most utility uses would be compatible with Williamson Act contracts, the total area likely to be affected under either of these scenarios would be very small. For example, conversion for the habitat enhancements would include converting grazing land to aquatic uses such as stock ponds, which could benefit grazing uses and provide a source of drinking water for livestock. It is anticipated that less than 10 acres would be removed from Williamson Act protection. In addition, a Williamson Act contract would only be extinguished by the amount of property that PG&E acquires; the contract on the remaining parcel would remain intact.

For these reasons, the project would not conflict with a Williamson Act contract and any impacts would be less than significant.

Impact AG-3: Conflict with existing zoning of forest land, timberland, or timberland zoned Timberland Production (Less-than-Significant Impact)

As stated above, PG&E's utility projects are not subject to local zoning regulations and would not conflict with existing zoning. Further, most of the counties in the study area do not contain land zoned for forest land, timberland, or TPZ. However, Sonoma and San Mateo Counties do contain land zoned for TPZ (Figure 3.2-3). PG&E's covered activities would permanently affect small amounts of land, much of which would be in or adjacent to existing utility easements or other PG&E properties. The vast majority of O&M activities would affect less than 0.1 acre (approximately 66 by 66 feet), and all O&M activities are part of baseline conditions. PG&E limits grading to the area necessary to ensure the safe movement of construction equipment in the ROW. Activities such as clearing would take place within PG&E's easement. These activities would be minor and would not result in zoning or land use changes. Therefore, this impact would be less than significant.

Impact AG-4: Loss of forest land or conversion of forest land to non-forest use (Less-than-Significant Impact)

As previously discussed above under Impact AG-3, the facilities in the study area do not cross forest land. Therefore, no impact would result.

Impact AG-5: Potential to cause changes in the existing environment that could result in conversion of farmland to nonagricultural use or conversion of forest land to non-forest use (Less-than-Significant Impact)

PG&E's covered activities associated with the ITP would not involve any other changes in the existing environment that could result in the conversion of farmland to a nonagricultural use or forest land to a non-forest use. Therefore, this impact would be less than significant.

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3.3 Air Quality

3.3.1 Existing Conditions

3.3.1.1 Regulatory Setting

The agencies of direct importance to the proposed project for air quality are the U.S. Environmental Protection Agency (EPA), California Air Resources Board (CARB), Bay Area Air Quality Management District (BAAQMD), Northern Sonoma County Air Pollution Control District (NSCAPCD), and the Yolo-Solano Air Quality Management District (YSAQMD). EPA has established federal air quality standards for which CARB and the regional air districts have primary implementation responsibility. This section describes the regulations applicable to air quality management in the study area.

Federal

Clean Air Act

The Clean Air Act (CAA) was first enacted in 1963 and has been amended numerous times in subsequent years (1965, 1967, 1970, 1977, and 1990). The CAA establishes federal air quality standards, known as National Ambient Air Quality Standards (NAAQS), and specifies future dates for achieving compliance. The CAA also mandates that the state submit and implement a State Implementation Plan (SIP) for local areas not meeting those standards. The plans must include pollution control measures that demonstrate how the standards will be met.

The 1990 amendments to the CAA identify specific emission-reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment of goals and incorporation of additional sanctions for failure to attain or meet interim milestones. The sections of the CAA that would most substantially affect ongoing operations and maintenance (O&M) activities include Title I (Nonattainment Provisions) and Title II (Mobile-Source Provisions).

Table 3.3-1 shows the NAAQS currently in effect for each criteria pollutant. The California Ambient Air Quality Standards (CAAQS) (discussed below) are also provided in the table, for reference.

Table 3.3-1. National and State Ambient Air Quality Standards

Criteria Pollutant	Average Time	California Standards	National Standards ^a	
			Primary	Secondary
Ozone	1-hour	0.09 ppm	None ^b	None ^b
	8-hour	0.070 ppm	0.070 ppm	0.070 ppm
Particulate matter (PM ₁₀)	24-hour	50 µg/m ³	150 µg/m ³	150 µg/m ³
	Annual mean	20 µg/m ³	None	None
Fine particulate matter (PM _{2.5})	24-hour	None	35 µg/m ³	35 µg/m ³
	Annual mean	12 µg/m ³	12.0 µg/m ³	15.0 µg/m ³
Carbon monoxide	8-hour	9.0 ppm	9 ppm	None
	1-hour	20 ppm	35 ppm	None

Criteria Pollutant	Average Time	California Standards	National Standards ^a	
			Primary	Secondary
Nitrogen dioxide	Annual mean	0.030 ppm	0.053 ppm	0.053 ppm
	1-hour	0.18 ppm	0.100 ppm	None
Sulfur dioxide ^c	Annual mean	None	0.030 ppm	None
	24-hour	0.04 ppm	0.14 ppm	None
	3-hour	None	None	0.5 ppm
	1-hour	0.25 ppm	0.075 ppm	None
Lead	30-day average	1.5 µg/m ³	None	None
	Calendar quarter	None	1.5 µg/m ³	1.5 µg/m ³
	3-month average	None	0.15 µg/m ³	0.15 µg/m ³
Sulfates	24-hour	25 µg/m ³	None	None
Visibility reducing particles	8-hour	— ^d	None	None
Hydrogen sulfide	1-hour	0.03 ppm	None	None
Vinyl chloride	24-hour	0.01 ppm	None	None

Source: California Air Resources Board 2016.

PM10 = particulate matter less than or equal to 10 microns in diameter

PM2.5 = particulate matter less than or equal to 2.5 microns in diameter

µg/m³ = micrograms per cubic meter

ppm = parts per million

^a National standards (NAAQS) are divided into primary and secondary standards. Primary standards are intended to protect public health, whereas secondary standards are intended to protect public welfare and the environment.

^b The federal 1-hour standard of 12 parts per hundred million was in effect from 1979 through June 15, 2005. The revoked standard is referenced because it was employed for such a long period and is a benchmark for State Implementation Plans.

^c The annual and 24-hour NAAQS for sulfur dioxide only apply for 1 year after designation of the new 1-hour standard to those areas that were previously nonattainment for 24-hour and annual NAAQS.

^d CAAQS for visibility reducing particles is defined by an extinction coefficient of 0.23 per kilometer—visibility of 10 miles or more due to particles when relative humidity is less than 70%.

State

California Clean Air Act

In 1988, the state legislature adopted the California CAA, which established a statewide air pollution control program. The California CAA requires all air districts in the state to endeavor to meet the CAAQS by the earliest practical date. Unlike the federal CAA, the California CAA does not set precise attainment deadlines. Instead, the California CAA establishes increasingly stringent requirements for areas that will require more time to achieve the standards. CAAQS are generally more stringent than the NAAQS and incorporate additional standards for sulfates, hydrogen sulfide, visibility reducing particles, and vinyl chloride. The CAAQS and NAAQS are both listed in Table 3.3-1.

CARB and regional air districts bear responsibility for achieving California's air quality standards, which are to be achieved through district-level air quality management plans that would be incorporated into the SIP. In California, EPA has delegated the authority to prepare SIPs to CARB, which, in turn, has delegated that authority to individual air districts. CARB traditionally has established state air quality standards, maintaining oversight authority in air quality planning,

developing programs for reducing emissions from motor vehicles, developing air emission inventories, collecting air quality and meteorological data, and approving SIPs.

The California CAA designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts the authority to implement transportation control measures. The California CAA also emphasizes the control of “indirect and area-wide sources” of air pollutant emissions. The California CAA gives local air pollution control districts explicit authority to regulate indirect sources of air pollution and to establish traffic control measures.

Toxic Air Contaminant Regulation

California regulates toxic air contaminants (TACs) primarily through the Toxic Air Contaminant Identification and Control Act of 1983 (Tanner Act) and the Air Toxics “Hot Spots” Information and Assessment Act of 1987 (“Hot Spots” Act). In the early 1980s, CARB established a statewide comprehensive air toxics program to reduce exposure to air toxics. The Tanner Act created California’s program to reduce exposure to air toxics. The “Hot Spots” Act supplements the Tanner Act by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

In August 1998, CARB identified diesel particulate matter (DPM) from diesel-fueled engines as TACs. In September 2000, CARB approved a comprehensive *Diesel Risk Reduction Plan* to reduce emissions from both new and existing diesel-fueled engines and vehicles. The goal of the plan is to reduce DPM (which is respirable particulate matter) emissions and the associated health risk by 75% in 2010 and by 85% by 2020. The plan identifies 14 measures that CARB will implement over the next several years.

Regional

The air pollution control districts and air quality management districts regulate air quality at the regional level. Air districts have local responsibility in overseeing stationary-source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality–related sections of environmental documents required by the California Environmental Quality Act (CEQA). The air districts are also responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws and for ensuring that NAAQS and CAAQS are met.

The study area is located in three different air quality management or air pollution control districts. These districts are BAAQMD, NSCAPCD, and YSAQMD. Each of these districts has its own set of air quality thresholds and rules that apply to projects within its jurisdiction, including ongoing O&M activities. Air district rules and analysis guidance are outlined in their respective CEQA handbooks and associated guidance.

3.3.1.2 Environmental Setting

Ambient air quality is generally affected by climatological conditions, the topography of the air basin, the type and amounts of pollutants emitted, and, for some pollutants, sunlight. The study area consists of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties. These nine counties are mostly located in the San Francisco Bay Area Air Basin

(SFBAAB), with parts of Solano County located in the Sacramento Valley Air Basin (SVAB), and parts of Sonoma County located in the North Coast Air Basin (NCAB).

Regional Topography, Meteorology, and Climate

The SFBAAB is characterized by complex terrain consisting of coastal mountain ranges, inland valleys, and bays, which can distort wind flow patterns. During the summer, the Pacific high pressure cell is centered over the northeastern Pacific Ocean, resulting in stable meteorological conditions and a steady northwesterly wind flow. In the winter, the Pacific high-pressure cell weakens and shifts southward, resulting in wind flow offshore, the absence of upwelling, and the occurrence of storms. Weak inversions coupled with moderate winds result in a low air pollution potential. A large-scale gradient (differential) in temperature is often created between the coast and the Central Valley because land tends to heat up and cool off more quickly than water, and small-scale local gradients are often produced along the shorelines of the ocean and bays.

The amount of annual precipitation can vary greatly from one part of the SFBAAB to another even within short distances. In general, total annual rainfall can reach 40 inches in the mountains, but it is often less than 16 inches in sheltered valleys. Winter rains account for about 75% of the average annual rainfall.

The NCAB is located just north of the SFBAAB and is similar in terms of meteorology and climate. In summer, warm ground surfaces draw cool air in from the coast, creating frequent thick fogs along the coast and making northwesterly winds common. In winter, precipitation is high, surface wind directions are highly variable, and weather is more affected by oceanic storm patterns.

The SVAB contains parts of the northeast portion of Solano County. Overall, the topography of the SVAB is very flat, but is bounded by the Coast Ranges on the west and the Sierra Nevada on the east. The portion of the study area in the SVAB is located predominantly within Solano County. Hot, dry summers and mild, rainy winters characterize the Mediterranean climate of the SVAB. During the year, the temperature may range from 20 degrees Fahrenheit (°F) to 115°F with summer highs usually in the 90s and winter lows occasionally below freezing. Average annual rainfall is about 20 inches, and the rainy season generally occurs November through March.

Criteria Air Pollutants

As discussed previously, the federal and state governments have established NAAQS and CAAQS, respectively, for six criteria pollutants: ozone, lead, carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and particulate matter (PM), which consists of PM less than or equal to 10 microns in diameter (PM₁₀) and PM less than or equal to 2.5 microns in diameter (PM_{2.5}). Ozone and NO₂ are considered regional pollutants because they (or their precursors) affect air quality on a regional scale. Pollutants such as CO, SO₂, and lead are considered local pollutants that tend to accumulate in the air locally.

The primary criteria pollutants of concern in the study area are ozone (including reactive organic gases [ROGs] and nitrogen oxides [NO_x]), CO, and PM. Principal characteristics of these pollutants are described below.

Ozone

Ozone, or smog, is photochemical oxidant that is formed when ROGs and NO_x, both by-products of the internal combustion engine, react with sunlight. Ozone poses a health threat to those who

already suffer from respiratory diseases as well as to healthy people. Additionally, ozone has been tied to crop damage, typically in the form of stunted growth and premature death. Ozone can also act as a corrosive, resulting in property damage, such as the degradation of rubber products.

Volatile Organic Compounds or Reactive Organic Gases

Volatile organic compounds (VOCs) or ROG are compounds made up primarily of hydrogen and carbon atoms. Internal combustion associated with motor vehicles is the major source of hydrocarbons. Other sources of ROG are emissions associated with the use of paints and solvents, the application of asphalt paving, and the use of household consumer products such as aerosols. Adverse effects on human health are not caused directly by ROG but rather by reactions of ROG to form secondary pollutants such as ozone.

Nitrogen Oxides

NO_x serve as integral participants in the process of photochemical smog production. The two major forms of NO_x are nitric oxide (NO) and NO₂. NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature or high pressure. NO₂ is a reddish-brown, irritating gas formed by the combination of NO and oxygen. NO_x acts as an acute respiratory irritant and increases susceptibility to respiratory pathogens.

NO_x forms when fuel is burned at high temperatures. Typical human-made sources of NO_x include motor vehicles; fossil-fueled electricity generation utilities; and other industrial, commercial, and residential sources that burn fuels. NO_x can harm humans by affecting the respiratory system. Small particles can penetrate the sensitive parts of the lungs, cause or worsen respiratory disease, and aggravate existing heart conditions. As discussed previously, ozone is formed when NO_x and ROGs (i.e. hydrocarbons) react with sunlight.

Particulate Matter

PM consists of finely divided solids or liquids such as soot, dust, aerosols, fumes, and mists. Two forms of fine particulates are now recognized—inhalable coarse particles, or PM₁₀, and inhalable fine particles, or PM_{2.5}. Particulate discharge into the atmosphere results primarily from industrial, agricultural, construction, and transportation activities. However, wind on arid landscapes also contributes substantially to local particulate loading. Both PM₁₀ and PM_{2.5} may adversely affect the human respiratory system, especially in people who are naturally sensitive or susceptible to breathing problems.

Carbon Monoxide

CO is a colorless, odorless, toxic gas produced by incomplete combustion of carbon substances, such as gasoline or diesel fuel. The primary adverse health effect associated with CO is interference with normal oxygen transfer to the blood, which may result in tissue oxygen deprivation and, in extreme cases, death.

Toxic Air Contaminants

Although NAAQS and CAAQS have been established for criteria pollutants, no ambient standards exist for TACs. Many pollutants are identified as TACs because of their potential to increase the risk of developing cancer or because of their acute or chronic health risks. For TACs that are known or suspected carcinogens, CARB has consistently found that there are no levels or thresholds below

which exposure is risk-free. Individual TACs vary greatly in the risks they present. At a given level of exposure, one TAC may pose a hazard that is many times greater than another. TACs are identified and their toxicity is studied by the California Office of Environmental Health Hazard Assessment.

Air toxics are generated by a variety of sources: stationary sources, such as dry cleaners, gas stations, auto body shops, and combustion sources; mobile sources, such as diesel trucks, ships, and trains; and area sources, such as farms, landfills, and construction sites. Adverse health effects of TACs can be carcinogenic (cancer-causing), short-term (acute) noncarcinogenic, and long-term (chronic) noncarcinogenic. Direct exposure to these pollutants has been shown to cause cancer, birth defects, damage to the brain and nervous system, and respiratory disorders.

Existing Air Quality

CARB and the regional air districts maintain a network of monitoring stations that record daily and annual pollutant concentrations. The local monitoring data are used to designate areas as nonattainment, maintenance, attainment, or unclassified for the NAAQS and CAAQS. The four designations are defined as follows.

- **Nonattainment**—assigned to areas where monitored pollutant concentrations consistently violate the standard in question.
- **Maintenance**—assigned to areas where monitored pollutant concentrations exceeded the standard in question in the past but are no longer in violation of that standard.
- **Attainment**—assigned to areas where pollutant concentrations meet the standard in question over a designated period of time.
- **Unclassified**—assigned to areas where data are insufficient to determine whether a pollutant is violating the standard in question.

Table 3.3-2 provides the current NAAQS and CAAQS attainment status for the study area in the three air basins. Most of the study area is currently designated as nonattainment for ozone, PM10, and PM2.5 (state and federal for ozone, state only for PM10 and PM2.5).

Table 3.3-2. Federal and State Attainment Status of the Study Area by Air Basin

Pollutant	SFBAAB	NCAB	SVAB
Federal Standards (NAAQS)			
Ozone	Marginal Nonattainment	Attainment	Severe 15 Nonattainment ^a
CO	Moderate Maintenance ^b	Attainment/Maintenance	Moderate Maintenance ^b
PM2.5	Moderate Nonattainment	Attainment	Moderate Nonattainment
PM10	Attainment	Attainment	Attainment
NO ₂	Attainment	Attainment	Attainment
SO ₂	Attainment	Attainment	Attainment
Lead	Attainment	Attainment	Attainment
State Standards (CAAQS)			
Ozone	Nonattainment	Nonattainment	Nonattainment
CO	Attainment	Attainment/Unclassified	Attainment
PM2.5	Nonattainment	Attainment	Nonattainment
PM10	Nonattainment	Attainment ^b	Nonattainment

Pollutant	SFBAAB	NCAB	SVAB
NO ₂	Attainment	Attainment	Attainment
SO ₂	Attainment	Attainment	Attainment
Lead	Attainment	Attainment	Attainment
Sulfates	Attainment	Attainment	Attainment
H ₂ S	Unclassified	Unclassified	Unclassified
VRP	Unclassified	Unclassified	Unclassified

Sources: U.S. Environmental Protection Agency 2017; California Air Resources Board 2017.

CAAQS = California Ambient Air Quality Standards

CO = carbon monoxide

H₂S = hydrogen sulfide

NAAQS = National Ambient Air Quality Standards

NCAB = North Coast Air Basin

NO₂ = nitrogen dioxide

PM₁₀ = particulate matter less than or equal to 10 microns in diameter

PM_{2.5} = particulate matter less than or equal to 2.5 microns in diameter

SFBAAB = San Francisco Bay Area Air Basin

SO₂ = sulfur dioxide

SVAB = Sacramento Valley Air Basin

VRP = visibility reducing particles

^a Areas classified as severe-15 must attain the NAAQS within 15 years of the effective date of the nonattainment designation

^b Designation applies to a portion of the study area.

Table 3.3-3 shows electricity and gas transmission and distribution facilities by air basin within the study area. The percentage is the length within the selected air basin. The SFBAAB has the vast majority of electricity and gas transmission and distribution facilities within the study area.

Table 3.3-3. Electricity and Gas Facilities by Air Basin

Type	Air Basin	Miles	Percentage
Electric	Lake County	<1	<1%
	North Central Coast	3	<1%
	North Coast	1,563	5%
	Sacramento Valley	1,609	5%
	San Francisco Bay	28,933	90%
	San Joaquin Valley	0	<1%
	<i>Total</i>	<i>32,109</i>	<i>100%</i>
Gas	North Central Coast	<1	<1%
	North Coast	160	1%
	Sacramento Valley	562	3%
	San Francisco Bay	19,891	96%
	<i>Total</i>	<i>20,613</i>	<i>100%</i>

Sensitive Receptors

The NAAQS and CAAQS apply at publicly accessible areas, regardless of whether those areas are populated. For the purposes of air quality analysis, sensitive land uses are defined as locations where human populations, especially children, seniors, and sick persons, are located and where there is reasonable expectation of continuous human exposure according to the averaging period for the air quality standards (e.g., 24-hour, 8-hour, and 1-hour). Typical sensitive receptors include residences, hospitals, and schools.

Because O&M activities are ongoing and dispersed throughout the study area, it is not possible to know where the nearest sensitive receptors are located. In rural areas, there may be no sensitive receptors located near construction areas. However, since most of the study area is located within the SFBAAB, which includes numerous densely populated urban areas, it is expected that sensitive receptors would be located within relatively close proximity to some O&M and minor new construction activities.

3.3.2 Environmental Impacts

3.3.2.1 Methods for Analysis

O&M activities would continue to generate traffic and associated vehicle emissions on roads and highways in the study area. Activities that require physical changes or heavy-duty equipment would also generate construction emissions through earthmoving activities and heavy-duty diesel-powered equipment. Although the majority of covered activities are similar to the ongoing activities currently undertaken and would take place within or immediately adjacent to existing Pacific Gas and Electric Company (PG&E) rights-of-way (ROWs), the precise sizes and locations of individual activities on these lands are not known at this time. In addition, because PG&E has conducted O&M activities in the study area for more than 30 years, O&M impacts described in this section represent baseline environmental conditions that would not change following approval of the Incidental Take Permit (ITP). Thus, it is not possible to identify the specific amount of air quality emissions that would result from covered activities, or where emissions would be generated. Accordingly, air quality impacts are assessed qualitatively based on the expected types, frequency, and intensity of construction and O&M activities, relative to existing conditions. Where applicable, previously published analyses of similar types of PG&E projects are used to identify the baseline conditions and inform the impact analysis and discussion.

The analysis discusses the potential for future individual activities in the study area to generate emissions that exceed regional air district thresholds and, where necessary, minimization measures that are available to reduce those emissions. This document focuses on identifying a strategy to ensure that an appropriate level of air quality protections are provided on a case-by-case basis. The analysis considers PG&E's existing environmental programs and avoidance and minimization measures, as described below.

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures

PG&E maintains an air quality program that it implements for all O&M projects and minor new construction activities. PG&E educates its staff on air quality and related legal requirements, vehicle

operation restrictions, and best management practices (BMPs) to minimize fugitive dust. In addition, BMPs, such as the following examples, are implemented to minimize air pollutant emissions.

- Encourage workers to carpool to the job site to the extent feasible for large jobs. The ability to develop an effective carpool program for the project will depend upon the proximity of carpool facilities to the area, the geographical commute departure points of construction workers, and the extent to which carpooling will not adversely affect worker arrival time and the project's schedule.
- Minimize unnecessary vehicle idling time. The ability to limit vehicle idling time will depend on the sequence of activities and when and where vehicles are needed or staged. Certain vehicles, such as large diesel-powered vehicles, have extended warm-up times following start-up that limit their availability for use following start-up. Where such diesel-powered vehicles are required for repetitive tasks, these vehicles may require more idling time. The crews apply a "common sense" approach to vehicle use, so that idling is reduced as far as possible below the maximum of 5 consecutive minutes allowed by California law; if a vehicle is not required for use immediately or continuously, its engine will be shut off.
- Maintain equipment in proper working conditions in accordance with PG&E standards.
- Minimize equipment exhaust by using low-emission or electric equipment where feasible. Portable diesel-fueled construction equipment with engines 50 horsepower or larger and manufactured in 2000 or later are registered under the CARB Statewide Portable Equipment Registration Program.
- Minimize welding and cutting by using compression of mechanical applications where practical and within standards.
- Encourage use of natural gas or electric powered vehicles for passenger cars and light-duty trucks where feasible and available.
- Encourage the recycling of waste where feasible.

Fugitive dust BMPs are typically designed and implemented to meet the requirements of the applicable air quality management district and typically would include the following or similar practices. The applicant proposed measure (APM) provided below includes the relevant rules within the study area and will be implemented on all projects as appropriate.

APM AIR-1: Implement Dust Control Best Management Practices

PG&E will implement control measures to reduce construction-related fugitive dust. The following measures are based on BAAQMD's CEQA guidelines and are in conformance with fugitive dust control recommendations from the NSCAPCD and YSAQMD. Updates may be incorporated as new measures are recommended.

- All exposed surfaces will be watered at a frequency adequate to maintain minimum soil moisture of 12%. Moisture content can be verified by lab samples or moisture probe.
- All haul trucks transporting soil, sand, or other loose material offsite will be covered.
- All visible mud or dirt track-out onto adjacent public roads will be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads will be limited to 15 miles per hour (mph).

- All roadways, driveways, and sidewalks to be paved will be completed as soon as possible. Building pads will be laid as soon as possible after grading unless seeding or soil binders are used.
- All excavation, grading, and/or demolition activities will be suspended when average wind speeds exceed 20 mph.
- Wind breaks (e.g., trees, fences) will be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50% air porosity.
- Vegetative ground cover (e.g., fast-germinating native grass seed) will be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.
- The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time will be limited. Activities will be phased to reduce the amount of disturbed surfaces at any one time.
- All trucks and equipment, including their tires, will be washed off prior to leaving the site.
- Site accesses to a distance of 100 feet from the paved road will be treated with a 6- to 12-inch compacted layer of wood chips, mulch, or gravel.
- Sandbags or other erosion control measures will be installed to prevent silt runoff to public roadways from sites with a slope greater than 1%.

Significance Criteria

In accordance with Appendix G of the State CEQA Guidelines, the potential significance of impacts on air quality from the proposed project and implementation of covered activities was evaluated for each of the following criteria:

- Conflict with or obstruct implementation of the applicable air quality plan.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard.
- Expose sensitive receptors to substantial pollutant concentrations.
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

As discussed previously, the study area spans three air districts (BAAQMD, NSCAPCD, and YSAQMD). Table 3.3-4 shows the criteria pollutant thresholds for each of these air districts. The thresholds consider whether a project's emissions would result in a cumulatively considerable adverse contribution to existing air quality conditions. If a project's emissions would be less than these levels, the project would not be expected to result in a cumulatively considerable contribution to the significant project-level and cumulative impact.

Table 3.3-4. Air District Criteria Pollutant and Precursor Thresholds

Analysis	BAAQMD	NSCAPCD	YSAQMD
Construction	ROG: 54 lbs/day	ROG: 40 tons/yr	ROG: 10 tons/yr
	NO _x : 54 lbs/day	NO _x : 40 tons/yr	NO _x : 10 tons/yr
	PM10: 82 lbs/day (exhaust only)	PM10: 15 tons/yr	PM10: 80 lbs/day
	PM2.5: 54 lbs/day (exhaust only)	PM2.5: 10 tons/yr	

Analysis	BAAQMD	NSCAPCD	YSAQMD
		CO: 100 tons/yr	
Operations	ROG: 54 lbs/day or 10 tons/yr NO _x : 54 lbs/day or 10 tons/yr PM10: 82 lbs/day or 15 tons/yr PM2.5: 54 lbs/day or 10 tons/yr CO: Violation of CAAQS	Same as construction	Same as construction (ROG, NO _x , PM10) CO: Violation of CAAQS
Sources: Bay Area Air Quality Management District 2017; Yolo-Solano Air Quality Management District 2007; Saschin pers. comm.			
BAAQMD= Bay Area Air Quality Management District			
CAAQS = California Ambient Air Quality Standards			
CO = carbon monoxide			
PM10 = particulate matter less than or equal to 10 microns in diameter			
PM2.5 = particulate matter less than or equal to 2.5 microns in diameter			
lbs = pounds			
NSCAPCD = Northern Sonoma County Air Pollution Control District			
NO _x = nitrogen oxides			
ROG = reactive organic gas			
yr = year			
YSAQMD= Yolo-Solano Air Quality Management District			

NSCAPCD's and BAAQMD's thresholds are based on the new source review (NSR) offset requirements for stationary sources. BAAQMD has concluded that the stationary pollutants described under the NSR program are equally significant to those pollutants generated with land use projects. BAAQMD's thresholds were set as the total emission thresholds associated within the NSR program to help attain the health-protective NAAQS (Bay Area Air Quality Management District 2017).

YSAQMD's ozone precursor thresholds are based on the emissions levels identified under Rule 3.20—Ozone Transport Mitigation, which implements the California Ozone Transport Mitigation Regulation codified under California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 1.5, Article 6, Section 70600(b)(1)(C). The Transport Mitigation Regulation was adopted to ensure that air quality is not significantly degraded by new sources of emissions, inclusive of pollutant transport to downwind air districts. Based on the ozone attainment status of YSAQMD and its location within the broader Sacramento Area, Rule 3.20 requires a 10 tons per year “no net increase” program for NO_x and ROG generated by stationary sources. YSAQMD has concluded that the stationary source restriction established by Rule 3.20 is equally applicable to land use projects. YSAQMD's regional ozone thresholds for attaining the CAAQS and NAAQS were therefore set as the total emission thresholds associated with Rule 3.20 and the California Ozone Transport Mitigation Regulation (Yolo-Solano Air Quality Management District 2007).

YSAQMD's PM10 thresholds are based on the emissions levels identified under the NSR program, which is a permitting program established by Congress as part of the CAA Amendments of 1990 to ensure that air quality is not significantly degraded by new sources of emissions. YSAQMD's NSR program requires best available control technologies (BACT) to be applied where new or modified PM10 emissions exceed 80 pounds per day. Therefore, a project's PM10 emissions that trigger the YSAQMD's BACT threshold for PM10 would result in substantial air emissions and have a potentially significant impact on air quality (Yolo-Solano Air Quality Management District 2007).

As shown in Table 3.3-4, BAAQMD and YSAQMD both consider localized CO concentrations above the CAAQS to be of concern. YSAQMD's (2007) CEQA Handbook specifically states that CO “hotspots

are usually associated with roadways that are congested and have heavy traffic volume.” BAAQMD (2017) has adopted the following screening criteria that provide a conservative presumption of when project-generated traffic would not cause a potential violation of the CO CAAQS:

- Project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
- Project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).
- The project is consistent with an applicable congestion management plan established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans.

YSAQMD (2017) has also adopted screening criteria for the analysis of CO concentrations from project-generated traffic. These criteria are based on whether a project would reduce the level of service (LOS) at affected intersections to LOS E or F.

BAAQMD (2017) has also adopted health risk thresholds to evaluate receptor exposure to TAC emissions and localized PM_{2.5} concentrations. Although not formally adopted, YSAQMD (2007) recommends use of the same health risk thresholds, which are the probability of contracting cancer for the maximum exposed individual (MEI) exceeding 10 in 1 million, or the ground-level concentrations of noncarcinogenic TACs resulting in a hazard index (HI) greater than 1 for the MEI.

Although there are no quantitative thresholds applicable to odors, all three air districts have adopted nuisance rules. BAAQMD (2017) considers odors to be a significant public nuisance if five confirmed complaints are received per year (averaged over 3 years) for the same facility.

3.3.2.2 Impact Discussion

Impact AQ-1: Conflict with or obstruct implementation of the applicable air quality plans (Less-than-Significant Impact)

There are several air quality plans that are applicable to the study area given the multijurisdictional nature of the study area and pollutants of concern for these regions. Requirements of the air quality plans are adopted, as applicable, by the governing air quality management district, and are enforced through district rules and regulations. Covered activities would be conducted in compliance with applicable federal, state, and regional air district requirements.

The mass emissions thresholds developed by BAAQMD, YSAQMD, and NSCAPCD to assess the potential for a project to violate the local air quality standards or contribute to an air quality standard violation correlate to the planned increases in air pollutant emissions that are assumed in the applicable regional air quality plans. Therefore, project-related increases that would exceed the BAAQMD, YSAQMD, and NSCAPCD significance thresholds would be considered to conflict with or obstruct implementation of an applicable air quality plan. If a project's emissions would be less than these thresholds, the project would not be expected to conflict with or obstruct implementation of the applicable air quality plans.

As described under Impact AQ-2, ongoing O&M will continue to generate varying levels of criteria pollutants, depending on the type and duration of activity. Emissions originate from the following sources.

- Vehicles used for employee access to the site, inspections, patrols, and materials delivery.
- Helicopters used for line stringing activities.
- Off-road equipment (e.g., bulldozers) used for minor new construction.
- Painting and asphalt paving.
- Ground-disturbing activities (e.g., grading).

Relative to existing conditions, emissions from O&M activities are expected to decline over the 30-year term of the ITP as PG&E replaces its vehicles and equipment with more efficient, less polluting models. No new permanent emission-generating facilities would be installed as part of O&M activities, and any replacement of existing facilities would be in kind. Accordingly, O&M activities would not result in a net increase of emissions, relative to existing conditions.

Minor new construction activities would result in short-term emissions; however, as discussed under Impact AQ-2, these emissions are not expected to exceed the applicable construction-related thresholds of significance in BAAQMD, YSAQMD, and NSCAPCD rules. Therefore, the covered activities would not conflict with any applicable air quality plans, and this impact would be less than significant. APM AIR-1, which includes the relevant air quality management district rules within the study area, will further reduce less-than-significant impacts.

Impact AQ-2: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (Less-than-Significant Impact)

Covered activities could result in the generation of criteria pollutants from on-road vehicle movement, use of mobile and stationary equipment, painting and asphalt paving, and earthmoving (e.g., grading). These emissions-generating sources may be used during operational activities, maintenance activities, or construction activities, which are each described below. In general, emissions would vary substantially depending on the level of activity, length of the activity, specific operations, types of equipment, number of personnel, wind and precipitation conditions, and soil moisture content.

Operational activities, which would be a continuation of ongoing activities, typically include inspecting, monitoring, testing, and operating valves, enclosures, switches, and other components. These activities involve utility personnel working at existing facilities for discrete and designated periods of time. In general, most operational activities are minor and temporary, involving few vehicle trips. Relative to existing conditions, emissions are expected to decline over the 30-year term of the ITP as PG&E replaces its vehicles and equipment with more efficient, less polluting models. No new permanent emission-generating facilities would be installed, and any replacement of existing facilities would be in kind.

Maintenance activities include repairing and replacing facilities, structures, and access roads. This work also includes emergency repair and replacement and vegetation management, including tree pruning and removal. Emissions associated with maintenance activities result from vehicle trips and use of heavy-duty equipment when required for facility repair or replacement. Fugitive dust and ROG_s are also generated during earthmoving or paving, as required. Most maintenance activities are small in scale and short term. Activities requiring the most intensive equipment and vehicle use are pipeline replacement and re-conductoring. Emissions from pipeline replacement and re-conductoring originate from mobile and stationary construction equipment exhaust, employee and haul truck

vehicle exhaust, and land clearing. Pipeline replacement may also involve trenching, which is a source of fugitive dust. Similar to operational activities, maintenance activities would be a continuation of ongoing activities, and emissions would likely decrease relative to existing conditions due to vehicle and equipment replacement.

Minor new construction activities include installing new gas pressure limiting station, substation expansion, and new lines to extend service to locally approved new residential or commercial customers. As discussed in Chapter 2, *Project Description*, there are limitations on the size and types of activities that count as minor new construction under the ITP. Criteria pollutant emissions would be generated by mobile and stationary construction equipment exhaust, employee and haul truck vehicle exhaust, and land clearing. Activities on linear projects would not take place in one location and most construction activities would be relatively small in scale (e.g., an average of 0.23 acre of permanent disturbance for each new distribution/transmission line project, and an average of 0.29 acre of disturbance for each electric tower line construction project). Likewise, depending on the activity, minor new construction activities would occur no more than two times per year per activity (refer to Table 2-2).

Minor new construction with the greatest likelihood to generate emissions would be new customer pipeline installation, new distribution and transmission line construction or relocation, electric tower line construction, and minor substation expansion. Based on previous similar projects, emissions from these types of construction activities are not likely to exceed applicable air district thresholds in the BAAQMD, YSAQMD, and NSCAPCD.¹ PG&E would obtain any applicable permits and, in the unlikely event that an activity exceeds a threshold, would mitigate impacts as required by the regional air district. All construction activities would also be subject to PG&E's air quality program, which would reduce criteria pollutant emissions. Because emissions from minor new construction activities would not exceed applicable thresholds, and because PG&E's air quality program would further reduce emissions, this impact would be less than significant.

Impact AQ-3: Expose sensitive receptors to substantial pollutant concentrations (Less-than-Significant Impact)

The primary pollutants of concern with respect to health risks to sensitive receptors are criteria pollutants (regional and local) and TAC. Ozone precursors (ROG and NO_x) and PM are considered regional pollutants because they affect air quality on a regional scale. Localized pollutants are deposited and potentially affect population near the emissions source. Because these pollutants dissipate with distance, emissions from individual projects can result in direct and material health impacts on adjacent sensitive receptors. The localized criteria pollutants of concern that would be generated by the project are PM (fugitive dust) and CO. The primary TAC of concern is DPM.

¹ For example, ROG and NO_x emissions from electric tower line or new distribution and transmission line construction would be expected to be in the range of less than 0.5 and less than 3 tons per year, respectively, based on modeling from the Cressey-Gallo 115-kV Power Line environmental analysis (which included construction of a 14.4-mile line; as shown in Chapter 2, covered linear activities, like transmission line construction, are limited to 2 miles or less). With regard to daily emissions, this would equate to approximately 5 and 39 pounds per day, respectively. These annual emissions are below the YSAQMD and NSCAPCD annual emissions thresholds for ROG and NO_x (10 tons/year for YSAQMD, 40 tons/year for NSCAPCD), and daily emissions are below the BAAQMD daily emissions thresholds for ROG and NO_x (54 lbs/day).

Regional Criteria Pollutants

Adverse health effects induced by regional criteria pollutant emissions (ozone precursors and PM) generated by performing the covered activities are highly dependent on a multitude of interconnected variables, including cumulative concentrations, local meteorology and atmospheric conditions, and the number, age and gender of exposed individuals. Because local conditions may spread emissions in unpredictable ways, ozone precursors (ROG and NO_x) emissions generated in one area may not equate to a specific ozone concentration in that same area. Similarly, some types of particulate pollution may be transported over long distances or formed through atmospheric reactions. As such, the magnitude and locations of specific health effects from exposure to increased ozone or regional PM concentrations are the product of emissions generated by numerous sources throughout a region, as opposed to a single individual project. Moreover, exposure to regional air pollution does not guarantee that an individual will experience an adverse health effect—there are large individual differences in the intensity of symptomatic responses to air pollutant. These differences are influenced, in part, by the underlying health condition of an individual, which cannot be known.

As discussed above, the air quality districts in the study area develop region-specific CEQA thresholds of significance in consideration of existing air quality concentrations and attainment or nonattainment designations under the NAAQS and CAAQS. Recognizing that air quality is a cumulative problem, air districts typically consider projects that generate criteria pollutants and ozone precursor emissions below the thresholds to be minor in nature. Such projects would not adversely affect air quality or exceed the NAAQS or CAAQS. As described under Impact AQ-2, implementation of the covered activities is highly unlikely to generate ROG, NO_x, or PM emissions in excess of applicable air district thresholds. As such, the project would not contribute a significant level of air pollution that would degrade long-term, regional air quality.

Localized Criteria Pollutants

During grading and excavation activities required for minor construction activities, localized fugitive dust would be generated. The amount of dust generated by a project is highly variable and dependent on the size of the disturbed area at any given time, the amount of activity, soil conditions, and meteorological conditions. BAAQMD's CEQA Air Quality Guidelines consider dust impacts to be less than significant if BAAQMD's construction BMPs are employed to reduce such emissions. Because BAAQMD's Basic Construction Mitigation Measures would be implemented, per APM AIR-1, construction-related fugitive dust emissions would be less than significant and would not expose receptors to substantial pollutant concentrations or risks.

Continuous engine exhaust during project operations may elevate localized CO concentrations, resulting in hot spots. Receptors exposed to these CO hot spots may have a greater likelihood of developing adverse health effects, such as fatigue, headaches, confusion, dizziness, and chest pain. CO hot spots are typically observed at heavily congested intersections where a substantial number of gasoline-powered vehicles idle for prolonged durations throughout the day. As discussed above, BAAQMD has developed screening criteria to assist lead agencies in evaluating potential impacts from localized CO. As discussed in Section 3.17, *Transportation and Traffic*, traffic generated directly by covered activities would be minimal, involving a varying number of personnel driving to and from work areas throughout the day. Depending on the activity, crews would generally consist of two to five workers for O&M activities and 10 to 20 workers for minor new construction activities. Traffic for habitat management and enhancement activities would be similar. The limited number of vehicle trips generated by crew members traveling and hauling equipment to and from work areas

would neither substantially worsen delay at existing intersections nor exceed BAAQMD's volume-based screening criteria of 44,000 vehicles per hour. Therefore, the project would not expose sensitive receptors to substantial CO concentrations.

Diesel Particulate Matter

Covered activities would be implemented in rural, urban, and suburban areas, including some areas of residential development. Although most of the covered activities would take place within PG&E ROWs, residential properties are located close to PG&E ROWs in many areas throughout the study area. Covered activities would predominantly be short term and temporary. No new permanent criteria pollutant-generating facilities would be installed, and any replacement of existing facilities would be in kind, likely resulting in an emissions reduction attributable to improvements in technology. Emissions from O&M activities are likewise expected to decline, relative to existing conditions, due to implementation of PG&E's air quality program. Accordingly, health risks from exposure to emissions from O&M activities are anticipated to be similar to existing conditions, and may decrease, over the 30-year term of the ITP.

Minor new construction activities could result in the generation of short-term diesel exhaust emissions from the use of helicopters (if required), onsite heavy-duty equipment, and offsite vehicles required for materials deliveries and debris hauling. Particulate exhaust emissions from diesel-fueled engines (DPM) were identified as a TAC by CARB in 1998. The dose to which receptors are exposed is the primary factor affecting health risk from TACs. Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance or substances. According to the Office of Environmental Health Hazard Assessment, health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 30-year exposure period when assessing TACs (such as DPM) that have only cancer or chronic noncancer health effects (Office of Environmental Health Hazard Assessment 2015). However, such health risk assessments should be limited to the duration of the emission-producing activities.

Emission-generating activities required for minor new construction would be relatively small and short term and would be spread out throughout the nine-county study area. For example, construction activities at individual utility poles along a transmission alignment would require no more than 1 to 2 days. Consequently, individual receptors would not be exposed to elevated levels of DPM for an extended period. In addition, PG&E has committed to implementing many BMPs (described under *PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures*) that would reduce overall emissions from construction activities. The use of BMPs, including those to reduce construction vehicle and equipment exhaust emissions, and the use of hybrid electric and fuel cell vehicles as part of PG&E's clean fleet program would reduce the likelihood that receptors would be exposed to substantial pollutant concentrations. In addition, because health risks associated with DPM are generally associated with chronic exposure and are assessed over a 30-year exposure period, emissions from minor new construction activities would have a limited potential to affect sensitive receptors. Therefore, the covered activities would result in a less-than-significant impact on nearby sensitive receptors.

Impact AQ-4: Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people (Less-than-Significant Impact)

Covered activities would generate mobile source emissions (e.g., from vehicles and the use of diesel equipment), which could result in the creation of objectionable odors. Such odors are temporary and generally not at magnitudes that affect substantial numbers of people. Further, covered activities would be spatially dispersed throughout the nine-county study area. Therefore, odors from these activities are not expected to affect a substantial number of people, and odors impacts would be less than significant.

3.3.3 References Cited

3.3.3.1 Printed References

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3.3.3.2 Personal Communications

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3.4 Biological Resources

3.4.1 Existing Conditions

3.4.1.1 Regulatory Setting

Federal

Federal Endangered Species Act

The federal Endangered Species Act (FESA) protects plants and wildlife that are listed as endangered or threatened by the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS). FESA prohibits take of endangered wildlife, where "take" is defined as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct" (16 United States Code [USC] Sections 1532[19], 1538). For plants, this statute governs removing, possessing, maliciously damaging, or destroying any listed plant on federal land and removing, cutting, digging up, damaging, or destroying any listed plant on non-federal land in knowing violation of state law (16 USC Section 1538[c]).

Under Section 7 of the FESA, federal agencies are required to consult with the USFWS or NMFS if their actions, including permit approvals or funding, could adversely affect a listed species (including plants) or its critical habitat. Through consultation and the issuance of a Biological Opinion, USFWS and NMFS may issue an incidental take statement, allowing take of the species that is incidental to another authorized activity, provided that the action would not jeopardize the continued existence of the species. Section 10 of the FESA provides for issuance of Incidental Take Permits (ITP) to private parties with the development of a Habitat Conservation Plan (HCP).

Bald and Golden Eagle Protection Act

The bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*) are federally protected under the Bald and Golden Eagle Protection Act (BGEPA), which was passed in 1940 to protect the bald eagle and amended in 1962 to include the golden eagle (16 USC Section 668a-d). The BGEPA prohibits the take, possession, sale, purchase, barter, offering to sell or purchase, export or import, or transport of bald eagles and golden eagles and their parts, eggs, or nests without a permit issued by the USFWS. The definition of "take" includes to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb. The BGEPA prohibits any form of possession or take of either eagle species, and imposes criminal and civil sanctions, as well as an enhanced penalty provision for subsequent offenses. Further, the BGEPA provides for the forfeiture of anything used to acquire eagles in violation of the statute. Regarding its prohibitions on possession, the statute exempts the use of eagles or eagle parts for exhibition, scientific, and Native American religious uses.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) protects migratory birds and any of their parts, eggs, and nests from activities such as intentionally hunting, pursuing, capturing, killing, selling, and shipping,

unless expressly authorized in the regulations or by permit. As authorized by the MBTA, USFWS issues permits to qualified applicants for the following types of activities.

- Falconry.
- Raptor propagation.
- Scientific collecting.
- Special purposes such as rehabilitation, education, migratory game bird propagation, and salvage.
- Take of depredating birds, taxidermy, and waterfowl sale and disposal.

The regulations governing migratory bird permits can be found in Title 50, Part 13 (General Permit Procedures) and Part 21 (Migratory Bird Permits) of the Code of Federal Regulations, which authorizes the issuance of permits for utility-related activities related to migratory birds, which are otherwise outside the scope of other migratory bird permits.

Clean Water Act

Section 404

The purpose of the Clean Water Act (CWA) is to “restore and maintain the chemical, physical, and biological integrity of the nation’s waters.” Section 404 of the CWA prohibits the discharge of dredge or fill material into waters of the United States without a permit from the U.S. Army Corps of Engineers (USACE). Under the current USACE-administered Nationwide Permit program, “activities required for the construction, maintenance, repair, and removal of utility lines and associated facilities” may be authorized under Nationwide Permit 12 (Utility Line Activities) if the activity does not result in a loss of more than 0.5 acre of waters of the United States “for each single and complete project.” Permanent impacts on waters of the United States that exceed 0.5 acre may require an Individual Permit. The study area is under the jurisdiction of the San Francisco and Sacramento Districts of USACE.

Section 401

Section 401 of the CWA requires that any discharge allowed under a federal permit or license must be certified by the state, confirming that the discharge would not violate water quality standards. Any Section 404 permit issued by USACE must also receive a Section 401 water quality certification or waiver from the relevant Regional Water Quality Control Board (RWQCB). The study area is under the jurisdiction of the San Francisco Bay, North Coast, and Central Valley RWQCBs.

State

California Fish and Game Code

Sections 1600 through 1616

Sections 1600 through 1616 of the California Fish and Game Code require that a notification must be submitted to the California Department of Fish and Wildlife (CDFW) for “any activity that may substantially divert or obstruct the natural flow of, or substantially change or use materials from the bed, channel, or bank of any river, stream, or lake.” CDFW reviews the notification package and, if

necessary, submits to the applicant a Draft Lake or Streambed Alteration Agreement (LSAA) that includes measures to protect affected fish and wildlife resources. The final proposal that is mutually agreed upon by CDFW and the applicant is an LSAA.

Sections 3503, 3503.5, 3513, and 3800

Sections 3503, 3503.5, 3513, and 3800 of the California Fish and Game Code afford protection over the destruction of nests or eggs of native bird species, and it states that no birds in the orders of Falconiformes or Strigiformes (i.e., birds of prey) can be taken, possessed, or destroyed.

Sections 3511, 4700, 5050, and 5515

Sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) of the California Fish and Game Code designate certain species as “fully protected.” Fully protected species may not be taken or possessed, and incidental take of these species cannot be authorized, except under a Natural Community Conservation Plan (NCCP). The State of California first began to designate species as fully protected prior to the creation of the California Endangered Species Act (CESA) and the FESA. Lists of fully protected species were initially developed to provide protection to animals that were rare or faced possible extinction, including fish, amphibians, reptiles, birds, and mammals. Most fully protected species have since been listed as threatened or endangered under the CESA or the FESA. Fully protected species may not be taken or possessed at any time, except under certain circumstances, such as scientific research and live capture and relocation of such species pursuant to a permit for the protection of livestock (California Fish and Game Code Section 3511).

California Endangered Species Act

The CESA (California Fish and Game Code Section 2050) generally parallels the main provisions of the FESA. Section 2080 of the California Fish and Game Code prohibits the take, possession, purchase, sale, and import or export of endangered, threatened, or candidate species, unless otherwise authorized by permit or in the regulations. *Take* is defined in Section 86 of the California Fish and Game Code as to “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.” Pursuant to Section 2081(b) of the California Fish and Game Code, the department may authorize, by permit, the take of endangered, threatened, and candidate species if the take is incidental to otherwise lawful activity. The impacts of the authorized take must be minimized and fully mitigated and issuance of the permit must not jeopardize continued existence of the species.

Native Plant Protection Act

The Native Plant Protection Act (NPPA) of 1977 (California Fish and Game Code Sections 1900–1913) directed CDFW to carry out the Legislature’s intent to “preserve, protect, and enhance rare and endangered plants in this state.” The NPPA is administered by CDFW. The California Fish and Game Commission has the authority to designate native plants as “endangered” or “rare,” and to protect endangered and rare plants from take. When the CESA was passed in 1984, it expanded on the original NPPA, enhanced legal protection for plants, and created the categories of “threatened” and “endangered” species to parallel the FESA.

CDFW generally considers plant species to be rare if they are included on California Rare Plant Rank (CRPR) Lists 1A, 1B, 2A, and 2B of the California Native Plant Society (CNPS) *Inventory of Rare and*

Endangered Plants of California. In addition, CRPR List 3 and 4 plants are sometimes considered in an impact analysis if the population has local significance in the area and would be impacted by a project. CRPR List 1 through 4 plants are included in this environmental impact report (EIR). Section 1913(b) includes a specific provision to allow for the incidental removal of endangered or rare plant species, if not otherwise salvaged by CDFW, within a right-of-way (ROW) to allow a public utility to fulfill its obligation to provide service to the public.

Natural Community Conservation Planning Act

The Natural Community Conservation Planning Act of 1991 is designed to conserve natural communities at the ecosystem scale within California while accommodating compatible land uses. Section 2800 of the California Fish and Game Code implements a collaborative program by the state and numerous public and private partners to take a broad ecosystem-approach to planning for the protection and perpetuation of biological diversity. NCCPs are the result of an effort to move away from specific species protections and implement community-wide protection measures.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1967 (California Water Code Section 13000 et seq.) requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect waters of the state. These criteria include the identification of beneficial uses, narrative and numerical water quality standards, and implementation procedures. Individual water quality control plans are prepared for each RWQCB. These plans set implementation policies, goals, and water management practices in accordance with the Porter-Cologne Water Quality Control Act. Waste discharge requirements and waivers are mechanisms used by the RWQCBs to control discharges and protect water quality.

McAteer-Petris Act

The McAteer-Petris Act of 1965 (Government Code Section 66000 et seq.), as amended, directs the San Francisco Bay Conservation and Development Commission (BCDC) to exercise its authority to issue or deny permit applications for placing fill, extracting materials, or changing the use of any land, water, or structure within the area of its jurisdiction, in conformity with the provisions and policies of both the McAteer-Petris Act and the San Francisco Bay Plan. BCDC jurisdiction consists of the San Francisco Bay (all areas subject to tidal action), a 100-foot-wide band along the bay shoreline, salt ponds diked off from the bay, managed wetlands that have been diked off from the bay, and certain waterways. State law requires that project sponsors proposing to fill or extract materials from San Francisco Bay apply for a BCDC permit, which addresses review by a variety of local agencies, as well as San Francisco Bay RWQCB, USACE, and CDFW.

Local

Although the Pacific Gas & Electric Company's (PG&E) project is not subject to local discretionary land use regulations and ordinances, the following overview of local regulations relating to biological resources is provided for information purposes and to assist with California Environmental Quality Act (CEQA) review.

Suisun Marsh Protection Plan

The Suisun Marsh Protection Plan allows Solano County to manage approximately 89,000 acres of tidal marsh, managed wetlands, adjacent grasslands, and waterways. BCDC now has jurisdiction over most of these acres and a secondary management area of approximately 22,500 acres of significant buffer lands. This plan provides Solano County, under specific guidelines, the authority to prepare and administer a local protection program. BCDC represents the state's interest, serving as the land use permitting agency for major projects in the primary management area and as an appellate body with limited functions in the secondary management area.

Habitat Conservation Plans

East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan

The *East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan* is overseen by the East Contra Costa County Habitat Conservancy (East Contra Costa County Habitat Conservation Plan Association 2006). The plan covers the eastern one-third of Contra Costa County (174,018 acres) and provides Contra Costa County, the Contra Costa County Flood Control and Water District, the East Bay Regional Park District, and the cities of Brentwood, Clayton, Oakley, and Pittsburg with 30-year permits from the USFWS and CDFW that authorize incidental take of covered species. The plan focuses on comprehensive species, wetlands, and ecosystem conservation, and contributes to the recovery of endangered species in California, while allowing for limited take of 28 listed and nonlisted (covered) species.

Santa Clara Valley Habitat Conservation Plan/Natural Communities Conservation Plan

The *Santa Clara Valley Habitat Conservation Plan* is overseen by the Santa Clara Valley Habitat Agency (City of Gilroy et al. 2012). The plan covers approximately 508,699 acres and provides the City of San Jose, Santa Clara County, Santa Clara Valley Transportation Authority, Santa Clara Valley Water District, City of Gilroy, and City of Morgan Hill with 50-year permits from the USFWS and CDFW that authorize incidental take of covered species. The plans focus on comprehensive species, wetlands, and ecosystem conservation, and contributes to the recovery of endangered species in California, while allowing for limited take of 18 listed and nonlisted (covered) species.

Solano Habitat Conservation Plan

The *Solano Habitat Conservation Plan* (Solano County Water Agency 2012) will facilitate conservation of approximately 36 federally listed, state-listed and special-status species in Solano and Yolo Counties for activities associated with urban development, flood control and irrigation projects. Finalization of this HCP is not expected until 2021.

San Bruno Mountain Area Habitat Conservation Plan

The *San Bruno Mountain Area Habitat Conservation Plan* was prepared to conserve habitat for four federally protected butterfly species and to conserve the ecosystem of San Bruno Mountain in San Mateo County. This HCP is managed by the County of San Mateo Parks Department, and activities that could affect butterflies or habitat require approval prior to commencement (San Bruno Mountain Habitat Conservation Plan Steering Committee 1982).

PG&E Bay Area O&M HCP

PG&E's *Bay Area Operations and Maintenance Habitat Conservation Plan* (Bay Area O&M HCP) authorizes incidental take of 13 federally listed plant species and 18 wildlife species for routine utility operations and maintenance (O&M) activities at PG&E facilities throughout Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties (Pacific Gas and Electric Company 2017a). The O&M activities addressed in the Bay Area O&M HCP are the same activities as described in Chapter 2, *Project Description*.

Conservation Strategies

East Alameda County Conservation Strategy

The *East Alameda County Conservation Strategy* is a collaborative conservation strategy aimed at preserving endangered species by developing and adopting guidelines to assist in their long-term protection. The conservation strategy covers the cities of Dublin, Pleasanton, and Livermore, as well as unincorporated areas of eastern Alameda County. The plan's focus is on annual grassland, seasonal and permanent wetlands, riparian woodland, oak woodland, and scrub communities that are known to support several listed or sensitive wildlife species (East Alameda County Conservation Strategy Steering Committee 2010). As a result of formal consultation with USACE, a programmatic Biological Opinion for this conservation strategy was prepared by USFWS and published May 31, 2012.

Santa Rosa Plain Conservation Strategy

The *Santa Rosa Plain Conservation Strategy* is a collaborative conservation strategy aimed at creating a long-term program to mitigate potential adverse effects on listed species due to future development on the Santa Rosa Plain and to preserve and enhance populations and habitat of the listed species (U.S. Fish and Wildlife Service 2005). The Santa Rosa Plain and adjacent areas are characterized by vernal pools, seasonal wetlands, and associated grassland habitat, which supports several species of plants and wildlife listed as threatened or endangered. The strategy area is located in central Sonoma County, bordered on the south and west by the Laguna de Santa Rosa, on the east by the foothills, and on the north by the Russian River. As a result of formal consultation with USACE, a programmatic Biological Opinion was originally published by USFWS for this strategy in 1998 and superseded on November 9, 2007.

3.4.1.2 Environmental Setting

Physical Setting

PG&E implements O&M and minor new construction activities in an area that encompasses PG&E's gas and electric transmission and distribution infrastructure in the San Francisco Bay Area (Bay Area) counties of Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco (Figure 2-1). This area is referred to as the *Permit Area* in this EIR. The PG&E utility infrastructure in the Bay Area includes gas and electric transmission and distribution facilities, ROWs, lands owned by PG&E or subject to PG&E easements to maintain these facilities, private access routes associated with PG&E's routine maintenance, and mitigation lands acquired to mitigate impacts on natural resources, covered by appropriate permits.

The study area consists of all nine Bay Area counties and encompasses all, or portions of, approximately 158 U.S. Geological Survey topographic quadrangles. Utility infrastructure crosses federal, state, private, and municipal lands.

General climate conditions in the study area are typical of a Mediterranean climate characterized by summer fog along the coast and East Bay, cool summers between coastal areas and Coast Ranges, and hot summers east of the Coast Ranges (California Department of Fish and Game 2003). Precipitation in the study area falls mostly as rain during the late fall, winter, and early spring months and averages approximately 16 to 32 inches per year, with northern counties generally receiving more rainfall than southern counties. Higher elevations can receive infrequent snowfalls during the winter months, with snow sometimes lasting for 2 to 3 days on Mount Diablo and Mount St. Helena.

The climate in the study area is influenced strongly by its location and topography. In the summer, a steady marine wind blows through the Golden Gate and up the Carquinez Strait. The eastern part of the study area is not influenced by this marine air to the same extent as the western part. Consequently, temperatures in the eastern part of the study area are generally warmer than those in the western part during the summer. During the winter, temperatures in the western part of the study area are generally warmer than those in the eastern part of the study area, owing to the tempering influence of the ocean and bay in the west.

Plant Communities and Land Cover Types

The utility infrastructure and ROWs in the Permit Area encompass approximately 402,440 acres; 128,735 acres (32%) are in natural land cover types (discussed below), 246,777 acres (61%) are in urban areas, and 26,928 acres (7%) are in agricultural areas. The extent of mapped land cover types in the Permit Area is shown in detail in Table 3.4-1. The primary communities represented include forest, grassland, riparian, shrubland, wetland, agriculture, and urban (Pacific Gas and Electric Company 2017a).

Forest

Woodlands and hardwood forests in the Bay Area are represented by a diversity of habitat structures and characteristic species. Coastal oak woodlands are the most prevalent forest habitat type with 3% cover. Coastal oak woodlands range from a closed canopy in mesic sites to open woodlands in drier sites, with understory species ranging from sparse to dense coverage of shrubs and herbs. Coastal oak woodlands are dominated by coast live oak (*Quercus agrifolia*) near the coast. In mesic coastal oak woodlands, the co- or sub-dominant species of coast live oak include: California bay (*Umbellularia californica*), madrone (*Arbutus menziesii*), tanbark oak (*Notholithocarpus densifolia*), and canyon live oak (*Quercus chrysolepis*). In drier coastal oak woodlands, coast live oak intergrades with valley oak (*Quercus lobata*), blue oak (*Quercus douglasii*), and foothill pine (*Pinus sabiniana*). Montane hardwoods are the second most prevalent forest habitat type with 2.5% cover. Montane hardwoods have a sparse shrub layer and are dominated by canyon live oak, with a small constituent of foothill pine, knobcone pine (*Pinus attenuata*) and madrone. Montane hardwoods border mixed conifer, montane hardwood-conifer, and mixed-chaparral habitat types. Blue oak woodland provides the third greatest forest cover (0.7%) in the study area; blue oak woodlands are dominated by blue oak, with patches of coast live oak, interior live oak (*Quercus wislizeni*), valley oak, and at higher elevations, foothill pine.

Grasslands

Grasslands in the region are primarily composed of nonnative annual grasslands and cover approximately 14% of the study area. The nonnative annual grassland is an assemblage of Mediterranean annuals that have largely invaded the California grasslands and replaced much of the native plant cover. Common annual grass species include wild oats (*Avena* sp.), brome grasses (*Bromus* sp.), barleys (*Hordeum* sp.), and annual fescues (*Festuca* sp.). Common herbs include introduced annuals such as filarees (*Erodium* sp.) and clovers (*Trifolium* sp.), and native species such as fiddleneck (*Amsinckia* sp.), lupines (*Lupinus* sp.), and owl's-clover (*Castilleja* sp.). These species germinate after the late fall and winter rains; and they grow, flower, and set seed through spring. Most die in the summer season.

Riparian

Riparian land cover types are typified by at least an ephemeral passage of water. Two riparian land cover types are known in the study area: montane riparian (0.3%) and valley foothill riparian (0.24%). Within the Coast Ranges, montane riparian habitat occurs as a narrow band of deciduous broadleaved trees along seeps, streams, and rivers. In montane riparian habitat, Fremont cottonwood (*Populus fremontii*) is the dominant species with other prevalent trees including willows (*Salix* sp.), big leaf maple (*Acer palmatum*), and California bay. At lower elevations in the central valley and foothills, valley foothill riparian habitats are commonly occupied by Fremont cottonwood, California sycamore (*Platanus racemosa*), and valley oak.

Shrubland

Scrub and chaparral habitats are inhabited by common shrub genera with species representation varying by substrate, climate, and geographical location. Within shrublands, scrub and chaparral land cover types are drought tolerant and adapted to more frequent fire than other habitats. Some scrub and chaparral communities commonly have a dense canopy, whereas other communities have intermittently spaced shrubs. The prevalent genera of scrub and chaparral include manzanita (*Arctostaphylos* sp.), chamise (*Adenostoma fasciculatum*), scrubby oaks (*Quercus* sp.) and California lilac (*Ceanothus* sp.). Mixed chaparral and coastal scrub are the most extensive shrubland cover types in the study area. At 0.43% cover, mixed chaparral typically contains dense shrub canopy cover with a high beta diversity (diversity between locations) of manzanita and California lilac species. Also, at approximately 0.43% cover, coastal scrub consists of low to moderate sized shrubs primarily inhabiting the California coastline and into Mount Diablo. Common woody species witnessed in the different coastal scrub habitats include coyote brush (*Baccharis pilularis* ssp. *pilularis*), bush lupines (*Lupinus* sp.), California lilac, coffeeberry (*Frangula californica*), poison oak (*Toxicodendron diversilobum*), and bush monkey flower (*Mimulus aurantiacus*).

Wetland

The wetland land cover types are inhabited by vegetation communities adapted to prolonged periods of inundation. Managed marshes (0.24%) are the most extensive wetland land cover type in the study area and are managed to provide habitat for wildlife species and associated recreation. In managed marshes, both the vegetation and hydrology (depth and hydroperiod) are controlled. A similarly prevalent wetland habitat type (0.2%), lacustrine habitats contain standing water in topographic depressions or dammed riverine channels. Common lacustrine habitats include permanently and intermittently flooded lakes, ponds, and seasonal wetlands. Commonly observed

wetland vegetation includes cattails (*Typha* sp.), sedges (*Carex* sp.), oat grasses (*Danthonia* sp.), rushes (*Juncus* sp.), bulrushes (*Schoenoplectus* sp.), duckweed (*Lemna* sp.), and some willows. More brackish areas will have a dominance of salt grass (*Distichlis spicata*), alkali heath (*Frankenia salina*), and pickleweed (*Sarcocornia pacifica*).

Urban Land Cover

Urban land cover types are currently or were previously utilized for society's benefit. These land cover types predominately include urban, agriculture, and barren habitats. Urban land covers 61% of the study area and was developed for commercial, utility, and residential use. Agriculture includes vineyards, orchards, and other crops and covers 6.9% of the study area. Barren habitat accounts for 1.2% of the study area and is typified by little to no vegetation cover due to soil compaction, frequent disturbance, or other conditions that preclude establishment and growth of vegetation. Barren habitat can be naturally occurring on rock faces or associated with previously disturbed locations.

Table 3.4-1. Mapped Extent of Land Cover Types in Permit Area

	Electricity Distribution (acres)	Electricity Transmission (acres)	Gas Distribution (acres)	Gas Transmission (acres)	Total (acres) ^c	Percent of Total
Natural Lands^a						
Forest						
Blue Oak Woodland	1,150	1,253	230	104	2,737	0.73%
Blue Oak-Foothill Pine	179	97	2	7	286	0.08%
Closed-Cone Pine- Cypress	269	217	1	0	487	0.13%
Coastal Oak Woodland	4,580	4,213	2,413	782	11,988	3.18%
Douglas Fir	779	336	85	42	1,242	0.33%
Eucalyptus	453	148	286	92	979	0.26%
Montane Hardwood	5,192	2,559	1,094	408	9,253	2.46%
Montane Hardwood- Conifer	1,690	681	285	60	2,716	0.72%
Ponderosa Pine	27	1	13	0	41	0.01%
Redwood	1,796	501	93	28	2,417	0.64%
Sierran Mixed Conifer	66	33	6	0	105	0.03%
Unknown Conifer Type	22	67	0	0	89	0.02%
Valley Oak Woodland	452	170	213	155	991	0.26%
Subtotal	16,655	10,276	4,721	1,678	33,331	8.85%
Grassland						
Annual Grassland	18,447	18,312	5,804	10,447	53,011	14.06%
Serpentine Grassland	352	714	132	707	1,905	0.51%
Pasture	3,824	3,182	444	3,148	10,598	2.81%
Perennial Grassland	26	12	0	8	46	0.01%
Subtotal	22,649	22,220	6,380	14,310	65,560	17.40%
Riparian						

	Electricity Distribution (acres)	Electricity Transmission (acres)	Gas Distribution (acres)	Gas Transmission (acres)	Total (acres) ^c	Percent of Total
Montane Riparian	594	85	352	100	1,131	0.30%
Valley Foothill Riparian	421	176	193	128	918	0.24%
Willow Grove (Sausal)	1	0	0	0	1	0.00%
Subtotal	1,016	261	545	228	2,050	0.54%
Shrubland						
Alkali Desert Scrub	3	29	0	18	50	0.01%
Chamise-Redshank Chaparral	420	697	77	106	1,299	0.34%
Coastal Scrub	702	615	94	244	1,656	0.44%
Mixed Chaparral	813	760	53	1	1,627	0.43%
Montane Chaparral	0	0	0	0	0	0.00%
Unknown Shrub Type	93	55	16	36	200	0.05%
Subtotal	2,031	2,156	240	405	4,832	1.28%
Wetland						
Active Salt Pond	69	558	0	0	627	0.17%
Crystallizer	15	7	1	0	23	0.01%
Diked Marsh	127	470	26	168	791	0.21%
Estuarine	5	1	0	0	7	0.00%
Farmed Bayland	270	473	47	92	882	0.23%
Freshwater Emergent Wetland	64	107	8	86	265	0.07%
Grazed Bayland	57	98	3	119	278	0.07%
High Elevation Tidal Marsh	122	560	15	45	743	0.20%
Inactive Salt Pond	22	134	0	0	156	0.04%
Lacustrine	296	285	66	110	758	0.20%
Lagoon	56	42	13	7	117	0.03%
Low/Mid Elevation Tidal Marsh	14	210	0	2	227	0.06%
Major Channel	39	100	2	26	168	0.04%
Managed Marsh	365	205	10	331	911	0.24%
Marine	6	0	0	0	6	0.00%
Muted Tidal Marsh	23	97	3	9	132	0.03%
Perennial Lake or Pond	1	0	0	0	2	0.00%
Riverine	100	131	11	120	362	0.10%
Saline Emergent Wetland	89	101	26	45	262	0.07%
Tidal Flat	55	243	10	4	312	0.08%
Water	8	6	0	0	15	0.00%
Wet Meadow	2	0	0	2	4	0.00%
Subtotal	1,805	3,828	241	1,166	7,048	1.87%

	Electricity Distribution (acres)	Electricity Transmission (acres)	Gas Distribution (acres)	Gas Transmission (acres)	Total (acres) ^c	Percent of Total
Dune						
Dune	0	0	16	0	16	0.00%
Barren/Ruderal						
Barren	1,569	983	767	1,163	4,482	1.19%
Ruderal	45	67	21	31	164	0.04%
Subtotal	1,614	1,050	788	1,194	4,646	1.23%
<i>Natural Lands Subtotal</i>	<i>45,774</i>	<i>39,795</i>	<i>12,930</i>	<i>18,980</i>	<i>117,480</i>	<i>31.18%</i>
Agriculture						
Agriculture	1,667	332	702	499	3,201	0.85%
Cropland	7,281	2,255	1,338	2,500	13,374	3.55%
Deciduous Orchard	591	286	75	171	1,123	0.30%
Evergreen Orchard	5	3	1	2	11	0.00%
Irrigated Grain Crops	2	4	0	8	13	0.00%
Irrigated Row and Field Crops	2,182	1,549	167	1,599	5,497	1.46%
Rice	14	1	0	0	14	0.00%
Vineyard	1,474	583	138	396	2,592	0.69%
Subtotal	13,216	5,013	2,422	5,174	25,825	6.85%
Urban						
Storage or treatment basin	31	86	1	38	156	0.04%
Urban	95,584	16,743	96,008	24,994	233,329	61.93%
Subtotal	95,615	16,829	96,009	25,032	233,485	61.97%
Total ^{b, c}	154,606	61,637	111,361	49,186	376,789	100.00%

Sources: Land cover types were derived from USDA Forest Service 2000 and 2007 Classification and Assessment with Landsat of Visible Ecological Groupings (CALVEG) geodatabase (USDA Forest Service 2000 and 2007); California Department of Forestry and Fire Protection 2002 Multi-Source Land-Cover Data, (v02_2); and San Francisco Estuary Institute 1996 Modern Baylands EcoAtlas data.

^a Some land cover types are present in the study area but not in the Permit Area (e.g., juniper).

^b Total acreage does not include unmapped facilities (estimated at approximately 17,000 acres), new facilities (estimated at approximately 3,800 acres), or mitigation lands (approximately 5,000 acres) and, therefore, does not match Chapter 2, *Project Description*. Unmapped facilities are expected to be located in proportion to the land cover type for mapped facilities; new facilities are expected to be located predominantly in natural lands; and mitigation lands are expected to be located in natural lands.

^c Numbers may not equal totals due to rounding.

Sensitive Natural Communities

CDFW, in cooperation with CNPS, develops and maintains lists of natural vegetation communities that are rare or considered vulnerable to loss (as a requirement of California Fish and Game Code Section 1940). All sensitive natural communities are identified in the *List of Vegetation Alliances and Associations* (California Department of Fish and Wildlife 2010).

A natural community intersecting the Permit Area was considered to be sensitive if accompanied by a state rarity ranking of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable). All wetland and riparian habitats are considered sensitive natural communities. The sensitive natural communities present in the Permit Area are listed in Table 3.4-2, along with natural community sensitivity ranking detail.

Table 3.4-2. Sensitive Natural Communities in the Permit Area

Natural Community	State Rank ^a	Natural Community in California (acres)	Natural Community in Permit Area (acres)
Northern Claypan Vernal Pool	S1.1	19,652	791.5
Sycamore Alluvial Woodland	S1.1	2,159	53.5
Stabilized Interior Dunes	S1.1	333	8.2
Valley Sink Scrub	S1.1	44,051	403.8
Cismontane Alkali Marsh	S1.1	61,541	204.0
Monterey Pine Forest	S1.1	12,949	10.9
Northern Maritime Chaparral	S1.2	3,727	53.5
Alkali Meadow	S2.1	2,408	226.0
Alkali Seep	S2.1	2,346	204.0
Coastal Terrace Prairie	S2.1	684	26.5
Northern Vernal Pool	S2.1	8,900	144.9
Coastal Brackish Marsh	S2.1	27,204	173.0
Coastal and Valley Freshwater Marsh	S2.1	24,113	12.9
Valley Oak Woodland	S2.1	47,933	17.2
Serpentine Bunchgrass	S2.2	11,827	1,160.0
Central Dune Scrub	S2.2	27,860	3.1
Northern Interior Cypress Forest	S2.2	28,859	2.3
Wildflower Field	S2.2	10,178	0.8
Valley Needlegrass Grassland	S3.1	49,689	1,103.8
Northern Hardpan Vernal Pool	S3.1	100,386	11.9
Northern Coastal Salt Marsh	S3.2	29,291	705.7
North Central Coast Steelhead/Sculpin Stream	SNR	1,182	66.7
N. Central Coast Calif. Roach/Stickleback/Steelhead Stream	SNR	1,886	70.6

Source: California Department of Fish and Wildlife 2018a

^a State Rank:

S1 = critically imperiled; S2 = imperiled; S3 = vulnerable; SNR = unranked

.1 = very threatened; .2 = moderate threat; .3 = few or no current threats

Special-Status Species

The potential for special-status plant and wildlife species to occur in the study area was determined based on the results of a desktop-level review of biological literature and databases. Searches of the nine Bay Area counties were performed in the California Natural Diversity Database (CNDDDB)

(California Department of Fish and Wildlife 2018a, 2018b), which is maintained by CDFW, *Inventory of Rare and Endangered Plants* (California Native Plant Society 2018), and the USFWS Information for Planning and Consultation online tool (U.S. Fish and Wildlife Service 2020). These searches generated a list of special-status plant and wildlife species with one or more occurrences in the Bay Area. Species were considered special-status if they met one or more of the following criteria.

- Plant and wildlife species listed as endangered, threatened, or candidates for listing under the FESA.
- Plant and wildlife species listed as endangered, threatened, or candidates for listing under the CESA.
- Wildlife species designated as fully protected species, as defined in California Fish and Game Code Sections 3511, 4700, 5050, and 5515.
- Wildlife species designated as Species of Special Concern by CDFW.
- CRPR List 1, 2, 3, and 4 plant species designated by the CNPS.
- Bald eagles and golden eagles, which are protected by the BGEPA.

Species were categorized by the likelihood of observance using information from the literature and database searches; for plants, herbarium records and field surveys were also used to confirm presence of 158 occurrences of several dozen special-status plants in the utility ROW. Therefore, the identification and categorization for special-status plants included, in part, field surveys for species likely to occur in PG&E's gas or electric utility corridors or otherwise be subject to potential impacts from covered activities (ICF 2016). The special-status species categories are as follows:

- **Present:** The occurrence or observation of a species was documented in the Permit Area during pre-activity surveys for covered activities (including focused plant surveys), or during monitoring of covered activities, or PG&E assumes the presence of the species within the study area.
- **Likely to occur:** The species is likely to be found in the Permit Area during implementation of covered activities. A species is categorized as "likely to occur" if recorded observations (e.g., CNDDDB occurrences or other records not made by PG&E staff or contractors) are documented within 1 mile of the Permit Area and suitable habitat that meets the life history requirements of the species is present in or near the Permit Area.
- **Potential to occur:** There is a possibility that the species can be found in the Permit Area during implementation of covered activities, but it has not been directly observed during prior surveys or monitoring of covered activities. A species is categorized as having the "potential to occur" if recorded observations (e.g., CNDDDB occurrences or other records not made by PG&E staff or contractors) are documented between 1 mile and 5 miles from facilities in the Permit Area and suitable habitat that meets the life history requirements of the species is present in or near the Permit Area.
- **Unlikely to occur:** The species is not likely to occur in the Permit Area based on the following considerations:
 - Suitable habitat and features that are required to satisfy the life history requirements of the species are absent from the Permit Area.
 - Predators or invasive species that inhibit survival or occupation are present.

- Nearby occurrence records are not documented or are more than 25 years old.
- Barriers to wildlife migration or dispersal are present.
- **Absent:** Suitable habitat does not exist in the Permit Area, or the species is restricted to or known to be present only within a specific area outside of the Permit Area. Nearby occurrence records are not documented or are more than 50 years old.

For species that qualified for more than one category, professional judgment and information from the literature and database searches informed the likelihood of observance. The age of the record of sighting (e.g., less than 25 years old) is not specified for “likely to occur” and “potential to occur”; therefore, determinations were made based on the potential lack of relatively recent survey data using species-specific requirements for suitable habitat, the location and accuracy of the records, and species’ ranges.

Special-Status Plants

All special-status plant species identified in the literature review are described in Table 3.4-3, which includes the listing status, habitat requirements, flowering phenology/life forms, known locations, and the potential for each species to occur within the Permit Area. Special-status plant occurrences documented in the Permit Area during special-status plant species assessments and field surveys (ICF 2016) were also identified. The results of the plant species and general resource assessment surveys are discussed further under Impact BIO-1 in Section 3.4.2, *Environmental Impacts*, and in Table 3.4-3. Of the 413 special-status plant species considered, 28 were determined to be present, 207 were determined to be likely to occur, 134 were determined to have a potential to occur, and 31 were determined to be unlikely to occur. In addition, 13 of the special-status plant species were determined to be absent due to range restrictions or lack of suitable habitat in the study area.

Special-Status Wildlife

All special-status wildlife species identified in the literature review are described in Table 3.4-4, which includes the listing status, life history, summary of the sightings and records, and the likelihood of each species to occur within the Permit Area. The results of the biological resource analysis are discussed further under Impact BIO-1 in Section 3.4.2. A desktop survey of observations records and known distribution determined that of the 103 special-status wildlife species considered, 0 species were present, 38 are likely to occur, 51 have the potential to occur, and 10 are unlikely to occur. In addition, four were determined to be absent due to range restrictions or lack of suitable habitat in the Permit Area.

Critical Habitat

Under the FESA, to the extent prudent and determinable, the USFWS is required to designate critical habitat for endangered and threatened species (16 USC Section 1533 [a][3]). Critical habitat is defined as specific geographic areas that contain the physical and biological features essential for the survival and recovery of endangered and threatened species. Designated critical habitat includes sites for breeding and rearing, movement or migration, feeding, roosting, cover, and shelter. Designated critical habitats require special management and protection of existing resources, including water quality and quantity, host animals and plants, food availability, pollinators, sunlight, and specific soil types.

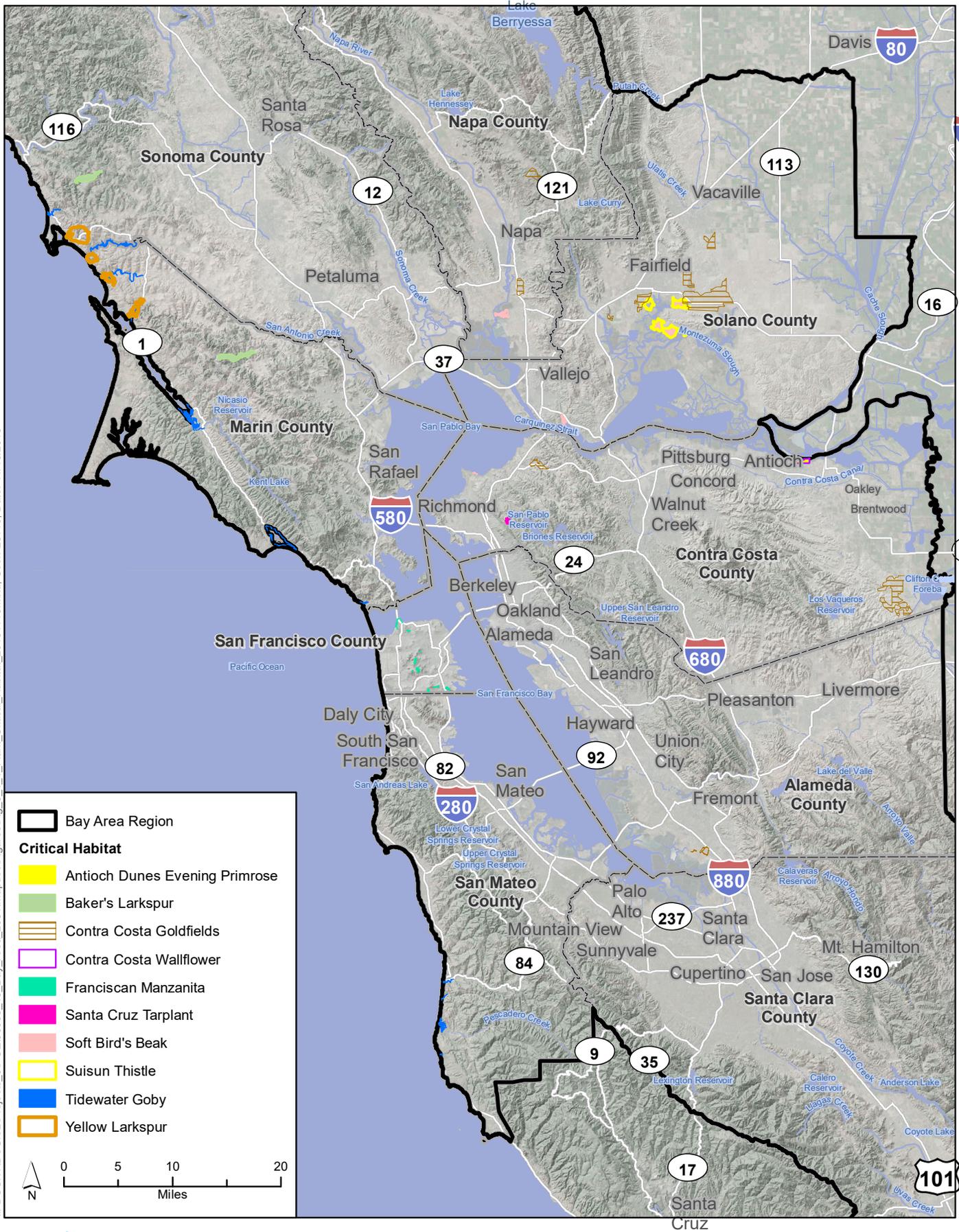
The facilities in the Permit Area cross USFWS-designated critical habitat for the following 26 plant and wildlife species.

- Franciscan manzanita (*Arctostaphylos franciscana*)
- Soft bird's beak (*Chloropyron molle* ssp. *molle*)
- Suisun thistle (*Cirsium hydrophilum* var. *hydrophilum*)
- Baker's larkspur (*Delphinium bakeri*)
- Yellow (golden) larkspur (*Delphinium luteum*)
- Contra Costa wallflower (*Erysimum capitatum* var. *angustatum*)
- Santa Cruz tarplant (*Holocarpha macradenia*)
- Contra Costa goldfields (*Lasthenia conjugens*)
- Antioch Dunes evening primrose (*Oenothera deltoides* ssp. *howellii*)
- Conservancy fairy shrimp (*Branchinecta conservatio*)
- Longhorn fairy shrimp (*Branchinecta longiantenna*)
- Vernal pool fairy shrimp (*Branchinecta lynchi*)
- Vernal pool tadpole shrimp (*Lepidurus packardii*)
- Delta green ground beetle (*Elaphrus viridis*)
- Bay checkerspot butterfly (*Euphydryas editha bayensis*)
- Chinook salmon (*Oncorhynchus tshawytscha*)
- Steelhead (*Oncorhynchus mykiss irideus*)
- Delta smelt (*Hypomesus transpacificus*)
- Tidewater goby (*Eucyclogobius newberryi*)
- California tiger salamander (*Ambystoma californiense*) (Central California Distinct Population Segment [DPS] and Sonoma County DPS)
- California red-legged frog (*Rana draytonii*)
- Alameda whipsnake (*Masticophis lateralis euryxanthus*)
- Western snowy plover (*Charadrius alexandrinus nivosus*)
- Marbled murrelet (*Brachyramphus marmoratus*)
- Northern spotted owl (*Strix occidentalis caurina*)
- Steller sea lion (*Eumetopias jubatus*)

Table 3.4-5 summarizes the critical habitat for federally listed species in the study area, including the designation date for each species and the total number of acres of designated critical habitat in California. Figures 3.4-1 and 3.4-2 depict critical habitat in the study area.

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**Figure 3.4-1
Plant Critical Habitat**



Table 3.4-3. Special-Status Plant Species' Probability of Occurrence in the Permit Area

Species Name	Status ^a Federal/State/ CRPR	Habitat Requirements	Flowering Phenology/ Life Form	Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
Adoxaceae – Moschatel Family					
<i>Viburnum ellipticum</i> Oval-leaved viburnum	-/-/2B.3	This species occurs in chaparral, oak woodlands, and lower montane coniferous forest from 700 to 4,600 feet elevation.	May–June / Shrub	There are 17 CNDDDB occurrence records of oval-leaved viburnum in the study area.	Likely to occur. The Permit Area intersects 12 occurrences of this species. Potential habitat for this species occurs where chaparral, oak woodland, and montane hardwood-conifer forest are present in northern Napa County.
Agavaceae – Agave Family					
<i>Chlorogalum pomeridianum</i> var. <i>minus</i> Dwarf soaproot	-/-/1B.2	This species occurs in openings in chaparral and grasslands from 1,000 to 3,280 feet elevation. It occurs on serpentine soils.	May–August / Perennial Herb	There are 4 CNDDDB occurrence records of dwarf soaproot in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where serpentine soils coincide with grassland or chaparral in the study area.
Alismataceae – Water-Plantain Family					
<i>Sagittaria sanfordii</i> Sanford's arrowhead	-/-/1B.2	This species occurs in freshwater marsh, sloughs, canals, and other slow-moving water habitats, below 2,130 feet elevation.	May–October / Perennial herb	There are 7 CNDDDB occurrence records of Sanford's arrowhead in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where freshwater emergent wetlands is present in the study area.
Alliaceae – Onion Family					
<i>Allium fimbriatum</i> var. <i>purdyi</i> Purdy's onion	-/-/4.3	This species occurs on serpentine outcrops in chaparral and oak woodland, at 985 to 1,970 feet elevation.	April–June / Perennial herb	There are 2 herbarium records of Purdy's onion in the study area.	Potential to occur. The Permit Area is located at the margin of the range of this species. Potential habitat for this species occurs where serpentine chaparral is present in northern Napa County.
<i>Allium howellii</i> var. <i>howellii</i> Howell's onion	-/-/4.3	This species occurs on grassy slopes from 655 to 2,950 feet elevation. It sometimes occurs on serpentine soils.	March–April / Perennial herb	There is 1 herbarium record of Howell's onion in the study area.	Potential to occur. The Permit Area is located at the margin of the range of this species. Potential habitat for this species occurs where serpentine grasslands are present in southern Santa Clara County.
<i>Allium peninsulare</i> var. <i>franciscanum</i> Franciscan onion	-/-/1B.2	This species occurs in grasslands and woodlands from 165 to 1,000 feet elevation. It occurs on clay serpentine soils.	May–June / Perennial herb	There are 24 CNDDDB occurrence records of Franciscan onion in the study area.	Likely to occur. The Permit Area intersects 13 occurrences of this species. Potential habitat for this species occurs where serpentine grasslands are present in the study area.
<i>Allium sharsmithiae</i> Sharsmith's onion	-/-/1B.3	This species occurs on rocky slopes, in chaparral or cypress woodland from 1,310 to 3,940 feet elevation. It occurs on serpentine substrates.	March–May / Perennial herb	There are 7 CNDDDB occurrence records of Sharsmith's onion in the study area.	Potential to occur. The Permit Area does not intersect any known occurrences of this species. Potential habitat for this species occurs where serpentine chaparral or closed-cone coniferous forest is present in eastern Alameda and Santa Clara County.
Apiaceae – Carrot Family					
<i>Cicuta maculata</i> var. <i>bolanderi</i> Bolander's water-hemlock	-/-/2B.1	This species occurs in freshwater or brackish marsh, below 655 feet elevation.	July–September / Perennial herb	There are 15 CNDDDB occurrence records of Bolander's water-hemlock in the study area.	Likely to occur. The Permit Area intersects 7 occurrences of this species. Potential habitat for this species occurs where freshwater emergent wetlands are present in the study area.
<i>Eryngium aristulatum</i> var. <i>hooveri</i> Hoover's button-celery	-/-/1B.1	This species occurs in vernal pools, between 3,345 and 4,755 feet elevation.	July / Perennial herb	There are 9 CNDDDB occurrence records of Hoover's button-celery in the study area.	Likely to occur. The Permit Area intersects 7 occurrences of this species. Potential habitat for this species occurs where vernal pools are present in Contra Costa, Alameda and Santa Clara Counties.
<i>Eryngium constancei</i> Loch Lomond coyote-thistle	E/E/1B.1	This species occurs in vernal pools, at approximately 2,600 feet elevation.	April–June / Perennial herb	There is 1 CNDDDB occurrence record of Loch Lomond coyote-thistle in the study area.	Unlikely to occur. The Permit Area does not intersect any known occurrences of this species. Potential habitat for this occurs where vernal pools are present in Napa County (ICF 2016).
<i>Eryngium jepsonii</i> Jepson's coyote-thistle	-/-/1B.2	This species occurs in grasslands on moist clay soils (wetted by spring rains), below 1,640 feet elevation.	April–August / Perennial herb	There are 17 CNDDDB occurrence records of Jepson's coyote-thistle in the study area.	Likely to occur. The Permit Area intersects 9 occurrences of this species. Potential habitat for this occurs where annual grasslands are present in the study area.
<i>Eryngium racemosum</i> Delta coyote-thistle	-/-/1B.1	This species occurs in seasonally inundated depressions along floodplains, between 10 and 100 feet elevation.	June–October / Perennial herb	There is 1 CNDDDB occurrence record of Delta coyote-thistle in the study area.	Unlikely to occur. The Permit Area does not intersect any known occurrences of this species. Potential habitat for this species occurs where floodplains are present in Contra Costa County (ICF 2016).
<i>Eryngium spinosepalum</i> Spiny-sepaled button-celery	-/-/1B.2	This species occurs in vernal pools, swales, and roadside ditches, between 325 and 2,625 feet elevation.	April–July / Perennial herb	There is 1 CNDDDB occurrence record of spiny-sepaled button-celery in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. The study area is located at the margin of the range of this species, but potential habitat for this species occurs where vernal pools are present in Contra Costa County.

Species Name	Status ^a Federal/State/ CRPR	Habitat Requirements	Flowering Phenology/ Life Form	Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
<i>Lilaeopsis masonii</i> Mason's lilaeopsis	-/R/1B.1	This species occurs in freshwater or brackish marsh within the tidal zone, below 15 feet elevation.	April–October / Perennial herb	There are 129 CNDDDB occurrence records of Mason's lilaeopsis in the study area.	Present. The Permit Area intersects 29 occurrences of this species. Potential habitat for this species occurs where high-elevation tidal marsh is present in Napa, Solano, and Contra Costa Counties (ICF 2016).
<i>Lomatium hooveri</i> Hoover's lomatium	-/-/4.3	This species occurs in serpentine chaparral and woodlands, between 985 and 1,970 feet elevation.	April–May / Perennial herb	There are 12 herbarium records of Hoover's lomatium in the study area.	Potential to occur. The Permit Area is located at the margin of the range of this species. Potential habitat for this species occurs where serpentine chaparral is present in northern Napa County.
<i>Lomatium observatorium</i> Mt. Hamilton lomatium	-/-/1B.2	This species occurs in oak woodland, between 4,000 and 4,360 feet elevation.	March–May / Perennial herb	There are 3 CNDDDB occurrence records of Mt. Hamilton lomatium in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where oak woodland is present in Santa Clara County.
<i>Lomatium repostum</i> Napa lomatium	-/-/4.3	This species occurs in serpentine chaparral and woodlands, between 330 and 2,625 feet elevation.	April–May / Perennial herb	There are 40 herbarium records of Napa lomatium in the study area.	Potential to occur. The Permit Area is located within the range of this species. Potential habitat occurs where serpentine chaparral is present in the study area.
<i>Perideridia gairdneri</i> ssp. <i>gairdneri</i> Gairdner's yampah	-/-/4.2	This species occurs in grasslands, coastal prairies, and open areas in conifer forest, below 1,500 feet elevation.	June–July / Perennial herb	There are 41 herbarium records of Gairdner's yampah in the study area.	Potential to occur. The Permit Area is located within the range of this species. Potential habitat occurs where grasslands are present in the study area.
<i>Sanicula hoffmannii</i> Hoffmann's sanicle	-/-/4.3	This species occurs on clay or serpentine soils, in coastal scrub, chaparral, oak woodland, broadleafed upland forest, and lower montane coniferous forest between 100 and 985 feet elevation.	March–May / Perennial herb	There are 4 herbarium records of Hoffmann's sanicle in the study area.	Potential to occur. The Permit Area is located at the margin of the range of this species. Potential habitat for this species occurs where coastal scrub, chaparral, coastal oak woodland, and montane hardwood-conifer forest are present in San Mateo and western Santa Clara Counties.
<i>Sanicula maritima</i> Adobe sanicle	-/ R/1B.1	This species occurs in moist clay or ultramafic soils, in meadows and grasslands at approximately 490 feet elevation.	April–May / Perennial herb	There are 2 CNDDDB occurrence records of adobe sanicle in the study area.	Unlikely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat occurs where serpentine grassland is present in San Francisco, San Mateo, Santa Clara, and Alameda Counties (ICF 2016).
<i>Sanicula saxatilis</i> Rock sanicle	-/ R/1B.2	This species occurs in bedrock outcrops and talus slopes in chaparral and oak woodland between 2,000 and 4,100 feet elevation.	April–May / Perennial herb	There are 7 CNDDDB occurrence records of rock sanicle in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where chaparral or oak woodland is present in Alameda, Contra Costa, and Santa Clara Counties.
Apocynaceae – Dogbane Family					
<i>Asclepias solanoana</i> Serpentine milkweed	-/-/4.2	This species occurs in serpentine outcrops, between 2,295 and 4,250 feet elevation.	June / Perennial herb	There are 4 herbarium records of serpentine milkweed in the study area.	Potential to occur. The Permit Area is located at the margin of the range of this species. Potential habitat for this species occurs where serpentine chaparral is present in Sonoma and Napa Counties.
Asteraceae – Composite Family					
<i>Balsamorhiza macrolepis</i> Big-scale balsamroot	-/-/1B.2	This species occurs in grasslands, foothill woodlands, and rocky hillsides below 5,100 feet elevation.	March–June / Perennial herb	There are 16 CNDDDB occurrence records of big-scale balsamroot in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where grasslands or blue oak woodland is present in the study area.
<i>Blennosperma bakeri</i> Sonoma sunshine	E/E/1B.1	This species occurs in vernal pools between 65 and 130 feet elevation.	March–May / Annual herb	There are 24 CNDDDB occurrence records of Sonoma sunshine in the study area.	Likely to occur. The Permit Area intersects 18 occurrences of this species. Potential habitat for this species occurs where vernal pools are present in Sonoma County (ICF 2016).
<i>Blennosperma nanum</i> var. <i>robustum</i> Point Reyes stickyseed	-/ R/1B.2	This species occurs in coastal scrub and perennial grasslands located on sandy soils, between 100 and 395 feet elevation.	January–April / Annual herb	There are 12 CNDDDB occurrence records of Point Reyes stickyseed in the study area.	Present. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where coastal scrub or perennial grasslands are present in Sonoma County (ICF 2016).
<i>Blepharizonia plumosa</i> Big tarplant	-/-/1B.1	This species occurs in annual grasslands, on dry hills and plains between 50 and 1,500 feet elevation.	July–October / Annual herb	There are 35 CNDDDB occurrence records of big tarplant in the study area.	Likely to occur. The Permit Area intersects 18 occurrences of this species. Potential habitat for this species occurs where annual grasslands are present in Contra Costa and Alameda Counties.
<i>Calycadenia micrantha</i> Small-flowered calycadenia	-/-/1B.2	This species occurs in rocky open areas in chaparral and grasslands between 1,430 and 4,610 feet elevation.	June–October / Annual herb	There is 1 herbarium record of small-flowered calycadenia in the study area.	Potential to occur. The Permit Area is located within the range of this species. Potential habitat for this species occurs where annual grassland or mixed chaparral are present in Napa County.
<i>Centromadia parryi</i> ssp. <i>congdonii</i> Congdon's tarplant	-/-/1B.2	This species occurs in annual grassland, on lower slopes, flats, and swales below 560 feet elevation. It sometimes occurs on alkaline or saline soils.	June–November / Annual herb	There are 29 CNDDDB occurrence records of Congdon's tarplant in the study area.	Likely to occur. The Permit Area intersects 15 occurrences of this species. Potential habitat for this species occurs where annual grassland is present in Solano, Contra Costa, Alameda, and Santa Clara Counties.

Species Name	Status ^a Federal/State/ CRPR	Habitat Requirements	Flowering Phenology/ Life Form	Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
<i>Centromadia parryi</i> ssp. <i>parryi</i> Pappose tarplant	-/-/1B.2	This species occurs in coastal prairies, meadows, seeps, coastal salt marsh, and annual grasslands below 1,380 feet elevation.	July–October / Annual herb	There are 28 CNDDDB occurrence records of pappose tarplant in the study area.	Likely to occur. The Permit Area intersects 22 occurrences of this species. Potential habitat for this species occurs where annual grassland or saline emergent wetland is present in Sonoma, Napa, Solano, and San Mateo Counties.
<i>Centromadia parryi</i> ssp. <i>rudis</i> Parry's red tarplant	-/-/4.2	This species occurs in alkali meadows and grasslands below 150 feet elevation.	June–October / Annual herb	There are 9 herbarium records of Parry's red tarplant in the study area.	Likely to occur. Potential habitat for this species occurs where annual grassland or saline emergent wetland is present in Sonoma, Napa, and Solano Counties.
<i>Cirsium andrewsii</i> Franciscan thistle	-/-/1B.2	This species occurs in moist areas in coastal prairies, coastal scrub, and mixed evergreen forests, below 440 feet elevation. It sometimes occurs on serpentinite.	March–July / Perennial herb	There are 31 CNDDDB occurrence records of Franciscan thistle in the study area.	Likely to occur. The Permit Area intersects 14 occurrences of this species. Potential habitat for this species occurs where coastal scrub and perennial grassland is present in San Francisco and Marin Counties.
<i>Cirsium fontinale</i> var. <i>campylon</i> Mt. Hamilton thistle	-/-/1B.2	This species occurs in serpentine seeps and streams at 425 to 2,885 feet elevation.	April–October / Perennial herb	There are 33 CNDDDB occurrence records of Mt. Hamilton thistle in the study area.	Likely to occur. The Permit Area intersects 15 occurrences of this species. Potential habitat for this species occurs where freshwater emergent wetland on serpentine soils is present in Santa Clara County.
<i>Cirsium fontinale</i> var. <i>fontinale</i> Fountain thistle	E/E/1B.1	This species occurs in seeps in chaparral and grasslands on serpentinite, at 395 to 490 feet elevation.	June–October / Perennial herb	There are 5 CNDDDB occurrence records of fountain thistle in the study area.	Present. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where freshwater emergent wetland in serpentine soils is present in San Mateo County (ICF 2016).
<i>Cirsium hydrophilum</i> var. <i>hydrophilum</i> Suisun thistle	E/-/1B.1	This species occurs in salt marsh at sea level.	July–September / Perennial herb	There are 4 CNDDDB occurrence records of Suisun thistle in the study area.	Unlikely to occur. The Permit Area does not intersect any known occurrences of this species. Potential habitat for this species occurs where high elevation tidal marsh is present in Solano County (ICF 2016).
<i>Cirsium hydrophilum</i> var. <i>vaseyi</i> Mt. Tamalpais thistle	-/-/1B.2	This species occurs in serpentine seeps and streams, in chaparral and broadleaved upland forests at 985 to 1,475 feet elevation.	May–August / Perennial herb	There are 14 CNDDDB occurrence records of Mt. Tamalpais thistle in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where freshwater emergent wetland on serpentine soils is present in Marin County.
<i>Cirsium occidentale</i> var. <i>compactum</i> Compact cobwebby thistle	-/-/1B.2	This species occurs in coastal dunes, coastal prairie, coastal scrub, and chaparral below 165 feet elevation.	April–June / Perennial herb	There is 1 CNDDDB occurrence record of compact cobwebby thistle in the study area.	Potential to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where dunes and coastal scrub are present in San Francisco and San Mateo Counties.
<i>Cirsium praeteriens</i> Lost thistle	-/-/1A	This species is presumed extinct and has unknown habitat requirements below 330 feet elevation.	June–July / Perennial herb	There is 1 CNDDDB occurrence record of lost thistle in the study area.	Absent. The Permit Area intersects 1 occurrence of this species in Santa Clara County. This species has not been observed since it was last collected in 1901 and is believed to be extinct.
<i>Corethrogyne leucophylla</i> Branching beach aster	-/-/3.2	This species occurs in closed-cone coniferous forest, coastal dunes at 10 to 195 feet elevation.	May–December / Perennial herb	There are no records of branching beach aster in the study area.	Potential to occur. Potential habitat for this species occurs where dunes are present in San Mateo County.
<i>Deinandra bacigalupii</i> Livermore tarplant	-/E/1B.2	This species occurs in alkali grassland at 330 to 650 feet elevation.	June–October / Annual herb	There are 4 CNDDDB occurrence records of Livermore tarplant in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where annual grassland on alkaline soils is present in Alameda County.
<i>Erigeron biolettii</i> Streamside daisy	-/-/3	This species occurs in moist rocky areas in broadleaved upland forest, north coast coniferous forest from 100 to 3,610 feet elevation.	June–October / Perennial herb	There are 35 herbarium records of streamside daisy in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where rocky outcrops in oak woodlands, broadleaf evergreen forest, or North Coast Coniferous Forest are present in Marin, Sonoma, Napa, and Solano Counties.
<i>Erigeron greenei</i> Greene's narrow-leaved daisy	-/-/1B.2	This species occurs in chaparral, on serpentinite and volcanic substrates from 295 to 1,265 feet elevation.	May–September / Perennial herb	There are 16 CNDDDB occurrence records of Greene's narrow-leaved daisy in the study area.	Likely to occur. The Permit Area intersects 9 occurrences of this species. Potential habitat for this species occurs where chaparral is present in Napa and Sonoma Counties.
<i>Erigeron serpentinus</i> Serpentine daisy	-/-/1B.3	This species occurs in chaparral, on serpentine substrates from 195 to 2,200 feet elevation.	May–August / Perennial herb	There are 6 CNDDDB occurrence records of serpentine daisy in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where serpentine chaparral is present in Sonoma County.
<i>Erigeron supplex</i> Supple daisy	-/-/1B.2	This species occurs in coastal scrub and perennial grassland from 30 to 165 feet elevation.	May–July / Perennial herb	There are 8 CNDDDB occurrence records of supple daisy in the study area.	Likely to occur. The Permit Area intersects 6 occurrences of this species. Potential habitat for this species occurs where coastal scrub or perennial grassland are present in Marin and Sonoma Counties.

Species Name	Status ^a Federal/State/ CRPR	Habitat Requirements	Flowering Phenology/ Life Form	Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
<i>Eriophyllum jepsonii</i> Jepson's woolly sunflower	-/-/4.3	This species occurs in chaparral, cismontane woodland, coastal scrub on dry, rocky slopes, between 1,000 and 3,500 feet elevation. It sometimes occurs on serpentinite substrates.	April-June / Perennial herb	There are about 14 herbarium records of Jepson's woolly sunflower in the study area.	Potential to occur. Potential habitat for this species occurs where coastal scrub, chaparral, or oak woodlands are present in Alameda, Santa Clara, and Contra Costa Counties.
<i>Eriophyllum latilobum</i> San Mateo woolly sunflower	E/E/1B.1	This species occurs in open areas in coast live oak woodland from 150 to 1,080 feet elevation.	May-June / Perennial herb	There are 5 CNDDDB occurrence records of San Mateo woolly sunflower in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where coastal oak woodland is present in San Mateo County.
<i>Grindelia hirsutula</i> var. <i>maritima</i> San Francisco gumplant	-/-/1B.2	This species occurs in coastal bluff scrub, coastal scrub, and grasslands from 50 to 1,310 feet elevation.	June-September / Perennial herb	There are 15 CNDDDB occurrence records of San Francisco gumplant in the study area.	Likely to occur. The Permit Area intersects 15 occurrences of this species. Potential habitat for this species occurs where coastal scrub or perennial grasslands are present in San Francisco and Marin Counties.
<i>Harmonia hallii</i> Hall's harmonia	-/-/1B.2	This species occurs in open areas in serpentine chaparral from 770 to 3,050 feet elevation.	April-June / Annual herb	There are 7 CNDDDB occurrence records of Hall's harmonia in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where serpentine chaparral is present in northern Napa County.
<i>Harmonia nutans</i> Nodding harmonia	-/-/4.3	This species occurs in woodlands and open areas in chaparral, on rocky, volcanic soils from 330 to 3,300 feet elevation.	April-June / Annual herb	There are 66 herbarium records of Nodding harmonia in the study area.	Potential to occur. Potential habitat for this species occurs where chaparral or oak woodland is present in Sonoma and Napa Counties.
<i>Helianthella castanea</i> Diablo helianthella	-/-/1B.2	This species occurs in chaparral and oak woodlands, often in partial shade and on rocky soils, between 80 and 3,800 feet elevation.	March-June / Perennial herb	There are 107 CNDDDB occurrence records of Diablo helianthella in the study area.	Likely to occur. The Permit Area intersects 32 occurrences of this species. Potential habitat for this species occurs where chaparral or oak woodland is present in Contra Costa, Alameda, San Francisco, and San Mateo Counties.
<i>Helianthus exilis</i> Serpentine sunflower	-/-/4.2	This species occurs on streambanks in gravelly serpentine soils from 985 to 4,265 feet elevation.	June-November / Annual herb	There are three herbarium records of serpentine sunflower in the study area.	Potential to occur. The Permit Area is located at the margin of the range of this species. Potential habitat for this species occurs where serpentine chaparral is present in Napa County.
<i>Hemizonia congesta</i> ssp. <i>congesta</i> Seaside tarplant	-/-/1B.2	This species occurs in grasslands from 66 to 1,835 feet elevation.	April- November / Annual herb	There are 50 CNDDDB occurrence records of seaside tarplant in the study area.	Likely to occur. The Permit Area intersects 40 occurrences of this species. Potential habitat for this species occurs where annual grassland is present in Sonoma, Marin, San Francisco, and San Mateo Counties.
<i>Hesperevax caulescens</i> Hogwallow starfish	-/-/4.2	This species occurs in vernal pools and flats, on clay soils, below 1,655 feet elevation.	March-June / Annual herb	There are 26 herbarium records of hogwallow starfish in the study area.	Potential to occur. Potential habitat for this species occurs where vernal pools and annual grassland are present in Solano, Contra Costa, and Alameda Counties.
<i>Hesperevax sparsiflora</i> var. <i>brevifolia</i> Short-leaved evax	-/-/1B.2	This species occurs in coastal dunes and sandy areas in coastal bluff scrub below 705 feet elevation.	March-June / Annual herb	There are 23 CNDDDB occurrence records of short-leaved evax in the study area.	Likely to occur. The Permit Area intersects 8 occurrences of this species. Potential habitat for this species occurs where annual grassland is present in Sonoma, Marin, San Francisco, and San Mateo Counties.
<i>Holocarpha macradenia</i> Santa Cruz tarplant	T/E/1B.1	This species occurs in coastal terrace grasslands on light sandy to sandy clay soils, below 300 feet elevation.	June-October / Annual herb	There are 18 CNDDDB occurrence records of Santa Cruz tarplant in the study area.	Unlikely to occur. The Permit Area intersects 9 occurrences of this species. Potential habitat for this species occurs where annual grassland is present in Alameda County (ICF 2016).
<i>Isocoma arguta</i> Carquinez goldenbush	-/-/1B.1	This species occurs in annual grassland on alkaline soils below 65 feet elevation.	August- December / Perennial herb	There are 14 CNDDDB occurrence records of Carquinez goldenbush in the study area.	Likely to occur. The Permit Area intersects 10 occurrences of this species. Potential habitat for this species occurs where annual grassland is present in Solano County.
<i>Isocoma menziesii</i> var. <i>diabolica</i> Satan's goldenbush	-/-/4.2	This species occurs on slopes and cliffs in foothill woodlands and grasslands, below 2,640 feet elevation.	August- November / Perennial herb	There are 8 herbarium records of Satan's goldenbush in the study area.	Potential to occur. Potential habitat for this species occurs where annual grassland or oak woodland are present in Santa Clara County.
<i>Lasthenia burkei</i> Burke's goldfields	E/E/1B.1	This species occurs in vernal pools and wet meadows from 50 to 1,970 feet elevation.	April-June / Annual herb	There are 28 CNDDDB occurrence records of Burke's goldfields in the study area.	Present. The Permit Area intersects 20 occurrences of this species. Potential habitat for this species occurs where vernal pools are present in Sonoma County (ICF 2016).
<i>Lasthenia californica</i> ssp. <i>bakeri</i> Baker's goldfields	-/-/1B.2	This species occurs in coastal scrub and openings in closed-cone coniferous forest from 195 to 1,705 feet elevation.	April-October / Perennial herb	There are 9 CNDDDB occurrence records of Baker's goldfields in the study area.	Likely to occur. The Permit Area intersects 8 occurrences of this species. Potential habitat for this species occurs where open, grassy areas within coastal scrub or closed-cone coniferous forest are present in Sonoma and Marin Counties.
<i>Lasthenia californica</i> ssp. <i>macrantha</i> Perennial goldfields	-/-/1B.2	This species occurs in coastal bluff scrub, coastal dunes, and coastal scrub from 15 to 1,705 feet elevation.	January- November / Perennial herb	There are 35 CNDDDB occurrence records of perennial goldfields in the study area.	Likely to occur. The Permit Area intersects 17 occurrences of this species. Potential habitat for this species occurs where dunes and coastal scrub are present in Sonoma, Marin, San Francisco, and San Mateo Counties.

Species Name	Status ^a Federal/State/ CRPR	Habitat Requirements	Flowering Phenology/ Life Form	Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
<i>Lasthenia conjugens</i> Contra Costa goldfields	E/-/1B.1	This species occurs in alkaline or saline vernal pools and swales, below 700 feet elevation.	March–June / Annual herb	There are 28 CNDDDB occurrence records of Contra Costa goldfields in the study area.	Present. The Permit Area intersects 20 occurrences of this species. Potential habitat for this species occurs where vernal pools are present in the study area (ICF 2016).
<i>Lasthenia ferrisiae</i> Ferris's goldfields	-/-/4.2	This species occurs in vernal pools and wet saline flats below 2,295 feet elevation.	February–May / Annual herb	There are 10 herbarium records of Ferris's goldfields in the study area.	Potential to occur. Potential habitat for this species occurs where vernal pools in alkaline soils are present in Contra Costa and Alameda Counties.
<i>Layia carnosa</i> Beach layia	E/E/1B.1	This species occurs in coastal dunes below 195 feet elevation.	May–July / Annual herb	There are 7 CNDDDB occurrence records of beach layia in the study area.	Unlikely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where dunes are present in Marin and San Francisco Counties (ICF 2016).
<i>Layia septentrionalis</i> Colusa layia	-/-/1B.2	This species occurs on sandy or serpentine soils, in grasslands and openings in chaparral and foothill woodlands from 330 to 3,595 feet elevation.	April–May / Annual herb	There are 18 CNDDDB occurrence records of Colusa layia in the study area.	Likely to occur. The Permit Area intersects 7 occurrences of this species. Potential habitat for this species occurs where serpentine grassland or serpentine chaparral are present in Sonoma and Napa Counties.
<i>Leptosyne hamiltonii</i> Mt. Hamilton coreopsis	-/-/1B.2	This species occurs in openings in chaparral and oak-pine woodland, on shale talus slopes from 1,805 to 4,265 feet elevation.	March–May / Annual herb	There are 19 CNDDDB occurrence records of Mt. Hamilton coreopsis in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where chaparral or oak-pine woodland are present in Santa Clara County.
<i>Lessingia arachnoidea</i> Crystal Springs lessingia	-/-/1B.2	This species occurs in serpentine grassland and open grassy areas in serpentine chaparral from 195 to 655 feet elevation.	July–October / Annual herb	There are 11 CNDDDB occurrence records of Crystal Springs lessingia in the study area.	Likely to occur. The Permit Area intersects 6 occurrences of this species. Potential habitat for this species occurs where serpentine grassland or serpentine chaparral are present in San Mateo County.
<i>Lessingia germanorum</i> San Francisco lessingia	E/E/1B.1	This species occurs in coastal scrub from 80 to 360 feet elevation.	June – November / Annual herb	There are 5 CNDDDB occurrence records of San Francisco lessingia in the study area.	Unlikely to occur. The Permit Area intersects 4 occurrences of this species. Potential habitat for this species occurs where coastal scrub is present in San Francisco and San Mateo Counties (ICF 2016).
<i>Lessingia hololeuca</i> Woolly-headed lessingia	-/-/3	This species occurs in clay or serpentinite substrates, in grasslands, coastal scrub, broadleaved upland forest, and lower montane coniferous forest from 50 to 1,000 feet elevation.	July–October / Annual herb	There are 99 herbarium records of woolly-headed lessingia in the study area.	Potential to occur. Potential habitat for this species occurs where coastal scrub is present in the study area.
<i>Lessingia micradenia</i> var. <i>glabrata</i> Smooth lessingia	-/-/1B.2	This species occurs on serpentinite substrates in chaparral and oak woodland from 395 to 1,380 feet elevation.	July–November / Annual herb	There are 41 CNDDDB occurrence records of smooth lessingia in the study area.	Likely to occur. The Permit Area intersects 21 occurrences of this species. Potential habitat for this species occurs where serpentine grassland or oak woodland is present in Santa Clara County.
<i>Lessingia micradenia</i> var. <i>micradenia</i> Tamalpais lessingia	-/-/1B.2	This species occurs in serpentine grassland and chaparral from 330 to 1,640 feet elevation.	July–October / Annual herb	There are 9 CNDDDB occurrence records of Tamalpais lessingia in the study area.	Likely to occur. The Permit Area intersects 8 occurrences of this species. Potential habitat for this species occurs where serpentine grassland and serpentine chaparral is present in Marin County.
<i>Lessingia tenuis</i> Spring lessingia	-/-/4.3	This species occurs in open grassy areas in chaparral and woodlands from 165 to 7,220 feet elevation.	May–July / Annual herb	There are 16 herbarium records of spring lessingia in the study area.	Potential to occur. Potential habitat for this species occurs where chaparral or oak woodland is present in Alameda, Santa Clara, and San Mateo Counties.
<i>Madia radiata</i> Showy madia	-/-/1B.1	This species occurs on slopes in oak woodland and grasslands below 3,000 feet elevation.	March–May / Annual herb	There are 9 CNDDDB occurrence records of showy madia in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where annual grassland is present in Contra Costa County.
<i>Malacothrix phaeocarpa</i> Dusky-fruited malacothrix	-/-/4.3	This species occurs in openings in chaparral and Bishop Pine forest, on slides and after burns from 330 to 4,265 feet elevation.	April–June / Annual herb	There is 1 herbarium record of dusky-fruited malacothrix in the study area.	Potential to occur. Potential habitat for this species occurs where chaparral or closed-cone coniferous woodland is present in Santa Clara County.
<i>Micropus amphiboles</i> Mt. Diablo cottonweed	-/-/3.2	This species occurs in mixed evergreen forest, oak woodland, chaparral, and grasslands, from 150 to 2,715 feet elevation.	March–May / Annual herb	There are 36 herbarium records of Mt. Diablo cottonweed in the study area.	Potential to occur. Potential habitat for this species occurs where annual grassland, chaparral, oak woodland or montane hardwood-conifer forest are present in the study area.
<i>Microseris paludosa</i> Marsh microseris	-/-/1B.2	This species occurs in grasslands, coastal scrub, closed-cone coniferous forest, and cismontane woodlands from 15 to 1,165 feet elevation.	April–June / Perennial herb	There are 22 CNDDDB occurrence records of marsh microseris in the study area.	Likely to occur. The Permit Area intersects 12 occurrences of this species. Potential habitat for this species occurs where annual grassland, coastal scrub, oak woodland, or closed-cone coniferous woodland is present in Sonoma, Marin, San Francisco, and San Mateo Counties.
<i>Microseris sylvatica</i> Sylvan microseris	-/-/4.2	This species occurs in grassland, oak woodland, and open grassy areas in chaparral; below 5,580 feet elevation.	March–June / Perennial herb	There are 22 herbarium records of sylvan microseris in the study area.	Potential to occur. Potential habitat for this species occurs where annual grassland, chaparral or oak woodland are present in the study area.

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<i>Monolopia gracilens</i> Woodland woollythreads	-/-/1B.2	This species occurs on serpentine substrates in annual grasslands, oak woodlands, grassy openings in broadleaved upland forest, chaparral, and North Coast coniferous forest from 328 to 3,935 feet elevation.	February–July / Annual herb	There are 41 CNDDDB occurrence records of marsh microseris in the study area.	Likely to occur. The Permit Area intersects 30 occurrences of this species. Potential habitat for this species occurs where annual grassland, chaparral, oak woodland, or montane hardwood-conifer forest is present in Contra Costa, Alameda, Santa Clara, and San Mateo Counties.
<i>Packera clevelandii</i> Cleveland's ragwort	-/-/4.3	This species occurs in annual grasslands, often on serpentinite, from 115 to 2,035 feet elevation.	March–May / Annual herb	There are 16 herbarium records of Cleveland's ragwort in the study area.	Potential to occur. Potential habitat for this species occurs where serpentine chaparral is present in Napa County.
<i>Pentachaeta bellidiflora</i> White-rayed pentachaeta	E/E/1B.1	This species occurs in grassland and grassy openings in oak woodlands from 1,200 to 2,805 feet elevation.	March–May / Annual herb	There are 10 CNDDDB occurrence records of white-rayed pentachaeta in the study area.	Present. The Permit Area intersects 9 occurrences of this species. Potential habitat for this species occurs where serpentine grassland is present in San Mateo County (ICF 2016).
<i>Pentachaeta exilis</i> ssp. <i>aeolica</i> San Benito pentachaeta	-/-/1B.2	This species occurs in vernal pools and swales from 30 to 1,640 feet elevation.	May–June / Annual herb	There are 6 CNDDDB occurrence records of San Benito pentachaeta in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where annual grassland or coastal oak woodland is present in Santa Clara County.
<i>Psilocarphus brevissimus</i> var. <i>multiflorus</i> Delta woolly-marbles	-/-/4.2	This species occurs in oak woodland, coastal scrub, open sandy, or rocky areas from 50 to 2,625 feet elevation.	January–April / Annual herb	There are 7 herbarium records of Delta woolly-marbles in the study area.	Potential to occur. Potential habitat for this species occurs where vernal pools are present in the study area.
<i>Senecio aphanactis</i> Chaparral ragwort	-/-/1B.2	This species occurs in serpentine seeps in chaparral from 365 to 2,955 feet elevation.	June–July / Perennial herb	There are 9 CNDDDB occurrence records of chaparral ragwort in the study area.	Likely to occur. The Permit Area intersects 7 occurrences of this species. Potential habitat for this species occurs where annual grassland, coastal scrub, or oak woodland is present in the study area.
<i>Stebbinsoseris decipiens</i> Santa Cruz microseris	-/-/1B.2	This species occurs in grasslands, coastal prairie, and open grassy areas in other habitat types from 35 to 1,640 feet elevation.	April–May / Annual herb	There are 6 CNDDDB occurrence records of Santa Cruz microseris in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where perennial grassland is present in Marin County.
<i>Symphotrichum lentum</i> Suisun Marsh aster	-/-/1B.2	This species occurs in brackish and freshwater marshes below 15 feet elevation.	August– November / Perennial herb	There are 107 CNDDDB occurrence records of Suisun Marsh aster in the study area.	Likely to occur. The Permit Area intersects 30 occurrences of this species. Potential habitat for this species occurs where high elevation tidal marsh is present in the study area.
<i>Tracyina rostrata</i> Beaked tracyina	-/-/1B.2	This species occurs in annual grassland and grassy slopes in oak woodlands from 295 to 950 feet elevation.	May–June / Annual herb	There is 1 CNDDDB occurrence record of beaked tracyina in the study area.	Likely to occur. The Permit Area does not intersect any occurrences of this species. Potential habitat for this species occurs where annual grassland and oak woodland is present in Sonoma County.
Azollaceae – Water Fern Family					
<i>Azolla microphylla</i> Mexican mosquito fern	-/-/4.2	This species occurs in ponds and the still water of streams and canals from 100 to 325 feet elevation.	August / Annual or perennial herb	There are 2 herbarium records of Mexican mosquito fern in the study area.	Potential to occur. Potential habitat for this species occurs where open water habitat is present in the study area.
Boraginaceae – Borage Family					
<i>Amsinckia grandiflora</i> Large-flowered fiddleneck	E/E/1B.1	This species occurs in valley grassland slopes below 1,200 feet elevation.	April–May / Annual herb	There are 5 CNDDDB occurrence records of large-flowered fiddleneck in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where annual grassland and oak woodland is present in Alameda and Contra Costa Counties.
<i>Amsinckia lunaris</i> Bent-flowered fiddleneck	-/-/1B.2	This species occurs in coastal bluff scrub, valley and foothill grasslands, and cismontane woodlands, from 10 to 1,645 feet elevation.	March–June / Annual herb	There are 48 CNDDDB occurrence records of bent-flowered fiddleneck in the study area.	Likely to occur. The Permit Area intersects 21 occurrences of this species. Potential habitat for this species occurs where coastal scrub, annual grassland, or blue oak woodland is present in the study area.
<i>Cryptantha dissita</i> Serpentine cryptantha	-/-/1B.1	This species occurs in chaparral, on serpentinite from 1,295 to 1,905 feet elevation.	April–May / Annual herb	There are 2 CNDDDB occurrence records of serpentine cryptantha in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where serpentine chaparral is present in Napa County.
<i>Cryptantha hooveri</i> Hoover's cryptantha	-/-/1A	This species occurs on coarse sandy soil in grasslands from 35 to 490 feet elevation.	April–May / Annual herb	There is 1 CNDDDB occurrence record of serpentine cryptantha in the study area.	Potential to occur. The Permit Area intersects 1 occurrence of this species, which is believed to have been extirpated. Potential habitat for this species occurs where annual grassland in sandy soil is present in Contra Costa County.
<i>Phacelia insularis</i> var. <i>continentis</i> North Coast phacelia	-/-/1B.2	This species occurs on coastal bluffs, on sandy soil or rock outcrops, below 510 feet elevation.	March–May / Annual herb	There are 6 CNDDDB occurrence records of North Coast phacelia in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where coastal scrub is present in Marin County.

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<i>Phacelia phacelioides</i> Mt. Diablo phacelia	-/-/1B.2	This species occurs in chaparral, oak woodlands, adjacent to trails, and on rock outcrops and talus slopes from 2,000 to 3,800 feet elevation.	April–May / Annual herb	There are 12 CNDDDB occurrence records of Mt. Diablo phacelia in the study area.	Likely to occur. The Permit Area intersects 8 occurrences of this species. Potential habitat for this species occurs where chaparral or oak woodland is present in Contra Costa, Alameda, and Santa Clara Counties.
<i>Plagiobothrys chorisianus</i> var. <i>chorisianus</i> Choris's popcornflower	-/-/1B.2	This species occurs in mesic areas in coastal prairie, coastal scrub, and chaparral from 10 to 525 feet elevation.	March–June / Annual herb	There are 32 CNDDDB occurrence records of Choris's popcornflower in the study area.	Likely to occur. The Permit Area intersects 14 occurrences of this species. Potential habitat for this species occurs where perennial grassland, coastal scrub, or chaparral is present in San Francisco and San Mateo Counties.
<i>Plagiobothrys chorisianus</i> var. <i>hickmanii</i> Hickman's popcornflower	-/-/4.2	This species occurs in vernal pools and swales below 655 feet elevation.	April–July / Annual herb	There are 19 herbarium records of Hickman's popcornflower in the study area.	Potential to occur. Potential habitat for this species is present in San Mateo and Santa Clara County.
<i>Plagiobothrys diffusus</i> San Francisco popcornflower	-/E/1B.1	This species occurs in coastal terrace grasslands below 1,600 feet elevation.	March–June / Annual herb	There are 3 CNDDDB occurrence records of San Francisco popcornflower in the study area.	Absent. The Permit Area intersects 2 occurrences of this species. Both occurrences are extirpated or likely extirpated. Potential habitat for this species occurs where perennial grassland is present in San Francisco County (ICF 2016).
<i>Plagiobothrys glaber</i> Hairless popcornflower	-/-/1A	This species occurs in alkaline meadows from 50 to 590 feet elevation.	April–May / Annual herb	There are 8 CNDDDB occurrence records of hairless popcornflower in the study area.	Potential to occur. The Permit Area intersects 8 occurrences of this species. All of these occurrences are believed to be extirpated. Potential habitat for this species occurs where saline emergent wetland is present in San Francisco County.
<i>Plagiobothrys hystriculus</i> Bearded popcornflower	-/-/1B.1	This species occurs in mesic grasslands and vernal pools below 900 feet elevation.	March–May / Annual herb	There are 13 CNDDDB occurrence records of bearded popcornflower in the study area.	Likely to occur. The Permit Area intersects 10 occurrences of this species. Potential habitat for this species occurs where vernal pools are present in Solano and Napa Counties.
<i>Plagiobothrys mollis</i> var. <i>vestitus</i> Petaluma popcornflower	-/-/1A	This species occurs in wet sites in grasslands, possibly near salt marsh from 35 to 165 feet elevation.	June–July / Annual herb	There is 1 CNDDDB occurrence record of Petaluma popcornflower in the study area.	Potential to occur. The Permit Area intersects 1 occurrence of this species. This occurrence is believed to be extirpated. Potential habitat for this species occurs where saline emergent wetland is present in Napa County.
<i>Plagiobothrys strictus</i> Calistoga popcornflower	E/T/1B.1	This species occurs in alkaline areas near thermal springs from 295 to 525 feet elevation.	March–June / Annual herb	There are 3 CNDDDB occurrence records of Calistoga popcornflower in the study area.	Present. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where wet meadow is present in Napa County (ICF 2016).
<i>Plagiobothrys uncinatus</i> Salinas Valley popcornflower	-/-/1B.2	This species occurs on sandy soils in grasslands, chaparral, and oak woodlands from 985 to 2,395 feet elevation.	April–May / Annual herb	There are no records of Salinas Valley popcornflower in the study area.	Absent. The study area lies outside of the range for Salinas Valley popcornflower.
<i>Plagiobothrys verrucosus</i> Warty popcornflower	-/-/2B.1	This species occurs on gravelly soils in open areas in chaparral from 2,280 to 2,790 feet elevation.	March–May / Annual herb	There are 4 CNDDDB occurrence records of warty popcornflower in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where chaparral is present in Santa Clara County.
Brassicaceae – Mustard Family					
<i>Arabis blepharophylla</i> Coast rock cress	-/-/4.3	This species occurs in rock outcrops on coastal bluffs and hill slopes from 165 to 985 feet elevation.	February–May / Perennial herb	There are 125 herbarium records of coast rock cress in the study area.	Potential to occur. Potential habitat for this species occurs where coastal scrub is present in Marin, San Francisco, and San Mateo Counties.
<i>Arabis modesta</i> Modest rock cress	-/-/4.3	This species occurs on steep slopes, cliffs, and shaded canyon ledges from 165 to 1,640 feet elevation.	March–May / Perennial herb	There are 9 herbarium records of modest rock cress in the study area.	Potential to occur. Potential habitat for this species occurs where rock outcrops in oak woodland, chaparral, and closed-cone coniferous woodland are present in Napa and Yolo Counties.
<i>Arabis oregana</i> Oregon rock cress	-/-/4.3	This species occurs in chaparral, on rocky hillsides and steep banks from 1,640 to 4,575 feet elevation.	May / Perennial herb	There are 9 herbarium records of Oregon rock cress in the study area.	Potential to occur. Potential habitat for this species occurs where rock outcrops in chaparral and closed-cone coniferous woodland are present in Napa County.
<i>Boechera rubicundula</i> Mt. Day rockcress	-/-/1B.1	This species occurs in chaparral, on rocky slopes around 3,935 feet elevation.	April–May / Perennial herb	There is 1 CNDDDB occurrence record of Mt. Day rock cress in the study area.	Potential to occur. This species is known from a single occurrence. The Permit Area does not intersect the occurrence. Potential habitat for this species occurs where rock outcrops in chaparral are present in Santa Clara County.
<i>Cardamine angulata</i> Seaside bittercress	-/-/2B.2	This species occurs in riparian areas and on streambanks in North Coast coniferous forest and lower montane coniferous forest from 15 to 1,720 feet elevation.	(January) March–July / Perennial herb	There is 1 CNDDDB occurrence record of seaside bittercress in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where coastal riparian habitat is present in Marin County.

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<i>Caulanthus lemmonii</i> Lemmon's jewelflower	-/-/1B.2	This species occurs in pinyon and juniper woodlands, and valley and foothill grasslands from 260 to 5,185 feet elevation.	February–May / Annual herb	There are 2 CNDDDB occurrence records of Lemmon's jewelflower in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where annual grassland habitat is present in Alameda County.
<i>Erysimum ammophilum</i> Coast wallflower	-/-/1B.2	This species occurs in coastal dunes and sandy openings in maritime chaparral and coastal scrub below 195 feet elevation.	February–June / Perennial herb	There is 1 CNDDDB occurrence record of coast wallflower in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where dunes and coastal scrub are present in southern San Mateo County.
<i>Erysimum capitatum</i> ssp. <i>angustatum</i> Contra Costa wallflower	E/E/1B.1	This species occurs on inland dunes from 10 to 65 feet elevation.	March–July / Perennial herb	There are 4 CNDDDB occurrence records of Contra Costa wallflower in the study area.	Present. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where dunes are present in Contra Costa County (ICF 2016).
<i>Erysimum concinnum</i> Headland wallflower	-/-/1B.2	This species occurs in coastal bluff scrub, coastal dunes, and coastal prairies below 605 feet elevation.	February–July / Annual / Perennial herb	There are 13 CNDDDB occurrence records of headland wallflower in the study area.	Likely to occur. The Permit Area intersects 5 occurrences of this species. Potential habitat for this species occurs where dunes, coastal scrub, and perennial grassland are present in Sonoma, Marin, and San Francisco Counties.
<i>Erysimum franciscanum</i> San Francisco wallflower	-/-/4.2	This species occurs in chaparral, coastal dunes, coastal scrub, and valley and foothill grasslands below 1,805 feet elevation. Substrates are often serpentinitic or granitic, and this species sometimes occurs on roadsides.	March–June / Perennial herb	There are about 125 herbarium records of San Francisco wallflower in the study area.	Potential to occur. Potential habitat for this species occurs where dunes and coastal scrub are present in Marin, San Francisco, and San Mateo Counties.
<i>Lepidium latipes</i> var. <i>heckardii</i> Heckard's pepper-grass	-/-/1B.2	This species occurs in annual grasslands on the margins of alkali scalds from 5 to 655 feet elevation.	March–May / Annual herb	There are 2 CNDDDB occurrence records of Heckard's pepper-grass in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where annual grassland in alkaline soils is present in Solano County.
<i>Streptanthus albidus</i> ssp. <i>albidus</i> Metcalf Canyon jewelflower	E/-/1B.1	This species occurs in serpentine grassland from 150 to 2,625 feet elevation.	April–July / Annual herb	There are 13 CNDDDB occurrence records of Metcalf Canyon jewelflower in the study area.	Present. The Permit Area intersects 5 occurrences of this species. Potential habitat for this species occurs where serpentine grassland is present in Santa Clara County (ICF 2016).
<i>Streptanthus albidus</i> ssp. <i>peramoenus</i> Most beautiful jewelflower	-/-/1B.2	This species occurs on ridges, slopes, and outcrops in serpentine chaparral and grasslands between 450 and 3,200 feet elevation.	April–June / Annual herb	There are 66 CNDDDB occurrence records of most beautiful jewelflower in the study area.	Likely to occur. The Permit Area intersects 27 occurrences of this species. Potential habitat for this species occurs where serpentine grassland and serpentine chaparral are present in Contra Costa, Alameda, and Santa Clara Counties.
<i>Streptanthus barbiger</i> Bearded jewelflower	-/-/4.2	This species occurs in serpentine chaparral and barrens from 255 to 4,920 feet elevation.	May–August / Annual herb	There are about 125 herbarium records of bearded jewelflower in the study area.	Potential to occur. Potential habitat for this species occurs where serpentine grassland and serpentine chaparral are present in Sonoma and Napa Counties.
<i>Streptanthus batrachopus</i> Tamalpais jewelflower	-/-/1B.3	This species occurs on serpentine substrates in chaparral and closed-cone coniferous forest from 1,000 to 2,135 feet elevation.	April–July / Annual herb	There are 8 CNDDDB occurrence records of Tamalpais jewelflower in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where serpentine chaparral and closed-cone coniferous woodland are present in Marin County.
<i>Streptanthus brachiatus</i> ssp. <i>hoffmanii</i> Freed's jewelflower	-/-/1B.2	This species occurs on serpentine substrates in chaparral from 1,610 to 3,935 feet elevation	May–July / Perennial herb	There are 5 CNDDDB occurrence records of Freed's jewelflower in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where serpentine chaparral is present in northern Napa County.
<i>Streptanthus brachiatus</i> ssp. <i>brachiatus</i> Socrates Mine jewelflower	-/-/1B.2	This species occurs on serpentinite substrates in chaparral and cypress forests from 1,790 to 3,280 feet elevation.	May–June / Perennial herb	There are 5 CNDDDB occurrence records of Socrates Mine jewelflower in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where serpentine chaparral is present in Sonoma County.
<i>Streptanthus callistus</i> Mt. Hamilton jewelflower	-/-/1B.3	This species occurs in chaparral and oak woodlands from 1,970 to 2,590 feet elevation.	April–May / Annual herb	There are 4 CNDDDB occurrence records of Mt. Hamilton jewelflower in the study area.	Potential to occur. The Permit Area does not intercept any occurrences of this species. Potential habitat for this species occurs where serpentine chaparral and blue oak-foothill pine woodland is present in Santa Clara County.
<i>Streptanthus glandulosus</i> ssp. <i>hoffmanii</i> Secund jewelflower	-/-/1B.3	This species occurs on serpentine substrates in chaparral and grasslands from 395 to 1,560 feet elevation.	March–July / Annual herb	There are 4 CNDDDB occurrence records of secund jewelflower in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where serpentine grassland and serpentine chaparral are present in Sonoma County.
<i>Streptanthus glandulosus</i> ssp. <i>niger</i> Tiburón jewelflower	E/E/1B.1	This species occurs in serpentine grasslands from 100 to 330 feet elevation.	May–July / Annual herb	There are 2 CNDDDB occurrence records of Tiburón jewelflower in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where serpentine grassland is present in Marin County.

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<i>Streptanthus glandulosus</i> ssp. <i>pulchellus</i> Mount Tamalpais jewelflower	-/-/1B.2	This species occurs in grasslands and dry, open areas in chaparral and oak woodland, usually on serpentinite, from 490 to 2,625 feet elevation.	May–July / Annual herb	There are 24 CNDDDB occurrence records of Mount Tamalpais jewelflower in the study area.	Likely to occur. The Permit Area intersects 4 occurrences of this species. Potential habitat for this species occurs where serpentine grassland and serpentine chaparral are present in Marin County.
<i>Streptanthus hesperidis</i> Green jewelflower	-/-/1B.2	This species occurs on serpentine and rocky substrates in chaparral, barrens, and closed-cone coniferous woodlands from 820 to 1,970 feet elevation.	May–July / Annual herb	There are 13 CNDDDB occurrence records of green jewelflower in the study area.	Likely to occur. The Permit Area intersects 7 occurrences of this species. Potential habitat for this species occurs where chaparral and closed-cone coniferous woodland are present in Napa and Sonoma Counties.
<i>Streptanthus hispidus</i> Mt. Diablo jewelflower	-/-/1B.3	This species occurs on rocky outcrops in annual grassland and chaparral from 2,000 to 3,850 feet elevation.	March–June / Annual herb	There are 8 CNDDDB occurrence records of Mt. Diablo jewelflower in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where serpentine grassland and serpentine chaparral are present in Contra Costa County.
<i>Streptanthus morrisonii</i> ssp. <i>elatus</i> Three Peaks jewelflower	-/-/1B.2	This species occurs in serpentine chaparral and in barrens from 785 to 2,410 feet elevation.	June–September / Perennial herb	There are 7 CNDDDB occurrence records of Three Peaks jewelflower in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where serpentine chaparral is present in Napa County.
<i>Streptanthus morrisonii</i> ssp. <i>hirtiflorus</i> Dorr's Cabin jewelflower	-/-/1B.2	This species occurs on serpentine substrates in chaparral, barrens, and cypress woodlands from 605 to 2,690 feet elevation.	June / Perennial herb	There is 1 CNDDDB occurrence record of Dorr's cabin jewelflower in the study area.	Potential to occur. The Permit Area does not intercept any occurrences of this species. Potential habitat for this species occurs where serpentine chaparral and closed-cone coniferous woodland are present in Sonoma and Napa Counties.
<i>Streptanthus morrisonii</i> ssp. <i>kruckebergii</i> Kruckeberg's jewelflower	-/-/1B.2	This species occurs on serpentine substrate in chaparral, barrens, and cypress woodlands from 785 to 2,180 feet elevation.	April–July / Perennial herb	There are 3 CNDDDB occurrence records of Kruckeberg's jewelflower in the study area.	Potential to occur. The Permit Area does not intercept any occurrences of this species. Potential habitat for this species occurs where serpentine chaparral and closed-cone coniferous woodland are present in Napa County.
<i>Streptanthus morrisonii</i> ssp. <i>morrisonii</i> Morrison's jewelflower	-/-/1B.2	This species occurs on serpentine substrate in chaparral, barrens, and cypress woodlands from 395 to 1,920 feet elevation.	May–September / Perennial herb	There are 5 CNDDDB occurrence records of Morrison's jewelflower in the study area.	Potential to occur. The Permit Area does not intercept any occurrences of this species. Potential habitat for this species occurs where serpentine chaparral and closed-cone coniferous woodland are present in Sonoma County.
<i>Thelypodium brachycarpum</i> Short-podded thelypodium	-/-/4.2	This species occurs in meadows and seeps on clay, alkaline, or serpentine soils in chaparral and lower montane coniferous forest from 2,200 to 8,400 feet elevation.	May–August / Perennial herb	There are three herbarium records of short-podded thelypodium in the study area.	Potential to occur. Potential habitat for this species occurs where serpentine chaparral is present in Napa and Sonoma Counties.
<i>Tropidocarpum capparideum</i> Caper-fruited tropidocarpum	-/-/1B.1	This species occurs on alkaline soils in valley and foothill grasslands from 5 to 1,460 feet elevation.	March–April / Annual herb	There are 7 CNDDDB occurrence records of caper-fruited tropidocarpum in the study area.	Potential to occur. The Permit Area intersects 7 occurrences of this species. However, all the occurrences are either extirpated or are based on historical records. Potential habitat for this species occurs where annual grassland is present in Alameda and Contra Costa Counties.
Campanulaceae – Bluebell Family					
<i>Downingia pusilla</i> Dwarf downingia	-/-/2B.2	This species occurs in vernal pools below 1,460 feet elevation.	March–May / Annual herb	There are 47 CNDDDB occurrence records of dwarf downingia in the study area.	Likely to occur. The Permit Area intersects 21 occurrences of this species. Potential habitat for this species occurs where vernal pools are present in Sonoma, Napa, and Solano Counties.
<i>Legenere limosa</i> Legenere	-/-/1B.1	This species occurs in vernal pools below 2,885 feet elevation.	May–June / Annual herb	There are 18 CNDDDB occurrence records of legenere in the study area.	Likely to occur. The Permit Area intersects 7 occurrences of this species. Potential habitat for this species occurs where vernal pools are present in Sonoma, Napa, and Solano Counties.
Caryophyllaceae – Pink Family					
<i>Arenaria paludicola</i> Marsh sandwort	E/E/1B.1	This species occurs in freshwater marshes and swamps from 10 to 560 feet elevation.	May–August / Perennial herb	There is 1 CNDDDB occurrence record of marsh sandwort in the study area.	Unlikely to occur. The Permit Area intersects 1 occurrence of this species; however, this occurrence has been extirpated. Potential habitat for this species occurs where freshwater emergent wetlands are present in San Francisco County (ICF 2016).
<i>Silene verecunda</i> ssp. <i>verecunda</i> San Francisco campion	-/-/1B.2	This species occurs in coastal prairie, coastal scrub, and chaparral from 100 to 2,115 feet elevation.	February– August / Perennial herb	There are 7 CNDDDB occurrence records of San Francisco campion in the study area.	Potential to occur. The Permit Area intersects 5 occurrences of this species. Potential habitat for this species occurs where coastal scrub, perennial grasslands, or chaparral are present in San Mateo and San Francisco Counties.

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<i>Spergularia macrotheca</i> var. <i>longistyla</i> Long-styled sand-spurry	-/-/1B.2	This species occurs in alkaline grassland, meadows, marshes, mud flats, and hot springs, below 655 feet elevation.	February–May / Perennial herb	There are 22 CNDDDB occurrence records of long-styled sand-spurry in the study area.	Potential to occur. The Permit Area intersects 18 occurrences of this species. Potential habitat for this species occurs where wet meadow is present in alkaline soils in Napa, Solano, Contra Costa, and Alameda Counties.
<i>Stellaria littoralis</i> Beach starwort	-/-/4.2	This species occurs in coastal marshes and bluffs below 130 feet elevation.	March–July / Perennial herb	There are about 33 herbarium records of beach starwort in the study area.	Potential to occur. Potential habitat for this species occurs where high elevation tidal marsh and coastal scrub are present in Sonoma, Marin, and San Francisco Counties.
Chenopodiaceae – Goosefoot Family					
<i>Atriplex cordulata</i> var. <i>cordulata</i> Heartscale	-/-/1B.2	This species occurs in alkali grassland, alkali meadow, and alkali scrub below 1,835 feet elevation.	May–October / Annual herb	There are 15 CNDDDB occurrence records of heartscale in the study area.	Likely to occur. The Permit Area intersects 9 occurrences of this species. Potential habitat for this species occurs where alkaline vernal pools or saline emergent wetlands are present in Solano County.
<i>Atriplex coronata</i> var. <i>coronata</i> Crownscale	-/-/4.2	This species occurs in alkali grassland, alkali meadow, and alkali scrub from 5 to 1,935 feet elevation.	August– September / Annual herb	There are about 33 herbarium records of crownscale in the study area.	Likely to occur. Potential habitat for this species occurs where alkaline vernal pools or saline emergent wetlands are present in Solano, Contra Costa, and Alameda Counties.
<i>Atriplex depressa</i> Brittlescale	-/-/1B.2	This species occurs in alkali grassland, alkali meadow, and alkali scrub from 5 to 1,050 feet elevation.	April–October / Annual herb	There are 26 CNDDDB occurrence records of brittlescale in the study area.	Likely to occur. The Permit Area intersects 16 occurrences of this species. Potential habitat for this species occurs where alkaline vernal pools or saline emergent wetlands are present in Solano, Contra Costa, and Alameda Counties.
<i>Atriplex minuscula</i> Lesser saltscale	-/-/1B.1	This species occurs in alkali sink and sandy alkaline soils in grasslands, from 65 to 325 feet elevation.	May–October / Annual herb	There are 4 CNDDDB occurrence records of lesser saltscale in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where alkaline vernal pools or saline emergent wetlands are present in Contra Costa and Alameda Counties.
<i>Atriplex persistens</i> Vernal pool smallscale	-/-/1B.2	This species occurs in the dry beds of vernal pools, on alkaline soils from 30 to 375 feet elevation.	June–October / Annual herb	There are 4 CNDDDB occurrence records of vernal pool smallscale in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where alkaline vernal pools or saline emergent wetlands are present in Solano County.
<i>Extriplex joaquiniana</i> San Joaquin spearscale	-/-/1B.2	This species occurs in alkali meadow, alkali grassland, and saltbush scrub from 5 to 2,740 feet elevation.	April– September / Annual herb	There are 81 CNDDDB occurrence records of San Joaquin spearscale in the study area.	Likely to occur. The Permit Area intersects 47 occurrences of this species. Potential habitat for this species occurs where alkaline vernal pools or saline emergent wetlands are present in Napa, Solano, Contra Costa, Alameda, and Santa Clara Counties.
<i>Suaeda californica</i> California seablight	E/-/1B.1	This species occurs on the margins of tidal salt marsh below 50 feet in elevation.	July–October / Perennial shrub	There are 10 CNDDDB occurrence records of California seablight in the study area.	Absent. The Permit Area intersects 7 occurrences of this species. Potential habitat for this species occurs where high elevation tidal marsh is present in Alameda, Santa Clara and San Francisco Counties (ICF 2016).
Convolvulaceae – Morning-Glory Family					
<i>Calystegia collina</i> ssp. <i>oxyphylla</i> Mt. Saint Helena morning- glory	-/-/4.2	This species occurs in open areas in serpentine chaparral from 900 to 3,315 feet elevation.	May–June / Perennial herb	There are about 21 herbarium records of Mt. Saint Helena morning-glory in the study area.	Potential to occur. Potential habitat for this species occurs where serpentine chaparral is present in Sonoma, Napa, and Marin Counties.
<i>Calystegia collina</i> ssp. <i>venusta</i> South Coast Range morning- glory	-/-/4.3	This species occurs in open grassy or rocky places in oak/pine woodlands, often on serpentinite, below 1,970 feet elevation.	April–June / Perennial herb	There are no herbarium or CNDDDB records of South Coast Range morning-glory in the study area.	Unlikely to occur. Although potential habitat for this species occurs where blue oak-foothill pine woodland is present, the study area appears to be outside of the subspecies' range.
<i>Calystegia purpurata</i> ssp. <i>saxicola</i> Coastal bluff morning-glory	-/-/1B.2	This species occurs in coastal dunes, coastal scrub, coastal bluff scrub, and North Coast coniferous forest below 1,410 feet elevation.	May–June / Perennial herb	There are 30 CNDDDB occurrence records of coastal bluff morning-glory in the study area.	Likely to occur. The Permit Area intersects 12 occurrences of this species. Potential habitat for this species occurs where dunes and coastal scrub are present in Sonoma and Marin Counties.
<i>Convolvulus simulans</i> Small-flowered morning-glory	-/-/4.2	This species occurs in chaparral openings, coastal scrub, valley and foothill grassland, on clay soils in serpentinite seeps, from 330 to 9,415 feet elevation.	April–June / Annual herb	There are 3 herbarium records of small-flowered morning-glory in the study area.	Potential to occur. Potential habitat for this species occurs where coastal scrub, chaparral, or grassland is present in Contra Costa County.
<i>Cuscuta obtusiflora</i> var. <i>glandulosa</i> Peruvian dodder	-/-/2B.2	This species occurs in freshwater marshes from 50 to 920 feet elevation.	July–October / Annual parasitic vine	There is 1 CNDDDB occurrence record of Peruvian dodder in the study area.	Likely to occur. The Permit Area intersects 1 occurrences of this species. Potential habitat for this species occurs where freshwater emergent wetland is present in Sonoma County.

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<i>Cuscuta pacifica</i> var. <i>papillata</i> Mendocino dodder	-/-/1B.2	This species occurs in coastal dunes and interdune depressions below 165 feet elevation.	June–October / Annual parasitic vine	There is 1 CNDDDB occurrence records of Mendocino dodder in the study area.	Likely to occur. The Permit Area intersects 1 occurrences of this species. Potential habitat for this species occurs where dunes are present in Sonoma County.
<i>Dichondra occidentalis</i> Western dichondra	-/-/4.2	This species occurs at the base of rocks and shrubs in coastal scrub, chaparral, and oak woodlands below 1,705 feet elevation.	March–June / Perennial herb	There are 3 herbarium records of western dichondra in the study area.	Potential to occur. Potential habitat for this species occurs where coastal scrub, chaparral, or oak woodland are present in Sonoma and Marin Counties.
Crassulaceae – Stonecrop Family					
<i>Dudleya abramsii</i> ssp. <i>setchellii</i> Santa Clara Valley dudleya	E/-/1B.1	This species occurs on serpentinite in grasslands, oak woodlands from 195 to 1,495 feet elevation.	April–June / Perennial herb	There are 58 CNDDDB occurrence records of Santa Clara Valley dudleya in the study area.	Present. The Permit Area intersects 23 occurrences of this species. Potential habitat for this species occurs where serpentine grassland or oak woodland are present in Santa Clara County (ICF 2016).
Cupressaceae – Cypress Family					
<i>Hesperocyparis abramsiana</i> var. <i>butano</i> Butano Ridge cypress	-/-/1B.2	This species occurs in closed-cone coniferous forests on sandstone-derived soils from 1,310 to 1,610 feet elevation.	October / Perennial evergreen tree	There is 1 CNDDDB occurrence record of Butano Ridge cypress in the study area.	Potential to occur. The Permit Area does not intersect any occurrences of this species. Potential habitat for this species occurs where closed-cone cypress-pine forest is present in San Mateo County.
<i>Hesperocyparis pygmaea</i> Mendocino cypress	-/-/1B.2	This species occurs in closed-cone pine-cypress forest from 100 to 1,970 feet elevation.	October / Perennial evergreen tree	There are 2 CNDDDB occurrence records of Mendocino cypress in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where closed-cone cypress-pine forest is present in Sonoma County.
Cyperaceae – Sedge Family					
<i>Carex albida</i> White sedge	E/E/1B.1	This species occurs in freshwater marsh at about 145 feet elevation.	May–July / Perennial herb	There are 2 herbarium records of white sedge in the study area.	Potential to occur. Potential habitat for this species occurs where freshwater emergent wetlands are present in Sonoma County. White sedge is no longer considered to be a valid species and has been dropped from the CNDDDB.
<i>Carex buxbaumii</i> Buxbaum's sedge	-/-/4.2	This species occurs in fens, wet meadows, seeps, marshes, and swamps below 10,825 feet elevation.	March–August / Perennial herb	Based on herbarium records, there are 3 occurrences of Buxbaum's sedge in the study area.	Potential to occur. Potential habitat for this species occurs where freshwater emergent wetlands are present in Sonoma and Marin Counties.
<i>Carex comosa</i> Bristly sedge	-/-/2B.1	This species occurs on lake margins below 2,050 feet elevation.	May–September / Perennial herb	There are 4 CNDDDB occurrence records of bristly sedge in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where freshwater emergent wetlands are present in Sonoma County.
<i>Carex leptalea</i> Flaccid sedge	-/-/2B.2	This species occurs in bogs and wet meadows, below 4,250 feet elevation.	June–August / Perennial herb	There is 1 CNDDDB occurrence record of flaccid sedge in the study area.	Potential to occur. The Permit Area intersects 1 occurrence of this species. Although potential habitat for this species occurs where freshwater emergent wetlands are present in Marin County, the Marin County occurrence appears to be extirpated.
<i>Carex lyngbyei</i> Lyngbye's sedge	-/-/2B.2	This species occurs in salt marshes, freshwater marshes, and sphagnum bogs below 35 feet elevation.	April–August / Perennial herb	There are 5 CNDDDB occurrence records of Lyngbye's sedge in the study area.	Likely to occur. The Permit Area intersects 4 occurrences of this species. Potential habitat for this species occurs where high elevation tidal marsh or freshwater emergent wetlands are present in Sonoma, Marin, and Napa Counties.
<i>Carex praticola</i> Mountain meadow sedge	-/-/2B.2	This species occurs in wet meadows and seeps from 50 to 10,500 feet elevation.	May–July / Perennial herb	There is 1 CNDDDB occurrence record of mountain meadow sedge in the study area.	Potential to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where freshwater emergent wetlands are present in Napa, Sonoma, and Marin Counties.
<i>Carex saliniformis</i> Deceiving sedge	-/-/1B.2	This species occurs in meadows and seeps, coastal salt marsh, coastal swamp, and wet areas in coastal prairie and coastal scrub below 760 feet elevation.	June–July / Perennial herb	There are 3 CNDDDB occurrence records of deceiving sedge in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where freshwater emergent wetlands are present in Sonoma County.
<i>Eleocharis parvula</i> Small spikerush	-/-/4.3	This species occurs in coastal brackish wetlands below 165 feet elevation.	Late winter–fall / Perennial herb	Based on herbarium records, there are 5 occurrences of small spikerush in the study area.	Potential to occur. Potential habitat for this species occurs where high elevation tidal marsh is present in Napa, Sonoma, Marin, and Alameda Counties.
<i>Eriophorum gracile</i> Slender cottongrass	-/-/4.3	This species occurs in wet meadows and bogs from 1,970 to 9,515 feet elevation.	May–July / Perennial herb	There are no herbarium or CNDDDB records of slender cottongrass in the study area.	Unlikely to occur. Potential habitat for this species occurs where high elevation bogs and wet meadows are present. The study area is outside of the range for this species, and the reported occurrence location in the CNPS Inventory is most likely erroneous.

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<i>Rhynchospora alba</i> White beaked-rush	-/-/2B.2	This species occurs in meadows, marshes, and bogs from 195 to 6,695 feet elevation.	July–August / Perennial herb	There is 1 CNDDDB occurrence record of white beaked-rush in the study area.	Potential to occur. The Permit Area does not intersect any occurrences of this species. Potential habitat for this species occurs where freshwater emergent wetlands are present in Sonoma County.
<i>Rhynchospora californica</i> California beaked-rush	-/-/1B.1	This species occurs in freshwater marshes and seeps from 150 to 3,315 feet elevation.	May–July / Perennial herb	There are 5 CNDDDB occurrence records of California beaked-rush in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where freshwater emergent wetlands are present in Napa, Sonoma, and Marin Counties.
<i>Rhynchospora capitellata</i> Brownish beaked-rush	-/-/2B.2	This species occurs in freshwater marshes and seeps from 150 to 6,560 feet elevation.	July–August / Perennial herb	There are 2 CNDDDB occurrence records of brownish beaked-rush in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where freshwater emergent wetlands are present in Sonoma County.
<i>Rhynchospora globularis</i> Round-headed beaked-rush	-/-/2B.1	This species occurs in freshwater marsh from 150 to 195 feet elevation.	July–August / Perennial herb	There are 2 CNDDDB occurrence records of round-headed beaked-rush in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where freshwater emergent wetlands are present in Sonoma County.
Equisetaceae – Horsetail Family					
<i>Equisetum palustre</i> Marsh horsetail	-/-/3	This species occurs in freshwater marsh, below 985 feet elevation.	NA (No flower) / Perennial herb	Based on herbarium records, there is 1 occurrence of marsh horsetail in the study area.	Potential to occur. Potential habitat for this species occurs where freshwater emergent wetlands are present in San Francisco County.
Ericaceae – Heath Family					
<i>Arctostaphylos andersonii</i> Santa Cruz manzanita	-/-/1B.2	This species occurs in chaparral and on the edges of broadleaved upland forest and north coast coniferous forest from 195 to 2,495 feet elevation.	November– April / Perennial shrub	There are 23 CNDDDB occurrence records of Santa Cruz manzanita in the study area.	Likely to occur. The Permit Area intersects 8 occurrences of this species. Potential habitat for this species occurs where chaparral is present in Santa Clara and San Mateo Counties.
<i>Arctostaphylos auriculata</i> Mt. Diablo manzanita	-/-/1B.3	This species occurs on sandstone in chaparral, in canyons and on slopes from 400 to 1,650 feet elevation.	January–March / Perennial shrub	There are 17 CNDDDB occurrence records of Mt. Diablo manzanita in the study area.	Likely to occur. The Permit Area intersects 8 occurrences of this species. Potential habitat for this species occurs where chaparral is present in Contra Costa County.
<i>Arctostaphylos bakeri</i> ssp. <i>bakeri</i> Baker’s manzanita	-/R/1B.1	This species occurs in broadleaved upland forest, chaparral, often on serpentine soils, from 245 to 985 feet elevation.	April–May / Perennial shrub	There are 3 CNDDDB occurrence records of Baker’s manzanita in the study area.	Present. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where serpentine chaparral is present in Sonoma County (ICF 2016).
<i>Arctostaphylos bakeri</i> ssp. <i>sublaevis</i> The Cedars manzanita	-/R/1B.2	This species occurs on serpentinite in closed-cone coniferous forests and chaparral from 605 to 2,495 feet elevation.	April–May / Perennial shrub	There are 4 CNDDDB occurrence records of The Cedars manzanita in the study area.	Unlikely to occur. The Permit Area does not intersect any occurrences of this species. Potential habitat for this species occurs where serpentine chaparral and closed-cone pine-cypress forest are present in Sonoma County (ICF 2016).
<i>Arctostaphylos densiflora</i> Vine Hill manzanita	-/E/1B.1	This species occurs, on acidic sandy soils derived from marine sediments in chaparral from 165 to 395 feet elevation.	February– March / Perennial shrub	There are 2 CNDDDB occurrence records of Vine Hill manzanita in the study area.	Unlikely to occur. The Permit Area does not intersect any occurrences of this species. Potential habitat for this species occurs where mixed chaparral is present in Sonoma County (ICF 2016).
<i>Arctostaphylos franciscana</i> Franciscan manzanita	-/-/1B.1	This species occurs on serpentinite in coastal scrub from 195 to 985 feet elevation.	February–April / Perennial shrub	There are 4 CNDDDB occurrence records of Franciscan manzanita in the study area.	Unlikely to occur. The Permit Area intersects 4 occurrences of this species. Potential habitat for this species occurs where coastal scrub is present in San Francisco County. Of the known occurrences, 3 are extirpated, and the remaining occurrence is protected in a native plant management area.
<i>Arctostaphylos hispidula</i> Howell’s manzanita	-/-/4.2	This species occurs on serpentinite or sandstone substrates in chaparral or woodlands from 330 to 4,100 feet elevation.	March–April / Perennial shrub	Based on herbarium records, there are 8 occurrences of Howell’s manzanita in the study area.	Potential to occur. Potential habitat for this species occurs where chaparral is present in Sonoma County.
<i>Arctostaphylos imbricata</i> San Bruno Mountain manzanita	-/E/1B.1	This species occurs in chaparral from 900 to 1,215 feet elevation.	February–May / Perennial shrub	There are 2 CNDDDB occurrence records of San Bruno Mountain manzanita in the study area.	Present. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where mixed chaparral is present in San Mateo County (ICF 2016).
<i>Arctostaphylos manzanita</i> ssp. <i>elegans</i> Konocti manzanita	-/-/1B.3	This species occurs on volcanic soils in chaparral, oak woodland, and lower montane coniferous forest from 740 to 6,005 feet elevation.	February–May / Perennial shrub	There are 5 CNDDDB occurrence records of Konocti manzanita in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where chaparral is present in Napa and Sonoma Counties.
<i>Arctostaphylos manzanita</i> ssp. <i>laevigata</i> Contra Costa manzanita	-/-/1B.2	This species occurs in chaparral from 490 to 2,000 feet elevation.	January– February / Perennial shrub	There are 10 CNDDDB occurrence records of Contra Costa manzanita in the study area.	Likely to occur. The Permit Area intersects 6 occurrences of this species. Potential habitat for this species occurs where chaparral is present in Contra Costa County.

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<i>Arctostaphylos montana</i> ssp. <i>montana</i> Mt. Tamalpais manzanita	-/-/1B.3	This species occurs on serpentine soil in chaparral and grasslands from 525 to 2,500 feet elevation.	February–April / Perennial shrub	There are 15 CNDDDB occurrence records of Mt. Tamalpais manzanita in the study area.	Likely to occur. The Permit Area intersects 10 occurrences of this species. Potential habitat for this species occurs where serpentine chaparral is present in Marin County.
<i>Arctostaphylos montana</i> ssp. <i>ravenii</i> Presidio manzanita	E/E/1B.1	This species occurs on serpentinite in coastal scrub from 150 to 705 feet elevation.	February–March / Perennial shrub	There are 7 CNDDDB occurrence records of Presidio manzanita in the study area.	Absent. The Permit Area intersects 5 occurrences of this species but not present in ROW. Potential habitat for this species occurs where serpentine chaparral is present in San Francisco County (ICF 2016).
<i>Arctostaphylos montaraensis</i> Montara manzanita	-/-/1B.2	This species occurs in maritime chaparral and coastal scrub from 260 to 1,640 feet elevation.	January–March / Perennial shrub	There are 4 CNDDDB occurrence records of Montara manzanita in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where coastal scrub or mixed chaparral is present in San Mateo County.
<i>Arctostaphylos pacifica</i> Pacific manzanita	-/E/1B.1	The species is known only from San Bruno Mountain.	February–April / Perennial shrub	There is 1 CNDDDB occurrence record of Pacific manzanita in the study area.	Absent. The Permit Area does not intersect any occurrences of this species. Potential habitat for this species occurs where mixed chaparral is present in San Mateo County (ICF 2016).
<i>Arctostaphylos pallida</i> Pallid manzanita	T/E/1B.1	This species occurs on slopes and ridges on siliceous shales in northern maritime chaparral and mixed evergreen forest from 600 to 1,530 feet elevation.	December–March / Perennial shrub	There are 9 CNDDDB occurrence records of pallid manzanita in the study area.	Present. The Permit Area intersects 7 occurrences of this species. Potential habitat for this species occurs where mixed chaparral is present in Alameda County (ICF 2016).
<i>Arctostaphylos regismontana</i> Kings Mountain manzanita	-/-/1B.2	This species occurs on granitic or sandstone outcrops in broadleaved upland forests, chaparral, and north coast coniferous forests from 1,000 to 2,395 feet elevation.	January–March / Perennial shrub	There are 16 CNDDDB occurrence records of Kings Mountain manzanita in the study area.	Likely to occur. The Permit Area intersects 12 occurrences of this species. Potential habitat for this species occurs where mixed chaparral or montane hardwood-conifer forest is present in San Mateo County.
<i>Arctostaphylos stanfordiana</i> ssp. <i>decumbens</i> Rincon manzanita	-/-/1B.1	This species occurs on rhyolitic soils in chaparral from 245 to 1,215 feet elevation.	February–April / Perennial shrub	There are 12 CNDDDB occurrence records of Rincon manzanita in the study area.	Likely to occur. The Permit Area intersects 9 occurrences of this species. Potential habitat for this species occurs where mixed chaparral is present in Napa and Sonoma Counties.
<i>Arctostaphylos virgata</i> Marin manzanita	-/-/1B.2	This species occurs on sandstone or granite substrates in chaparral, Bishop pine forests, broadleaved upland forests, and north coast coniferous forests from 200 to 2,300 feet elevation.	January–March / Perennial shrub	There are 32 CNDDDB occurrence records of Marin manzanita in the study area.	Likely to occur. The Permit Area intersects 9 occurrences of this species. Potential habitat for this species occurs where serpentine chaparral or closed-cone pine-cypress forest is present in Marin County.
<i>Pityopus californicus</i> California pinefoot	-/-/4.2	This species occurs in mixed evergreen forest and coniferous forest below 5,905 feet elevation.	May–July / Perennial herb	Based on herbarium records, there are 5 occurrences of California pinefoot in the study area.	Potential to occur. Potential habitat for this species occurs where montane hardwood-conifer forest is present in Sonoma and Marin Counties.
Fabaceae – Pea Family					
<i>Amorpha californica</i> var. <i>napensis</i> Napa false indigo	-/-/1B.2	This species occurs in openings in broadleaved upland forest, cismontane woodland, and chaparral from 500 to 6,580 feet elevation.	April–July / Perennial shrub	There are 68 CNDDDB occurrence records of Napa false indigo in the study area.	Likely to occur. The Permit Area intersects 36 occurrences of this species. Potential habitat for this species occurs where mixed chaparral, oak woodland, or montane hardwood-conifer forest are present in Napa, Sonoma, and Marin Counties.
<i>Astragalus breweri</i> Brewer's milkvetch	-/-/4.2	This species occurs on open slopes in grasslands below 2,970 feet elevation.	March–June / Annual herb	Based on herbarium records, there are as many as 20 occurrences of Brewer's milkvetch in the study area.	Present. Potential habitat for this species occurs where serpentine chaparral or alkali meadow is present in the Permit Area in Napa, Sonoma, and Marin Counties (ICF 2016).
<i>Astragalus clarianus</i> Clara Hunt's milkvetch	E/T/1B.1	This species occurs on thin volcanic or serpentine soils in serpentine grasslands and open grassy areas in oak woodland from 230 to 900 feet elevation.	March–April / Annual herb	There are 6 CNDDDB occurrence records of Clara Hunt's milkvetch in the study area.	Present. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where annual grassland is present in Napa, Sonoma, and Marin Counties (ICF 2016).
<i>Astragalus clevelandii</i> Cleveland's milkvetch	-/-/4.3	This species occurs on serpentinite in meadows, seeps, and streambanks from 330 to 4,920 feet elevation.	June–September / Perennial herb	Based on herbarium records, there are about 10 occurrences of Cleveland's milkvetch in the study area.	Potential to occur. Potential habitat for this species occurs where serpentine chaparral is present in Napa and Sonoma Counties.
<i>Astragalus nuttallii</i> var. <i>nuttallii</i> Nuttall's milkvetch	-/-/4.2	This species occurs in coastal bluffs and dunes, in rocky or sandy areas below 820 feet elevation.	January–December / Perennial herb	Based on herbarium records, there are 4 occurrences of Nuttall's milkvetch in the study area.	Potential to occur. Potential habitat for this species occurs where coastal scrub is present in Marin, San Francisco, San Mateo, and Alameda Counties.
<i>Astragalus pycnostachyus</i> var. <i>pycnostachyus</i> Coastal marsh milkvetch	-/-/1B.2	This species occurs in moist sites and along streams in coastal dunes and coastal salt marsh below 100 feet elevation.	April–October / Perennial herb	There are 21 CNDDDB occurrence records of coastal marsh milkvetch in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where serpentine grassland is present in Napa County.

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<i>Astragalus rattanii</i> var. <i>jepsonianus</i> Jepson's milkvetch	-/-/1B.2	This species occurs on serpentine soils in grasslands and open grassy areas in chaparral from 970 to 2,295 feet elevation.	April-June / Perennial herb	There are 7 CNDDDB occurrence records of Jepson's milkvetch in the study area.	Likely to occur. The Permit Area intersects 6 occurrences of this species. Potential habitat for this species occurs where serpentine grassland is present in Marin and San Mateo Counties.
<i>Astragalus rattanii</i> var. <i>rattanii</i> Rattan's milkvetch	-/-/4.3	This species occurs on riverbanks and sandbars from 165 to 4,920 feet elevation.	April-July / Perennial herb	There are no herbarium or CNDDDB records of this species in the study area.	Absent. The study area is outside of the range for this species, and the reported occurrence location in the CNPS Inventory is most likely erroneous.
<i>Astragalus tener</i> var. <i>ferrisiae</i> Ferris' milkvetch	-/-/1B.1	This species occurs in subalkaline flats and flood lands, usually on adobe soil, from 5 to 245 feet elevation.	April-May / Annual herb	There are 2 CNDDDB occurrence records of Ferris' milkvetch in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where alkaline vernal pools are present in Solano County.
<i>Astragalus tener</i> var. <i>tener</i> Alkali milkvetch	-/-/1B.2	This species occurs in grassy flats and vernal pool margins, on alkali soils from 5 to 195 feet elevation.	March-June / Annual herb	There are 44 CNDDDB occurrence records of alkali milkvetch in the study area.	Likely to occur. The Permit Area intersects 31 occurrences of this species. Potential habitat for this species occurs where alkaline vernal pools are present in Napa, Solano, Contra Costa, Alameda, and Santa Clara Counties.
<i>Hoita strobilina</i> Loma Prieta hoita	-/-/1B.1	This species occurs on serpentinite in oak woodland, riparian woodland, and chaparral from 100 to 2,820 feet elevation.	May-October / Perennial herb	There are 34 CNDDDB occurrence records of Loma Prieta hoita in the study area.	Likely to occur. The Permit Area intersects 11 occurrences of this species. Potential habitat for this species occurs where serpentine chaparral and annual grasslands are present in Contra Costa, Alameda, and Santa Clara Counties.
<i>Hosackia gracilis</i> Harlequin lotus	-/-/4.2	This species occurs in wet meadows and other wet habitats below 2,295 feet elevation.	March-July / Perennial	There are about 32 herbarium records of harlequin lotus in the study area.	Potential to occur. Potential habitat for this species occurs where wet meadow is present in Sonoma, Marin, San Francisco, and San Mateo Counties.
<i>Lathyrus jepsonii</i> var. <i>jepsonii</i> Delta tule pea	-/-/1B.2	This species occurs in freshwater and brackish marshes and swamps below 15 feet elevation.	May-June / Perennial herb	There are 95 CNDDDB occurrence records of Delta tule pea in the study area.	Likely to occur. The Permit Area intersects 27 occurrences of this species. Potential habitat for this species occurs where high elevation tidal marsh is present in Napa, Solano, and Contra Costa Counties.
<i>Lathyrus palustris</i> Marsh pea	-/-/2B.2	This species occurs in coastal freshwater wetlands from 5 to 460 feet elevation.	May-August / Perennial herb	There are 2 CNDDDB occurrence records of marsh pea in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where high elevation tidal marsh is present in Sonoma County.
<i>Lupinus arboreus</i> var. <i>eximius</i> San Mateo tree lupine	-/-/3.2	This species occurs in coastal scrub below 3,705 feet elevation.	April-July / Perennial herb	Based on herbarium records, there are 5 occurrences of San Mateo tree lupine in the study area.	Potential to occur. Potential habitat for this species occurs where coastal scrub is present in Sonoma, Marin, and San Mateo Counties.
<i>Lupinus sericatus</i> Cobb Mountain lupine	-/-/1B.2	This species occurs on gravelly soils in open wooded slopes and knobcone pine-oak woodlands, from 900 to 5,005 feet elevation.	March-June / Perennial herb	There are 37 CNDDDB occurrence records of Cobb Mountain lupine in the study area.	Likely to occur. The Permit Area intersects 12 occurrences of this species. Potential habitat for this species occurs where closed-cone pine-cypress forest is present in Napa and Sonoma Counties.
<i>Lupinus tidestromii</i> Tidestrom's lupine	E/E/1B.1	This species occurs in coastal dunes and coastal dune scrub below 330 feet elevation.	May-June / Perennial herb	There are 37 CNDDDB occurrence records of Tidestrom's lupine in the study area.	Absent. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where dunes and coastal scrub are present in Sonoma and Marin Counties (ICF 2016).
<i>Trifolium amoenum</i> Showy rancheria clover	E/-/1B.1	This species occurs in low elevation grasslands, including swales and disturbed areas, from 15 to 1,360 feet elevation.	April-June / Annual herb	There are 26 CNDDDB occurrence records of showy rancheria clover in the study area.	Absent. The Permit Area intersects 24 occurrences of this species. Potential habitat for this species occurs where annual grasslands is present in Napa, Sonoma, Marin, San Mateo, and Solano Counties. Almost all occurrences appear to be extirpated (ICF 2016).
<i>Trifolium buckwestiorum</i> Santa Cruz clover	-/-/1B.1	This species occurs in coastal prairie, broadleaved upland forest, and cismontane woodland from 345 to 2,000 feet elevation.	May-October / Annual herb	There are 6 CNDDDB occurrence records of Santa Cruz clover in the study area.	Likely to occur. The Permit Area intersects 4 occurrences of this species. Potential habitat for this species occurs where annual grasslands in montane hardwood-conifer forest are present in Sonoma County.
<i>Trifolium hydrophilum</i> Saline clover	-/-/1B.2	This species occurs in salt marshes, mesic alkaline areas in grasslands, and vernal pools, below 990 feet elevation.	April-June / Annual herb	There are 32 CNDDDB occurrence records of saline clover in the study area.	Likely to occur. The Permit Area intersects 28 occurrences of this species. Potential habitat for this species occurs where vernal pools and annual grasslands on alkaline soils are present in the study area.
Fagaceae - Beech Family					
<i>Quercus parvula</i> var. <i>tamalpaisensis</i> Tamalpais oak	-/-/1B.3	This species occurs in lower montane coniferous forest from 330 to 2,460 feet elevation.	March-April / Perennial shrub	There are 9 CNDDDB occurrence records of Tamalpais oak in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where montane hardwood-conifer forest is present in Marin County.

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Grossulariaceae – Gooseberry Family					
<i>Ribes victoris</i> Victor's gooseberry	-/-/4.3	This species occurs in shaded, mesic areas in broadleaved upland forest and chaparral from 330 to 2,460 feet elevation.	March–April / Perennial shrub	There are about 83 herbarium records of Victor's gooseberry in the study area.	Potential to occur. Potential habitat for this species occurs where chaparral and montane hardwood-conifer forest are present in the study area.
Iridaceae – Iris Family					
<i>Iris longipetala</i> Coast iris	-/-/4.2	This species occurs in coastal prairie and open areas in coastal forest, below 1,970 feet elevation.	March–June / Perennial herb	There are about 85 herbarium records of coast iris in the study area.	Potential to occur. Potential habitat for this species occurs where perennial grassland is present in the study area.
Juglandaceae – Walnut Family					
<i>Juglans hindsii</i> Northern California black walnut	-/-/1B.1	This species occurs in riparian forest and riparian woodland below 1,445 feet elevation.	April–May / Perennial tree	There are 4 CNDDDB occurrence records of black walnut in the study area.	Likely to occur. The Permit Area intersects 4 occurrences of this species. Potential habitat for this species occurs where valley-foothill riparian forest is present in Napa, Solano, and Contra Costa Counties.
Juncaceae – Rush Family					
<i>Juncus luciensis</i> Santa Lucia dwarf rush	-/-/1B.2	This species occurs in wet meadows, vernal pools, seeps, and along streambanks from 985 to 6,250 feet elevation.	April–August / Annual herb	There is 1 CNDDDB occurrence record of Santa Lucia dwarf rush in the study area.	Potential to occur. The Permit Area does not intersect any occurrences of this species. Potential habitat for this species occurs where vernal pools or freshwater emergent wetlands are present in the study area.
Lamiaceae – Mint Family					
<i>Acanthomintha duttonii</i> San Mateo thornmint	E/E/1B.1	This species occurs on serpentine clay soils in annual grasslands and open areas in chaparral and coastal scrub from 165 to 985 feet elevation.	April–June / Annual herb	There are 5 CNDDDB occurrence records of San Mateo thornmint in the study area.	Present. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where serpentine grassland is present in San Mateo County (ICF 2016).
<i>Acanthomintha lanceolata</i> Santa Clara thornmint	-/-/4.2	This species occurs on rocky slopes, outcrops, and talus in woodlands and chaparral below 3,935 feet elevation.	March–June / Annual herb	Based on herbarium records, there are about 18 occurrences of Santa Clara thornmint in the study area.	Potential to occur. Potential habitat for this species occurs where chaparral or oak woodland is present in Alameda and Santa Clara Counties.
<i>Monardella antonina</i> ssp. <i>antonina</i> San Antonio Hills monardella	-/-/3	This species occurs in oak woodland from 1,050 to 3,280 feet elevation.	June–August / Perennial herb	There are no herbarium or CNDDDB records of San Antonio Hills monardella in the study area.	Unlikely to occur. Potential habitat for this species occurs where chaparral or oak woodland is present in Contra Costa, Alameda, and Santa Clara Counties. The CNPS reports of occurrences in the study area are possibly erroneous.
<i>Monardella sinuata</i> ssp. <i>nigrescens</i> Northern curly-leaved monardella	-/-/1B.2	This species occurs on sandy soils in coastal dunes, coastal scrub, chaparral, and lower montane coniferous forest below 985 feet elevation.	April– September / Annual herb	There are 13 CNDDDB occurrence records of northern curly-leaved monardella in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where dunes, coastal scrub, mixed chaparral, and montane hardwood-conifer forest are present in Marin County.
<i>Monardella viridis</i> ssp. <i>viridis</i> Green monardella	-/-/4.3	This species occurs in chaparral, oak woodland, and conifer forest from 490 to 2,625 feet elevation.	June–September / Perennial herb	Based on herbarium records, there are about 18 occurrences of green monardella in the study area.	Potential to occur. Potential habitat for this species occurs where chaparral, oak woodland and montane hardwood-conifer forest is present in Sonoma and Napa Counties.
<i>Scutellaria galericulata</i> Marsh skullcap	-/-/2B.2	This species occurs in marshes, meadows, and seeps below 6,890 feet elevation.	June–September / Perennial herb	There is 1 CNDDDB occurrence record of marsh skullcap in the study area.	Potential to occur. The Permit Area does not intersect any occurrences of this species. Potential habitat for this species occurs where freshwater emergent wetlands are present in Contra Costa County.
<i>Trichostema ruygtii</i> Napa bluecurls	-/-/1B.2	This species occurs on rocky, volcanic soils in grassland and grassy openings in chaparral, woodlands, and ponderosa pine forests from 100 to 2,230 feet elevation.	June–October / Annual herb	There are 18 CNDDDB occurrence records of Napa bluecurls in the study area.	Likely to occur. The Permit Area intersects 9 occurrences of this species. Potential habitat for this species occurs where annual grassland is present in Napa County.
Liliaceae – Lily Family					
<i>Calochortus pulchellus</i> Mt. Diablo fairy lantern	-/-/1B.2	This species occurs in cismontane woodland and chaparral from 100 to 2,755 feet elevation.	April–June / Perennial herb	There are 52 CNDDDB occurrence records of Mt. Diablo fairy lantern in the study area.	Likely to occur. The Permit Area intersects 13 occurrences of this species. Potential habitat for this species occurs where mixed chaparral and montane hardwood-conifer forest is present in Contra Costa and Alameda Counties.
<i>Calochortus raichei</i> The Cedars globe-lily	-/-/1B.2	This species occurs on serpentinite barrens, outcrops, and talus slopes in chaparral, Sargent cypress forest from 655 to 1,610 feet elevation.	May–August / Perennial herb	There are 9 CNDDDB occurrence records of The Cedars globe-lily in the study area.	Potential to occur. The Permit Area does not intersect any occurrences of this species. Potential habitat for this species occurs where closed-cone pine-cypress forest is present in Sonoma County.

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<i>Calochortus tiburonensis</i> Tiburon mariposa lily	T/T/1B.1	This species occurs in serpentine grasslands from 165 to 330 feet elevation.	May–June / Perennial herb	There is 1 CNDDDB occurrence record of Tiburon mariposa lily in the study area.	Unlikely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where serpentine grassland is present in Marin County (ICF 2016).
<i>Calochortus umbellatus</i> Oakland star-tulip	-/-/4.2	This species occurs in open areas in chaparral and oak woodland, on serpentinite, from 330 to 2,295 feet elevation.	March–May / Perennial herb	There are over 100 herbarium records of Oakland star-tulip in the study area.	Potential to occur. Potential habitat for this species occurs where annual grassland is present in the study area.
<i>Calochortus uniflorus</i> Large-flowered mariposa lily	-/-/4.2	This species occurs in moist meadows below 1,640 feet elevation.	April–June / Perennial herb	There are about 45 herbarium records of large-flowered mariposa lily in the study area.	Potential to occur. Potential habitat for this species occurs where wet meadow is present in the study area.
<i>Erythronium helenae</i> St. Helena fawn lily	-/-/4.2	This species occurs on serpentine soils in chaparral, woodland, and forest from 985 to 3,920 feet elevation.	March–May / Perennial herb	There are about 28 herbarium records of St. Helena fawn lily in the study area.	Potential to occur. Potential habitat for this species occurs where serpentine chaparral is present in the study area.
<i>Erythronium revolutum</i> Coast fawn lily	-/-/2B.2	This species occurs in broadleaved upland forest, North Coast coniferous forest, and mesic sites and on streambanks from 195 to 4,610 feet elevation.	March–July / Perennial herb	There are no herbarium or CNDDDB records coast fawn lily in the study area.	Potential to occur. Although the study area appears to be outside of the range of this species, the CNPS Inventory reports that this species has been observed in Sonoma County.
<i>Fritillaria agrestis</i> Stinkbells	-/-/4.2	This species occurs in grasslands, foothill woodlands, and open grassy areas in chaparral from 30 to 5,100 feet elevation.	March–June / Perennial herb	There are 15 herbarium records of stinkbells in the study area.	Potential to occur. Potential habitat for this species occurs where annual grassland is present in Contra Costa, Alameda, and San Mateo Counties.
<i>Fritillaria biflora</i> var. <i>ineziana</i> Hillsborough chocolate lily	-/-/1B.1	This species occurs in serpentine grasslands at about 500 feet elevation.	March–April / Perennial herb	There are 2 CNDDDB records of Hillsborough chocolate lily in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where serpentine grassland is present in San Mateo County.
<i>Fritillaria falcata</i> Talus fritillary	-/-/1B.2	This species occurs on serpentine talus in chaparral, oak woodland, and coniferous forest from 985 to 5,005 feet elevation.	March–May / Perennial herb	There are 8 CNDDDB records of talus fritillary lily in the study area.	Likely to occur. The Permit Area intersects 1 occurrences of this species. Potential habitat for this species occurs where serpentine chaparral is present in Alameda and Santa Clara Counties.
<i>Fritillaria lanceolata</i> var. <i>tristulis</i> Marin checker lily	-/-/1B.1	This species occurs in canyons and streambanks in coastal prairie, coastal scrub, coastal bluffs, often on serpentinite, from 50 to 500 feet elevation.	February–May / Perennial herb	There are 32 CNDDDB records of Marin checker lily in the study area.	Likely to occur. The Permit Area intersects 11 occurrences of this species. Potential habitat for this species occurs where coastal scrub and perennial grassland are present in Marin County.
<i>Fritillaria liliacea</i> Fragrant fritillary	-/-/1B.2	This species occurs in coastal scrub, coastal prairie, annual grassland, often on serpentine soils, below 1,350 feet elevation.	February–April / Perennial herb	There are 75 CNDDDB records of fragrant fritillary in the study area.	Likely to occur. The Permit Area intersects 41 occurrences of this species. Potential habitat for this species occurs where serpentine grassland and serpentine chaparral are present in the study area.
<i>Fritillaria pluriflora</i> Adobe lily	-/-/1B.2	This species occurs on adobe soil in foothill and valley grasslands from 195 to 2,295 feet elevation.	February–April / Perennial herb	There are 15 CNDDDB records of adobe lily in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where annual grassland is present in Napa County.
<i>Fritillaria purdyi</i> Purdy's fritillary	-/-/4.3	This species occurs in open areas in serpentine chaparral, woodlands from 1,310 to 6,875 feet elevation.	March–June / Perennial herb	There are about 11 herbarium records of Purdy's fritillary in the study area.	Potential to occur. Potential habitat for this species occurs where serpentine chaparral is present in Napa County.
<i>Fritillaria roderickii</i> Roderick's fritillary	-/-/1B.1	This species occurs in coastal scrub and perennial grassland from 50 to 1,310 feet elevation.	March–May / Perennial herb	There is 1 CNDDDB records of Roderick's fritillary in the study area.	Potential to occur. The Permit Area does not intersect any occurrences of this species. Potential habitat for this species occurs where perennial grassland is present in Sonoma County.
<i>Lilium maritimum</i> Coast lily	-/-/1B.1	This species occurs in wet areas in closed-cone pine-cypress forest, coastal scrub, and perennial grassland, often in roadside ditches from 33 to 1,560 feet elevation.	May–July / Perennial herb	There are 12 CNDDDB records of coast lily in the study area.	Likely to occur. The Permit Area intersects 7 occurrences of this species. Potential habitat for this species occurs where annual grassland is present in Sonoma and Marin Counties.
<i>Lilium pardalinum</i> ssp. <i>pitkinense</i> Pitkin Marsh lily	E/E/1B.1	This species occurs in freshwater marsh from 115 to 215 feet elevation.	June–July / Perennial herb	There are 4 CNDDDB records of Pitkin Marsh lily in the study area.	Likely to occur. The Permit Area intersects 4 occurrences of this species. Potential habitat for this species occurs where freshwater emergent wetland is present in Sonoma County.
<i>Lilium rubescens</i> Redwood lily	-/-/4.2	This species occurs in chaparral and open areas in coniferous forest from 100 to 5,905 feet elevation.	May–August / Perennial herb	Based on herbarium records, there are 13 occurrences of redwood lily in the study area.	Potential to occur. Potential habitat for this species occurs where chaparral or redwood forest are present in Sonoma and Napa Counties.

Species Name	Status ^a Federal/State/ CRPR	Habitat Requirements	Flowering Phenology/ Life Form	Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
Limnathaceae – Meadowfoam Family					
<i>Limnanthes douglasii</i> ssp. <i>ornduffii</i> Ornduff's meadowfoam	-/-/1B.1	This species occurs in agricultural fields, meadows, and seeps from 35 to 65 feet elevation.	November–May / Annual herb	There are 2 CNDDDB records of Ornduff's meadowfoam in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where freshwater emergent wetland is present in San Mateo County.
<i>Limnanthes douglasii</i> ssp. <i>sulphurea</i> Point Reyes meadowfoam	-/E/1B.2	This species occurs in wet meadows and vernal pools below 460 feet elevation.	April–May / Annual herb	There are 12 CNDDDB records of Point Reyes meadowfoam in the study area.	Present. The Permit Area intersects 7 occurrences of this species. Potential habitat for this species occurs where freshwater emergent wetland is present in Marin and San Mateo Counties (ICF 2016).
<i>Limnanthes floccosa</i> ssp. <i>floccosa</i> Woolly meadowfoam	-/-/4.2	This species occurs in vernal pools and swales from 195 to 4,380 feet elevation.	March–May / Annual herb	Based on herbarium records, there are 3 occurrences of woolly meadowfoam in the study area.	Likely to occur. Potential habitat for this species occurs where vernal pools and swales are present in Napa County.
<i>Limnanthes vinculans</i> Sebastopol meadowfoam	E/E/1B.1	This species occurs in vernal pools and wet meadows from 50 to 1,000 feet elevation.	April–May / Annual herb	There are 45 CNDDDB records of Sebastopol meadowfoam in the study area.	Present. The Permit Area intersects 23 occurrences of this species. Potential habitat for this species occurs where vernal pools are present in Sonoma and Napa Counties (ICF 2016).
Linaceae – Flax Family					
<i>Hesperolinon bicarpellatum</i> Two-carpellate western flax	-/-/1B.2	This species occurs in serpentine chaparral from 195 to 3,295 feet elevation.	May–July / Annual herb	There are 4 CNDDDB records of two-carpellate western flax in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where serpentine chaparral is present in Napa and Sonoma Counties.
<i>Hesperolinon breweri</i> Brewer's western flax	-/-/1B.2	This species occurs on serpentine slopes in chaparral and grasslands from 100 to 3,085 feet elevation.	May–July / Annual herb	There are 25 CNDDDB records of Brewer's western flax in the study area.	Likely to occur. The Permit Area intersects 8 occurrences of this species. Potential habitat for this species occurs where serpentine grassland or serpentine chaparral is present in Sonoma, Napa, Solano, Contra Costa, and Alameda Counties.
<i>Hesperolinon congestum</i> Marin western flax	T/T/1B.1	This species occurs in serpentine grassland from 15 to 1,215 feet elevation.	April–July / Annual herb	There are 27 CNDDDB records of Marin western flax in the study area.	Present. The Permit Area intersects 14 occurrences of this species. Potential habitat for this species occurs where serpentine grassland is present in Marin, San Francisco, and San Mateo Counties (ICF 2016).
<i>Hesperolinon drymarioides</i> Drymaria-like western flax	-/-/1B.2	This species occurs on serpentine soil in chaparral and McNab cypress forest from 330 to 3,705 feet elevation.	May–August / Annual herb	There are 3 CNDDDB records of drymaria-like western flax in the study area.	Potential to occur. The Permit Area does not intercept any occurrences of this species. Potential habitat for this species occurs where serpentine grassland or closed-cone pine-cypress forest is present.
<i>Hesperolinon sharsmithiae</i> Sharsmith's western flax	-/-/1B.2	This species occurs on serpentine soil in chaparral from 590 to 2,200 feet elevation.	May–July / Annual herb	There are 29 CNDDDB records of Sharsmith's western flax in the study area.	Likely to occur. The Permit Area intersects 9 occurrences of this species. Potential habitat for this species occurs where serpentine chaparral is present in Napa County.
Lycopodiaceae – Club-Moss Family					
<i>Lycopodium clavatum</i> Running pine	-/-/4.1	This species occurs in marshes and wet areas in North Coast coniferous forest from 150 to 4,020 feet elevation.	N/A / Perennial herb	There is 1 CNDDDB record of running pine in the study area.	Potential to occur. The Permit Area does not intercept any occurrences of this species. Potential habitat for this species occurs where redwood forest or montane hardwood-conifer forest is present.
Malvaceae – Mallow Family					
<i>Hibiscus lasiocarpus</i> var. <i>occidentalis</i> Rose-mallow	-/-/1B.2	This species occurs in freshwater marsh along rivers and sloughs below 395 feet elevation.	August–September / Perennial herb	There are 39 CNDDDB records of rose-mallow in the study area.	Likely to occur. The Permit Area intersects 9 occurrences of this species. Potential habitat for this species occurs where freshwater emergent wetland is present in Solano and Contra Costa Counties.
<i>Malacothamnus aboriginum</i> Indian Valley bush mallow	-/-/1B.2	This species occurs on granitic outcrops and sand in chaparral and oak woodland from 460 to 4,265 feet elevation.	May–July / Perennial shrub	There are 5 herbarium records of Indian Valley bush mallow in the study area.	Potential to occur. Potential habitat for this species occurs where chaparral or oak woodland is present in San Mateo and Santa Clara Counties.
<i>Malacothamnus arcuatus</i> Arcuate bush mallow	-/-/1B.2	This species occurs in chaparral from 50 to 1,165 feet elevation.	April–September / Perennial shrub	There are 29 CNDDDB records of arcuate bush mallow in the study area.	Likely to occur. The Permit Area intersects 17 occurrences of this species. Potential habitat for this species occurs where chaparral is present in San Mateo and Santa Clara Counties.
<i>Malacothamnus davidsonii</i> Davidson's bush mallow	-/-/1B.2	This species occurs in coastal scrub and riparian woodland, in sandy washes from 900 to 2,800 feet elevation.	June–September / Perennial shrub	There are 7 herbarium records of Davidson's bush mallow in the study area.	Potential to occur. Potential habitat for this species occurs where coastal scrub or valley-foothill riparian woodland is present in San Mateo and Santa Clara Counties.
<i>Malacothamnus hallii</i> Hall's bush mallow	-/-/1B.2	This species occurs in chaparral from 800 to 1,350 feet elevation.	May–September / Perennial shrub	There are 30 CNDDDB records of Hall's bush mallow in the study area.	Likely to occur. The Permit Area intersects 17 occurrences of this species. Potential habitat for this species occurs where chaparral is present in Contra Costa and Santa Clara Counties.

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<i>Malacothamnus helleri</i> Heller's bush mallow	-/-/4.3	This species occurs in foothill woodlands, along stream banks and on gravel bars from 1,000 to 2,085 feet elevation.	May-June / Perennial shrub	There is 1 herbarium record of Heller's bush mallow in the study area.	Potential to occur. Potential habitat for this species occurs where oak woodland is present in Napa County.
<i>Sidalcea calycosa</i> ssp. <i>rhizomata</i> Point Reyes checkerbloom	-/-/1B.2	This species occurs in freshwater wetlands, including marshes, swamps, and seeps, from 15 to 245 feet elevation.	April- September / Perennial herb	There are 28 CNDDDB records of Point Reyes checkerbloom in the study area.	Likely to occur. The Permit Area intersects 13 occurrences of this species. Potential habitat for this species occurs where freshwater emergent wetland is present in Sonoma and Marin Counties.
<i>Sidalcea hickmanii</i> ssp. <i>napensis</i> Napa checkerbloom	-/-/1B.1	This species occurs in chaparral, on rhyolitic substrates from 1,360 to 2,000 feet elevation.	May-June / Perennial herb	There are 2 CNDDDB records of Napa checkerbloom in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where chaparral is present in Napa County.
<i>Sidalcea hickmanii</i> ssp. <i>viridis</i> Marin checkerbloom	-/-/1B.3	This species occurs in openings in chaparral, on volcanic or serpentine substrates from 165 to 1,395 feet elevation.	May-June / Perennial herb	There are 4 CNDDDB records of Marin checkerbloom in the study area.	Likely to occur. The Permit Area intersects 4 occurrences of this species. Potential habitat for this species occurs where chaparral is present in Marin and Sonoma Counties.
<i>Sidalcea keckii</i> Keck's checkerbloom	E/-/1B.1	This species occurs in grassland areas within blue oak woodland, on clay soils derived from serpentinite, from 250 to 2,130 feet elevation.	April-May / Perennial herb	There are 7 CNDDDB records of Keck's checkerbloom in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where annual grassland or blue oak woodland is present in Napa and Solano Counties.
<i>Sidalcea malachroides</i> Maple-leaved checkerbloom	-/-/4.2	This species occurs in openings in coastal scrub, broadleaved upland forest, redwood forest, Douglas-fir forest, and in coastal prairie below 2,395 feet elevation.	May-August / Perennial herb	There are 7 CNDDDB records of maple-leaved checkerbloom in the study area.	Likely to occur. The Permit Area intersects 5 occurrences of this species. Potential habitat for this species occurs where coastal scrub, perennial grassland, or montane hardwood-conifer forest is present in Sonoma County.
<i>Sidalcea malviflora</i> ssp. <i>purpurea</i> Purple-stemmed checkerbloom	-/-/1B.2	This species occurs in broadleaved upland forest and coastal prairie from 50 to 280 feet elevation.	May-June / Perennial herb	There are 13 CNDDDB records of purple-stemmed checkerbloom in the study area.	Likely to occur. The Permit Area intersects 10 occurrences of this species. Potential habitat for this species occurs where perennial grassland, or montane hardwood-conifer forest is present in Sonoma and Marin Counties.
<i>Sidalcea oregana</i> ssp. <i>hydrophila</i> Marsh checkerbloom	-/-/1B.2	This species occurs in meadows and moist areas in perennial grassland from 985 to 7,530 feet elevation.	July-August / Perennial herb	There is 1 CNDDDB record of marsh checkerbloom in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where perennial grassland or wet meadow is present in Napa County.
<i>Sidalcea oregana</i> ssp. <i>valida</i> Kenwood Marsh checkermallow	E/E/1B.2	This species occurs in freshwater marsh from 375 to 490 feet elevation.	June-September / Perennial herb	There are 2 CNDDDB records of Kenwood Marsh checkermallow in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where freshwater emergent wetland is present in Napa County.
Melanthiaceae - False-Hellebore Family					
<i>Toxicoscordion fontanum</i> Marsh zigadenus	-/-/4.2	This species occurs in moist or marshy areas of chaparral, woodlands, and lower montane coniferous forests below 1,640 feet elevation.	April-July / Perennial herb	Based on herbarium specimens, there are about 26 occurrences of marsh zigadenus in the study area.	Potential to occur. Potential habitat for this species occurs where freshwater emergent wetland is present in serpentine chaparral, oak woodland, and montane hardwood-conifer forest in Napa, Sonoma, and Marin Counties.
<i>Veratrum fimbriatum</i> Fringed false-hellebore	-/-/4.2	This species occurs in wet meadows and other wetlands in coastal scrub and North Coast coniferous forests below 330 feet elevation.	July-September / Perennial herb	Based on herbarium specimens, there are about 8 occurrences of fringed false-hellebore in the study area.	Potential to occur. Potential habitat for this species occurs where wet meadow is present in Sonoma County.
Montiaceae - Miner's-Lettuce Family					
<i>Calandrinia breweri</i> Brewer's calandrinia	-/-/4.2	This species occurs in open areas in chaparral, northern coastal scrub and coastal sage scrub, often after fires or other disturbance, below 3,935 feet elevation.	February-May / Annual herb	Based on herbarium specimens, there are about 24 occurrences of Brewer's calandrinia in the study area.	Potential to occur. Potential habitat for this species occurs in various disturbed or burned chaparral and coastal scrub habitats throughout the study area.
<i>Calyptridium parryi</i> var. <i>hesseae</i> Santa Cruz Mountain pussypaws	-/-/1B.1	This species occurs in openings in chaparral, cypress forest, on bare, sandy soil, from 1,000 to 5,020 feet elevation.	April-July / Annual herb	There are 3 CNDDDB records of Santa Cruz Mountains pussypaws in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where mixed chaparral or closed-cone pine-cypress forest is present in Santa Clara County.
<i>Calyptridium quadripetalum</i> Four-petaled pussypaws	-/-/4.3	This species occurs in open, sandy or gravelly areas, usually on serpentine soils, from 1,310 to 6,560 feet elevation.	April-June / Annual herb	Based on herbarium specimens, there are about 8 occurrences of four-petaled pussypaws in the study area.	Potential to occur. Potential habitat for this species occurs where serpentine chaparral is present in Sonoma and Napa Counties.

Species Name	Status ^a Federal/State/ CRPR	Habitat Requirements	Flowering Phenology/ Life Form	Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
Onagraceae – Evening-Primrose Family					
<i>Clarkia breweri</i> Brewer's clarkia	-/-/4.2	This species occurs in chaparral and cismontane woodland, coastal scrub, on talus or dry slopes, often serpentine, below 4,000 feet elevation.	April–June / Annual herb	Based on herbarium specimens, there are about 14 occurrences of Brewer's clarkia in the study area.	Potential to occur. Potential habitat for this species occurs where chaparral or blue oak woodland is present in Alameda and Santa Clara Counties.
<i>Clarkia concinna</i> ssp. <i>automixa</i> Santa Clara red-ribbons	-/-/4.3	This species occurs in mesic, shaded oak woodlands from 295 to 4,920 feet elevation.	April–July / Annual herb	There are 20 CNDDDB records of Santa Clara red-ribbons in the study area.	Likely to occur. The Permit Area intersects 15 occurrences of this species. Potential habitat for this species occurs where blue oak woodland is present in Santa Clara County.
<i>Clarkia concinna</i> ssp. <i>raichei</i> Raiche's red-ribbons	-/-/1B.1	This species occurs in coastal bluff scrub, on exposed rocky bluffs, below 330 feet elevation.	April–May / Annual herb	There is 1 CNDDDB record of Raiche's red-ribbons in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where coastal scrub is present in Marin County.
<i>Clarkia franciscana</i> Presidio clarkia	E/E/1B.1	This species occurs in coastal scrub, grasslands, on serpentine soils, from 80 to 1,100 feet elevation.	May–July / Annual herb	There are 4 CNDDDB records of Presidio clarkia in the study area.	Present. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where coastal scrub or annual grassland is present in San Francisco and Alameda Counties (ICF 2016).
<i>Clarkia gracilis</i> ssp. <i>tracyi</i> Tracy's clarkia	-/-/4.2	This species occurs in serpentine chaparral, McNab cypress forest, in the open areas of meadow or streambanks from 330 to 1,640 feet elevation.	April–July / Annual herb	Based on herbarium specimens, there are about 7 occurrences of Tracy's clarkia in the study area.	Potential to occur. Potential habitat for this species occurs where serpentine chaparral or closed-cone pine-cypress forest is present in Napa County.
<i>Clarkia imbricata</i> Vine Hill clarkia	E/E/1B.1	This species occurs in grassy areas in oak woodland from 165 to 245 feet elevation.	June–August / Annual herb	There are 3 CNDDDB records of Vine Hill clarkia in the study area.	Unlikely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where oak woodland is present in Sonoma County (ICF 2016).
<i>Oenothera deltoides</i> ssp. <i>howellii</i> Antioch Dunes evening primrose	E/E/1B.1	This species occurs in inland dunes below 100 feet elevation.	March– September / Perennial herb	There are 9 CNDDDB records of Antioch Dunes evening primrose in the study area.	Present. The Permit Area intersects 5 occurrences of this species. Potential habitat for this species occurs where dunes are present in Contra Costa County (ICF 2016).
Orchidaceae – Orchid Family					
<i>Cypripedium californicum</i> California lady's-slipper	-/-/4.2	This species occurs in bogs and fens, seeps and stream banks in lower montane coniferous forest, usually on serpentine soils, from 100 to 9,020 feet elevation.	April–August / Perennial herb	There are 8 herbarium records of California lady's-slipper in the study area.	Potential to occur. Potential habitat for this species occurs where freshwater emergent wetland is present in Sonoma, Marin, and San Francisco Counties.
<i>Cypripedium fasciculatum</i> Clustered lady's-slipper	-/-/4.2	This species occurs in mesic to moist areas in shady conifer forests from 330 to 6,560 feet elevation.	March–July / Perennial herb	There are 8 herbarium records of clustered lady's-slipper in the study area.	Potential to occur. Potential habitat for this species occurs where montane hardwood-conifer forest is present in San Mateo and Santa Clara Counties.
<i>Cypripedium montanum</i> Mountain lady's-slipper	-/-/4.2	This species occurs on dry, undisturbed slopes in lower montane coniferous forest, broadleafed upland forest, cismontane woodland, and North Coast coniferous forest from 605 to 7,300 feet elevation.	March–August / Perennial herb	There are 9 herbarium records of mountain lady's-slipper in the study area.	Potential to occur. Potential habitat for this species occurs where montane hardwood-conifer forest is present in Sonoma, San Mateo, and Santa Clara Counties.
<i>Piperia candida</i> White-flowered rein orchid	-/-/4.2	This species occurs in the understory of redwood forest and Douglas-fir forest below 3,940 feet elevation.	May– September / Perennial herb	There are 6 CNDDDB records of white-flowered rein orchid in the study area.	Likely to occur. The Permit Area intersects 4 occurrences of this species. Potential habitat for this species occurs where redwood forest or Douglas-fir forest are present in Sonoma and Santa Cruz Counties.
<i>Piperia elegans</i> ssp. <i>decurtata</i> Pt. Reyes rein orchid	-/-/1B.1	This species occurs in coastal bluff scrub and coastal prairie from 50 to 510 feet elevation.	August– September / Perennial herb	There are 6 CNDDDB records of Pt. Reyes rein orchid in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where coastal scrub and perennial grassland are present in Marin County.
<i>Piperia leptopetala</i> Narrow-petaled rein orchid	-/-/4.3	This species occurs in dry scrub and woodland habitats from 1,245 to 7,300 feet elevation.	May–July / Perennial herb	Based on herbarium records, there are 3 occurrences of narrow-petaled rein orchid in the study area.	Potential to occur. Potential habitat for this species occurs where oak woodland or montane hardwood-conifer forest are present in Sonoma, Napa, and Santa Clara Counties.
<i>Piperia michaelii</i> Michael's rein orchid	-/-/4.2	This species occurs in dry sites in coastal scrub, woodlands, mixed evergreen forest, and closed-cone pine forest, below 2,295 feet elevation.	April–August / Perennial herb	There are 19 herbarium records of Michael's rein orchid in the study area.	Potential to occur. Potential habitat for this species occurs where coastal scrub, coastal oak woodland, closed-cone pine-cypress forest or montane hardwood-conifer forest are present in Marin, San Francisco, San Mateo, Contra Costa, Alameda, and Santa Clara Counties.

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Orobanchaceae - Broomrape Family					
<i>Aphyllon validum</i> ssp. <i>howellii</i> Howell's broomrape	-/-/4.3	This species occurs in chaparral, on volcanic and serpentine soils, parasitic on Garrya, from 655 to 5,575 feet elevation.	June–September / Perennial herb	Based on herbarium records, there are 4 occurrences of Howell's broomrape in the study area.	Potential to occur. Potential habitat for this species occurs where mixed chaparral is present in Sonoma and Napa Counties.
<i>Castilleja affinis</i> ssp. <i>neglecta</i> Tiburon paintbrush	E/T/1B.2	This species occurs in serpentine grassland from 195 to 1,310 feet elevation.	April–June / Perennial herb	There are 7 CNDDDB records of Tiburon paintbrush in the study area.	Present. The Permit Area intersects 4 occurrences of this species. Potential habitat for this species occurs where serpentine grassland is present in Marin, Napa, and Santa Clara Counties (ICF 2016).
<i>Castilleja ambigua</i> ssp. <i>ambigua</i> Salt marsh owl's-clover	-/-/4.2	This species occurs on coastal bluffs and terraces, in grassland, below 1,640 feet elevation.	May–August / Annual herb	There are 86 herbarium records of salt marsh owl's-clover in the study area.	Potential to occur. Potential habitat for this species occurs where coastal scrub is present in the study area.
<i>Castilleja ambigua</i> ssp. <i>humboldtensis</i> Humboldt Bay owl's-clover	-/-/1B.2	This species occurs in coastal salt marsh below 15 feet elevation.	April–August / Annual herb	There are 4 CNDDDB records of Humboldt Bay owl's-clover in the study area.	Potential to occur. The Permit Area does not intersect any occurrences of this species. Potential habitat for this species occurs where high elevation tidal marsh is present in Sonoma and Marin Counties.
<i>Castilleja ambigua</i> ssp. <i>meadii</i> Mead's owl's-clover	-/-/1B.1	This species occurs in vernal pools and meadows on volcanic clay soils from 1,475 to 1,560 feet elevation.	April–May / Annual herb	There are 3 CNDDDB records of Mead's owl's-clover in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where vernal pools are present in Napa County.
<i>Castilleja leschkeana</i> Point Reyes paintbrush	-/-/1A	This species occurs in coastal marshes and swamps below 35 feet elevation.	June / Perennial herb	There are 2 CNDDDB records of Point Reyes paintbrush in the study area.	Unlikely to occur. The Permit Area intersects 2 occurrences of this species; however, both occurrences are possibly extirpated. Potential habitat for this species occurs where freshwater emergent wetland is present in Marin County.
<i>Castilleja mendocinensis</i> Mendocino Coast paintbrush	-/-/1B.2	This species occurs in coastal scrub and perennial grassland below 525 feet elevation.	April–August / Perennial herb	There is 1 CNDDDB record of Mendocino Coast paintbrush in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where coastal scrub and perennial grassland are present in Sonoma County.
<i>Castilleja rubicundula</i> ssp. <i>rubicundula</i> Pink creamsacs	-/-/1B.2	This species occurs in grassland and grassy areas in chaparral and oak woodland, often on serpentine soils, from 65 to 3,020 feet elevation.	April–June / Annual herb	There are 4 CNDDDB records of pink creamsacs in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where annual grassland is present in Napa and Santa Clara Counties.
<i>Castilleja uliginosa</i> Pitkin Marsh paintbrush	-/E/1A	This species occurs in freshwater marsh, at 155 to 200 feet elevation.	June–July / Perennial herb	There are 2 CNDDDB records of Pitkin Marsh paintbrush in the study area.	Unlikely to occur. The Permit Area does not intersect any occurrences of this species. Both known occurrences are possibly extirpated. Potential habitat for this species occurs where freshwater emergent wetlands are present in Sonoma County (ICF 2016).
<i>Chloropyron maritimum</i> ssp. <i>palustre</i> Pt. Reyes salty bird's-beak	-/-/1B.2	This species occurs in coastal salt marsh below 35 feet elevation.	June–October / Annual herb	There are 51 CNDDDB records of Pt. Reyes salty bird's-beak in the study area.	Likely to occur. The Permit Area intersects 18 occurrences of this species. Potential habitat for this species occurs where high elevation tidal marsh is present in Sonoma, Marin, San Francisco, San Mateo, Santa Clara, and Alameda Counties.
<i>Chloropyron molle</i> ssp. <i>hispidum</i> Hispid salty bird's-beak	-/-/1B.1	This species occurs in meadow, grassland, playa; on alkaline soils, below 500 feet elevation.	June–September / Annual herb	There are 2 CNDDDB records of hispid salty bird's-beak in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where wet meadow in alkaline soils is present in Solano and Alameda Counties.
<i>Chloropyron molle</i> ssp. <i>molle</i> Soft bird's-beak	E/R/1B.2	This species occurs in tidal salt marsh below 10 feet elevation.	July–September / Annual herb	There are 26 CNDDDB records of soft salty bird's-beak in the study area.	Likely to occur. The Permit Area intersects 7 occurrences of this species. Potential habitat for this species occurs where high elevation tidal marsh is present in Sonoma, Marin, Napa, Solano, and Contra Costa Counties.
<i>Chloropyron palmatum</i> Palmate-bracted bird's-beak	E/E/1B.1	This species occurs in alkaline grasslands, chenopod scrub from 15 to 510 feet elevation.	May–October / Annual herb	There is 1 CNDDDB record of palmate-bracted bird's-beak in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where alkali desert scrub is present in Alameda County.
<i>Cordylanthus nidularis</i> Mt. Diablo bird's-beak	-/R/1B.1	This species occurs in grassy or rocky areas within serpentine chaparral, at 2,510 feet elevation.	July–August / Annual herb	There are 2 CNDDDB records of Mt. Diablo bird's-beak in the study area.	Potential to occur. The Permit Area does not intersect any occurrences of this species. Potential habitat for this species occurs where serpentine chaparral is present in Contra Costa County.
<i>Cordylanthus tenuis</i> ssp. <i>brunneus</i> Serpentine bird's-beak	-/-/4.3	This species occurs on rocky serpentine slopes from 1,000 to 3,000 feet elevation.	July–August / Annual herb	There are 26 herbarium records of serpentine bird's-beak in the study area.	Potential to occur. Potential habitat for this species occurs where serpentine chaparral is present in Sonoma and Napa Counties.

Species Name	Status ^a Federal/State/ CRPR	Habitat Requirements	Flowering Phenology/ Life Form	Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
<i>Cordylanthus tenuis</i> ssp. <i>capillaris</i> Pennell's bird's-beak	E/R/1B.2	This species occurs on rocky serpentine slopes from 150 to 1,000 feet elevation.	June-July / Annual herb	There are 4 herbarium records of Pennell's bird's-beak in the study area.	Present. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where serpentine chaparral is present in Alameda County (ICF 2016).
<i>Kopsiopsis hookeri</i> Small groundcone	-/-/2B.3	This species occurs in North Coast coniferous forest, usually parasitic on salal plants, from 395 to 4,710 feet elevation.	April-August / Perennial herb	There are 5 CNDDDB records of small groundcone in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where montane hardwood-conifer forest is present in Sonoma and Marin Counties.
<i>Pedicularis dudleyi</i> Dudley's lousewort	-/R/1B.2	This species occurs in maritime chaparral, North Coast coniferous forest, and valley and foothill grassland from 195 to 2,955 feet elevation.	April-June / Perennial herb	There is 1 CNDDDB record of Dudley's lousewort in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where annual grassland, mixed chaparral, montane hardwood-conifer forest, or redwood forest is present in San Mateo County.
<i>Triphysaria floribunda</i> San Francisco owl's-clover	-/-/1B.2	This species occurs in coastal prairie and annual grassland, on serpentine soils, from 35 to 525 feet elevation.	April-June / Annual herb	There are 50 CNDDDB records of San Francisco owl's-clover in the study area.	Likely to occur. The Permit Area intersects 25 occurrences of this species. Potential habitat for this species occurs where serpentine grassland is present in Marin, San Francisco, and San Mateo Counties.
Papaveraceae - Poppy Family					
<i>Eschscholzia rhombipetala</i> Diamond-petaled California poppy	-/-/1B.1	This species occurs in grassland, chenopod scrub; on clay soils where grass cover is sparse enough to allow growth of low annuals, below 3,200 feet elevation.	March-May / Annual herb	There are 5 CNDDDB records of diamond-petaled California poppy in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where annual grassland is present in Contra Costa and Alameda Counties.
<i>Meconella oregona</i> Oregon meconella	-/-/1B.1	This species occurs in coastal prairie and coastal scrub from 820 to 1,645 feet elevation.	March-April / Annual herb	There are 5 CNDDDB records of Oregon meconella in the study area.	Unlikely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where coastal scrub or perennial grassland is present in Contra Costa and Santa Clara Counties (ICF 2016).
Phrymaceae - Monkeyflower Family					
<i>Erythranthe nudata</i> Bare monkeyflower	-/-/4.3	This species occurs in serpentine seeps from 820 to 2,295 feet elevation.	May-June / Annual herb	Based on herbarium records, there are about 11 occurrences of bare monkeyflower in the study area.	Potential to occur. Potential habitat for this species occurs where seeps are present in serpentine chaparral or closed-cone pine-cypress forest are present in Sonoma and Napa Counties.
Pinaceae - Pine Family					
<i>Pinus radiata</i> Monterey pine	-/-/1B.1	This species occurs in Monterey pine forest and oak woodland from 200 to 410 feet elevation.	Year-round / Perennial evergreen tree	There is 1 CNDDDB record of Monterey pine in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where closed-cone pine-cypress forest is present in San Mateo County.
Plantaginaceae - Plantain Family					
<i>Antirrhinum virga</i> Tall snapdragon	-/-/4.3	This species occurs in open rocky areas in chaparral, often on serpentinite, from 330 to 7,055 feet elevation.	June-July / Perennial herb	There are 26 herbarium records of tall snapdragon in the study area.	Potential to occur. Potential habitat for this species occurs where serpentine chaparral is present in Sonoma and Napa Counties.
<i>Collinsia corymbosa</i> Round-headed Chinese houses	-/-/1B.2	This species occurs in coastal dunes below 65 feet elevation.	April-June / Annual herb	There are 4 CNDDDB records of round-headed Chinese houses in the study area.	Likely to occur. The Permit Area intersects 4 occurrences of this species. Potential habitat for this species occurs where dunes are present in Marin, San Francisco, and San Mateo Counties.
<i>Collinsia multicolor</i> San Francisco collinsia	-/-/1B.2	This species occurs in Northern Coastal scrub and closed-cone coniferous forest from 100 to 820 feet elevation.	March-May / Annual herb	There are 24 CNDDDB records of San Francisco collinsia in the study area.	Likely to occur. The Permit Area intersects 17 occurrences of this species. Potential habitat for this species occurs where coastal scrub or closed-cone pine-cypress forest is present in San Francisco, San Mateo, and Santa Clara Counties.
<i>Gratiola heterosepala</i> Boggs Lake hedge-hyssop	-/E/1B.2	This species occurs in vernal pools and swales from 30 to 7,790 feet elevation.	April-June / Annual herb	There are 7 CNDDDB records of Boggs Lake hedge-hyssop in the study area.	Unlikely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where vernal pools are present in Sonoma and Solano Counties (ICF 2016).
<i>Penstemon newberryi</i> var. <i>sonomensis</i> Sonoma beardtongue	-/-/1B.3	This species occurs in rocky areas in chaparral from 2,295 to 4,495 feet elevation.	May-July / Perennial herb	There are 10 CNDDDB records of Sonoma beardtongue in the study area.	Likely to occur. The Permit Area intersects 5 occurrences of this species. Potential habitat for this species occurs where chaparral is present in Napa and Sonoma Counties.
<i>Penstemon rattanii</i> var. <i>kleei</i> Santa Cruz Mountains beardtongue	-/-/1B.2	This species occurs on sandy shale slopes, in chaparral/forest transition zones from 1,310 to 3,610 feet elevation.	May-June / Perennial herb	There are 2 CNDDDB records of Santa Cruz Mountains beardtongue in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where chaparral is present in Santa Clara County.

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Poaceae – Grass Family					
<i>Agrostis blasdalei</i> var. <i>blasdalei</i> Blasdale's bent grass	-/-/1B.2	This species occurs in coastal dunes, coastal scrub, and perennial grassland below 490 feet elevation.	May–July / Perennial grass	There are 35 CNDDDB records of Blasdale's bent grass in the study area.	Likely to occur. The Permit Area intersects 16 occurrences of this species. Potential habitat for this species occurs where dunes, coastal scrub, or perennial grassland are present in Sonoma, Marin, and San Mateo Counties.
<i>Agrostis hendersonii</i> Henderson's bent grass	-/-/3.2	This species occurs in moist places in grasslands, and vernal pool from 230 to 1,000 feet elevation.	April–May / Annual grass	There is 1 CNDDDB record of Henderson's bent grass in the study area.	Potential to occur. The Permit Area does not intersect any occurrences of this species. Potential habitat for this species occurs where annual grassland and vernal pools occur in Marin County.
<i>Alopecurus aequalis</i> var. <i>sonomensis</i> Sonoma alopecurus	E/-/1B.1	This species occurs in wet areas, marshes, and riparian banks from 15 to 1,200 feet elevation.	May–July / Perennial grass	There are 21 CNDDDB records of Sonoma alopecurus in the study area.	Absent. The Permit Area intersects 18 occurrences of this species. Potential habitat for this species occurs where freshwater emergent wetland and valley/foothill riparian woodlands are present in Sonoma and Marin Counties (ICF 2016).
<i>Calamagrostis bolanderi</i> Bolander's reed grass	-/-/4.2	This species occurs in meadows, marshes and other wet areas in North Coast coniferous forest, closed-cone coniferous forest, and coastal scrub below 1,495 feet elevation.	May–August / Perennial grass	Based on herbarium records, there are 9 occurrences of this species in the study area.	Potential to occur. Potential habitat for this species occurs where wet meadow is present in Sonoma County.
<i>Calamagrostis crassiglumis</i> Thurber's reed grass	-/-/2B.1	This species occurs in freshwater emergent wetland within coastal scrub from 35 to 195 feet elevation.	May–August / Perennial grass	There are 9 CNDDDB records of Thurber's reed grass in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where freshwater emergent wetland is present in Sonoma and Marin Counties.
<i>Calamagrostis ophitidis</i> Serpentine reed grass	-/-/4.3	This species occurs in open areas in serpentine chaparral and woodland, and serpentine grassland and meadow, below 3,495 feet elevation.	April–June / Perennial grass	There are 39 herbarium records of serpentine reed grass in the study area.	Likely to occur. Potential habitat for this species occurs where serpentine chaparral is present in Napa, Sonoma, and Marin Counties.
<i>Elymus californicus</i> California bottle-brush grass	-/-/4.3	This species occurs in conifer forest below 1,640 feet elevation.	May–August / Perennial grass	There are 50 herbarium records of California bottle-brush grass in the study area.	Potential to occur. Potential habitat for this species occurs where montane hardwood-conifer forest is present in Sonoma, Marin, and San Mateo Counties.
<i>Hordeum intercedens</i> Vernal barley	-/-/3.2	This species occurs in vernal pools, saline streambeds, and alkali flats from 15 to 3,280 feet elevation.	March–June / Annual grass	There are no CNDDDB or herbarium records for vernal barley in the study area, although the CNPS Inventory reports San Mateo County to be within the species' range.	Potential to occur. Potential habitat for this species occurs where vernal pools are present in the study area.
<i>Neostapfia colusana</i> Colusa grass	E/E/1B.1	This species occurs in vernal pools from 15 to 655 feet elevation.	May–August / Annual grass	There are 4 CNDDDB records of Colusa grass in the study area.	Unlikely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where vernal pools are present in Solano County (ICF 2016).
<i>Orcuttia inaequalis</i> San Joaquin Orcutt grass	T/E/1B.1	This species occurs in vernal pools from 35 to 2,475 feet elevation.	April– September / Annual grass	There is 1 CNDDDB record of San Joaquin Orcutt grass in the study area.	Unlikely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where vernal pools are present in Solano County (ICF 2016).
<i>Panicum acuminatum</i> var. <i>thermale</i> Geysers panicum	-/E/1B.1	This species occurs in McNab cypress woodland, meadows, and grasslands, along streams and near hot springs, from 1,495 to 8,105 feet elevation.	June– September/ Perennial grass	There are 5 CNDDDB records of Geysers panicum in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where hot springs are present in closed-cone pine-cypress forest in Sonoma County.
<i>Pleuropogon hooverianus</i> North Coast semaphore grass	-/T/1B.1	This species occurs in moist, grassy, sometimes shaded areas, in broadleafed upland forest, as well as in vernal pools, from 35 to 2,200 feet elevation.	May–August / Perennial grass	There are 7 CNDDDB records of North Coast semaphore grass in the study area.	Present. The Permit Area intersects 5 occurrences of this species. Potential habitat for this species occurs where wet meadow is present in Sonoma and Marin Counties (ICF 2016).
<i>Pleuropogon refractus</i> Nodding semaphore grass	-/-/4.2	This species occurs in wet meadows and shady banks, below 5,250 feet elevation.	April–July / Perennial grass	Based on herbarium records, there are 3 occurrences of nodding semaphore grass in the study area.	Potential to occur. Potential habitat for this species occurs where wet meadow or valley/foothill riparian scrub is present in Marin County.
<i>Poa napensis</i> Napa bluegrass	E/E/1B.1	This species occurs in alkaline areas near thermal springs from 330 to 655 feet elevation.	May–August / Perennial grass	There are 2 CNDDDB records of Napa bluegrass in the study area.	Present. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where wet meadow is present in Napa County (ICF 2016).

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<i>Puccinellia simplex</i> California alkali grass	-/-/1B.2	This species occurs in seasonally wet alkaline wetlands, sinks, flats, vernal pools, and lake margins below 3,000 feet elevation.	March–May / Annual grass	There are 14 CNDDDB records of California alkali grass in the study area.	Likely to occur. The Permit Area intersects 11 occurrences of this species. Potential habitat for this species occurs where alkaline vernal pools, wet meadow in alkaline soils, or alkali desert scrub is present in Napa, Solano, Contra Costa, Alameda, and Santa Clara Counties.
<i>Tuctoria mucronata</i> Solano grass	E/E/1B.1	This species occurs in vernal pools from 35 to 65 feet elevation.	April–August / Annual grass	There are 2 CNDDDB records of Solano grass in the study area.	Unlikely to occur. The Permit Area does not intersect any occurrences of this species. Potential habitat for this species occurs where alkaline vernal pools are present in Solano County (ICF 2016).
Polemoniaceae – Phlox Family					
<i>Collomia diversifolia</i> Serpentine collomia	-/-/4.3	This species occurs in open, rocky to gravelly areas in serpentine chaparral from 195 to 2,970 feet elevation.	April–July / Annual herb	There are 34 herbarium records of serpentine collomia in the study area.	Potential to occur. Potential habitat for this species occurs where serpentine chaparral is present in Napa, Sonoma, Marin, and Contra Costa Counties.
<i>Eriastrum erterrae</i> Lime Ridge woollystar	-/-/1B.1	This species occurs in open areas in chaparral, in alkaline or semi-alkaline sandy soils from 690 to 900 feet elevation.	June–July / Annual herb	There are 2 CNDDDB records of Lime Ridge woollystar in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where chaparral is present in Contra Costa County.
<i>Eriastrum tracyi</i> Tracy’s woollystar	-/R/1B.2	This species occurs in chenopod scrub, grassland, and sparsely vegetated alkaline alluvial fans from 315 to 5,840 feet elevation.	April–July / Annual herb	There are 4 CNDDDB records of Tracy’s woollystar in the study area.	Unlikely to occur. The Permit Area does not intersect any occurrences of this species. Potential habitat for this species occurs where annual grassland, oak woodland, or chaparral is present in Santa Clara County (ICF 2016).
<i>Gilia capitata</i> ssp. <i>chamissonis</i> Blue coast gilia	-/-/1B.1	This species occurs in coastal dunes and coastal scrub below 660 feet elevation.	April–July / Annual herb	There are 31 CNDDDB records of blue coast gilia in the study area.	Likely to occur. The Permit Area intersects 19 occurrences of this species. Potential habitat for this species occurs where dunes and coastal scrub are present in Sonoma, Marin, and San Francisco Counties.
<i>Gilia capitata</i> ssp. <i>pacifica</i> Pacific gilia	-/-/1B.2	This species occurs in coastal prairie and coastal scrub from 15 to 5,465 feet elevation.	May–August / Annual herb	There are 4 CNDDDB records of Pacific gilia in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where coastal scrub and perennial grassland are present in Sonoma County.
<i>Gilia capitata</i> ssp. <i>tomentosa</i> Woolly-headed gilia	-/-/1B.1	This species occurs on rocky serpentinite outcrops in coastal bluff scrub, and valley and foothill woodlands from 35 to 720 feet elevation.	May–July / Annual herb	There are 11 CNDDDB records of woolly-headed gilia in the study area.	Likely to occur. The Permit Area intersects 6 occurrences of this species. Potential habitat for this species occurs where coastal scrub is present in Sonoma and Marin Counties.
<i>Gilia millefoliata</i> Dark-eyed gilia	-/-/1B.2	This species occurs in coastal dunes from 10 to 100 feet elevation.	April–July / Annual herb	There are 21 CNDDDB records of dark-eyed gilia in the study area.	Likely to occur. The Permit Area intersects 10 occurrences of this species. Potential habitat for this species occurs where dunes are present in Sonoma, Marin, and San Francisco Counties.
<i>Leptosiphon acicularis</i> Bristly linanthus	-/-/4.2	This species occurs in open grassy areas in chaparral and woodlands below 2,295 feet elevation.	April–June / Annual herb	There are 42 herbarium records of bristly linanthus in the study area.	Potential to occur. Potential habitat for this species occurs where annual grassland or oak woodland is present in Sonoma, Marin, Napa, San Mateo, and Alameda Counties.
<i>Leptosiphon ambiguus</i> Serpentine linanthus	-/-/4.2	This species occurs in serpentine grassland below 3,280 feet elevation.	March–June / Annual herb	There are 121 herbarium records of serpentine linanthus in the study area.	Potential to occur. Potential habitat for this species occurs where serpentine grassland is present in Contra Costa, Alameda, Santa Clara, and San Mateo Counties.
<i>Leptosiphon croceus</i> Coast yellow linanthus	-/-/1B.1	This species occurs in coastal bluff scrub and coastal prairie from 35 to 490 feet elevation.	April–June / Annual herb	There is 1 CNDDDB record of coast yellow linanthus in the study area.	Unlikely to occur. The Permit Area does not intersect any occurrence of this species. The species is known only from a single occurrence. Potential habitat for this species occurs where coastal scrub and perennial grassland are present in San Mateo County.
<i>Leptosiphon grandiflorus</i> Large-flowered linanthus	-/-/4.2	This species occurs in grasslands, on sandy soils below 3,935 feet elevation.	April–July / Annual herb	There are 66 herbarium records of large-flowered linanthus in the study area.	Unlikely to occur. Potential habitat for this species occurs where annual grassland is present in Contra Costa, Alameda, Santa Clara, Marin, San Francisco, and San Mateo Counties (ICF 2016).
<i>Leptosiphon jepsonii</i> Jepson’s linanthus	-/-/1B.2	This species occurs in grassy slopes, on volcanics or periphery of serpentinite from 330 to 1,640 feet elevation.	March–May / Annual herb	There are 37 CNDDDB records of Jepson’s linanthus in the study area.	Likely to occur. The Permit Area intersects 18 occurrences of this species. Potential habitat for this species occurs where open, grassy areas in chaparral and oak woodlands are present in Napa and Sonoma Counties.
<i>Leptosiphon latisectus</i> Broad-lobed linanthus	-/-/4.3	This species occurs in open grassy areas in broadleaved evergreen forest, on slopes and roadcuts, below 4,920 feet elevation.	March–June / Annual herb	There are 39 herbarium records of broad-lobed linanthus in the study area.	Potential to occur. Potential habitat for this species occurs where annual grassland or montane broadleaved-conifer forest is present in Napa, Sonoma, Marin, San Francisco, and San Mateo Counties.

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<i>Leptosiphon rosaceus</i> Rose linanthus	-/-/1B.1	This species occurs in coastal bluff scrub below 330 feet elevation.	April–July / Annual herb	There are 31 herbarium records of rose linanthus in the study area.	Likely to occur. The Permit Area intersects 8 occurrences of this species. Potential habitat for this species occurs where coastal scrub present in Sonoma, Marin, and San Mateo Counties.
<i>Navarretia cotulifolia</i> Cotula navarretia	-/-/4.2	This species occurs in chaparral, woodlands, and grasslands on heavy clay soils from 15 to 6,005 feet elevation.	May–June / Annual herb	There are 46 herbarium records of cotula navarretia in the study area.	Potential to occur. Potential habitat for this species occurs where annual grassland and open grassy areas in chaparral and oak woodland with clay soils are present in the study area.
<i>Navarretia gowenii</i> Lime Ridge navarretia	-/-/1B.1	This species occurs in chaparral, on carbonate-rich clay soils from 590 to 1,000 feet elevation.	May–June / Annual herb	There are 2 CNDDDB records of Lime Ridge navarretia in the study area.	Present. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where open, grassy areas in chaparral are present in Contra Costa County (ICF 2016).
<i>Navarretia heterandra</i> Tehama navarretia	-/-/4.3	This species occurs in mesic areas in valley and foothill grasslands and vernal pools from 100 to 3,315 feet elevation.	April–June / Annual herb	There are 18 herbarium records of Tehama navarretia in the study area.	Potential to occur. Potential habitat for this species occurs where vernal pools and annual grasslands are present in Sonoma, Napa, Solano, and Contra Costa Counties.
<i>Navarretia jepsonii</i> Jepson's navarretia	-/-/4.3	This species occurs in serpentine grasslands and clay flats from 490 to 2,625 feet elevation.	April–June / Annual herb	Based on herbarium records, there are 9 occurrences of Jepson's navarretia in the study area.	Potential to occur. Potential habitat for this species occurs where serpentine grassland is present in Sonoma and Napa Counties.
<i>Navarretia leucocephala</i> ssp. <i>bakeri</i> Baker's navarretia	-/-/1B.1	This species occurs in mesic habitat in cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland, and vernal pools from 15 to 5,710 feet elevation.	April–July / Annual herb	There are 34 CNDDDB records of Baker's navarretia in the study area.	Likely to occur. The Permit Area intersects 23 occurrences of this species. Potential habitat for this species occurs where vernal pools are present in Solano, Napa, Sonoma, and Marin Counties.
<i>Navarretia leucocephala</i> ssp. <i>pauciflora</i> Few-flowered navarretia	E/T/1B.1	This species occurs in volcanic mud flows and vernal pools from 1,310 to 2,805 feet elevation.	May–June / Annual herb	There are 2 CNDDDB records of few-flowered navarretia in the study area.	Unlikely to occur. The Permit Area does not intersect any occurrences of this species. Potential habitat for this species occurs where vernal pools are present in Napa County (ICF 2016).
<i>Navarretia leucocephala</i> ssp. <i>pliantha</i> Many-flowered navarretia	E/E/1B.2	This species occurs in volcanic mud flows and vernal pools from 100 to 3,115 feet elevation.	May–June / Annual herb	There are 2 CNDDDB records of many-flowered navarretia in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where vernal pools are present in Sonoma County.
<i>Navarretia linearifolia</i> ssp. <i>pinnatisecta</i> Pinnate-leaved navarretia	-/-/4.3	This species occurs in openings in sagebrush scrub, chaparral, or forests, on serpentine or volcanic soils from 985 to 7,220 feet elevation.	June–August / Annual herb	Based on herbarium records, there are 3 occurrences of pinnate-leaved navarretia in the study area.	Potential to occur. Potential habitat for this species occurs where chaparral or lower montane coniferous forest are present in Sonoma and Napa Counties.
<i>Navarretia nigelliformis</i> ssp. <i>nigelliformis</i> Adobe navarretia	-/-/4.2	This species occurs in vernal pools and clay flats below 3,280 feet elevation.	April–June / Annual herb	There is 1 herbarium record of adobe navarretia in the study area.	Potential to occur. Potential habitat for this species occurs where annual grassland on clay soils is present in Contra Costa and Alameda Counties.
<i>Navarretia nigelliformis</i> ssp. <i>radians</i> Shiny navarretia	-/-/1B.2	This species occurs in mesic areas with heavy clay soils, in swales and clay flats; in oak woodland and grasslands from 650 to 3,300 feet elevation.	May–June / Annual herb	Based on herbarium records, there are 3 occurrences of shiny navarretia in the study area.	Potential to occur. Potential habitat for this species occurs where annual grassland on clay soils is present in Contra Costa County.
<i>Navarretia paradoxinota</i> Porter's navarretia	-/-/1B.3	This species occurs in swales and dry streambeds in serpentine chaparral from 575 to 2,870 feet elevation.	May–July / Annual herb	There are 3 CNDDDB records of Porter's navarretia in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where serpentine chaparral is present in Napa County.
<i>Navarretia prostrata</i> Prostrate navarretia	-/-/1B.1	This species occurs in vernal pools and mesic areas in coastal scrub and alkali grasslands from 10 to 3,970 feet elevation.	April–July / Annual herb	There are 3 CNDDDB records of prostrate navarretia in the study area.	Unlikely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where vernal pools are present in Alameda County (ICF 2016).
<i>Navarretia rosulata</i> Marin County navarretia	-/-/1B.2	This species occurs in chaparral and Sargent cypress forest, on serpentine soils, from 655 to 2,085 feet elevation.	May–July / Annual herb	There are 15 CNDDDB records of Marin County navarretia in the study area.	Likely to occur. The Permit Area intersects 4 occurrences of this species. Potential habitat for this species occurs where serpentine chaparral or closed-cone pine-cypress forest is present in Marin and Napa Counties.
<i>Navarretia subuligera</i> Awl-leaved navarretia	-/-/4.3	This species occurs in rocky, mesic areas in chaparral, cismontane woodland, and lower montane coniferous forest from 490 to 3,610 feet elevation.	April–August / Annual herb	Based on herbarium records, there are 6 occurrences of awl-leaved navarretia in the study area.	Potential to occur. Potential habitat for this species occurs where coastal scrub, perennial grassland or montane hardwood-conifer forest is present in Napa County.

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<i>Polemonium carneum</i> Oregon polemonium	-/-/2B.2	This species occurs in coastal prairie, coastal scrub, and lower montane coniferous forest below 6,005 feet elevation.	April– September / Perennial herb	There are 6 CNDDDB records of Oregon polemonium in the study area.	Unlikely to occur. The Permit Area intersects 5 occurrences of this species. All occurrences in the study area are historic (before 1940). Potential habitat for this species occurs where serpentine chaparral or closed-cone pine-cypress forest is present in Marin and Napa Counties.
Polygonaceae – Buckwheat Family					
<i>Chorizanthe cuspidata</i> var. <i>cuspidata</i> San Francisco Bay spineflower	-/-/1B.2	This species occurs in coastal dunes, coastal bluff scrub, coastal scrub, and coastal prairie, on sandy soil from 10 to 705 feet elevation.	April–July / Perennial herb	There are 17 CNDDDB records of San Francisco Bay spineflower in the study area.	Likely to occur. The Permit Area intersects 5 occurrences of this species. Potential habitat for this species occurs where dunes and coastal scrub are present in Marin, San Francisco, and San Mateo Counties.
<i>Chorizanthe cuspidata</i> var. <i>villosa</i> Woolly-headed spineflower	-/-/1B.2	This species occurs in coastal dunes, coastal scrub, coastal prairie, in sandy soil, from 30 to 195 feet elevation.	May–August / Annual herb	There are 17 CNDDDB records of woolly-headed spineflower in the study area.	Likely to occur. The Permit Area intersects 8 occurrences of this species. Potential habitat for this species occurs where dunes and coastal scrub are present in Sonoma and Marin Counties.
<i>Chorizanthe robusta</i> ssp. <i>robusta</i> Robust spineflower	E/-/1B.1	This species occurs in coastal dunes and coastal scrub, on sandy soil, from 10 to 985 feet elevation.	April– September / Annual herb	There are 5 CNDDDB records of robust spineflower in the study area.	Unlikely to occur. The Permit Area intersects 5 occurrences of this species; however, all of these occurrences are possibly extirpated. Potential habitat for this species occurs where dunes and coastal scrub are present in San Francisco, San Mateo, Alameda, and Santa Clara Counties.
<i>Chorizanthe valida</i> Sonoma spineflower	E/E/1B.1	This species occurs in coastal prairie from 35 to 1,000 feet elevation.	June–August / Annual herb	There are 6 CNDDDB records of Sonoma spineflower in the study area.	Likely to occur. The Permit Area intersects 6 occurrences of this species. Potential habitat for this species occurs where coastal scrub is present in Sonoma and Marin Counties.
<i>Eriogonum argillosum</i> Clay-loving buckwheat	-/-/4.3	This species occurs in cismontane woodland on serpentine or clay soils from 490 to 2,625 feet elevation.	March–June / Annual herb	There are 3 herbarium records of clay-loving buckwheat in the study area.	Potential to occur. Potential habitat for this species occurs where open areas in oak woodland with clay soils are present in Santa Clara County.
<i>Eriogonum cedrorum</i> The Cedars buckwheat	-/-/1B.3	This species occurs in serpentine barrens from 1,200 to 1,805 feet elevation.	June–September / Perennial herb	There are 3 CNDDDB records of The Cedars buckwheat in the study area.	Potential to occur. The Permit Area does not intersect any occurrences of this species. Potential habitat for this species occurs where closed-cone pine-cedar forest is present in Sonoma County.
<i>Eriogonum luteolum</i> var. <i>caninum</i> Tiburon buckwheat	-/-/1B.2	This species occurs in grassland, coastal prairie, and coastal scrub on serpentine soils below 1,650 feet elevation.	May–September / Annual herb	There are 26 CNDDDB records of Tiburon buckwheat in the study area.	Likely to occur. The Permit Area intersects 15 occurrences of this species. Potential habitat for this species occurs where grassland or coastal scrub in serpentine soils is present in Alameda and Marin Counties.
<i>Eriogonum nervulosum</i> Snow Mountain buckwheat	-/-/1B.2	This species occurs in chaparral, on serpentine soils from 985 to 2,105 feet elevation.	June–September / Perennial herb	There are 3 CNDDDB records of Snow Mountain buckwheat in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where serpentine chaparral is present in Napa and Sonoma Counties.
<i>Eriogonum nudum</i> var. <i>decurrens</i> Ben Lomond buckwheat	-/-/1B.1	This species occurs in chaparral and maritime ponderosa pine sandhills from 165 to 2,610 feet elevation.	June–October / Perennial herb	There are no CNDDDB records of Ben Lomond buckwheat in the study area. There is 1 herbarium record of Ben Lomond buckwheat in Marin County that appears to be erroneous.	Absent. No potential habitat for this species occurs in the study area.
<i>Eriogonum nudum</i> var. <i>psychicola</i> Antioch Dunes buckwheat	-/-/1B.1	This species occurs in interior dunes below 65 feet elevation.	July–October / Perennial herb	There is 1 CNDDDB record of Antioch Dunes buckwheat in the study area.	Present. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where dunes are present in Contra Costa County.
<i>Eriogonum ternatum</i> Ternate buckwheat	-/-/4.3	This species occurs in serpentine barrens, conifer woodland, and open rocky areas in conifer forest from 1,310 to 5,575 feet elevation.	June–August / Perennial herb	There are no herbarium or CNDDDB records from the study area. Reported locations in the study area are erroneous.	Absent. Habitat for this species is not present in the Permit Area.
<i>Eriogonum tripodum</i> Tripod buckwheat	-/-/4.2	This species occurs in gravelly slopes and flats, often on serpentine, in chaparral and cismontane woodland from 655 to 5,250 feet elevation.	May–July / Perennial herb	There are 3 herbarium records of tripod buckwheat in the study area.	Potential to occur. Potential habitat for this species occurs where serpentine chaparral is present in Napa County.
<i>Eriogonum truncatum</i> Mt. Diablo buckwheat	-/-/1B.1	This species occurs in coarse sandy soil in grasslands from 10 to 1,150 feet elevation.	April– September / Annual herb	There are 7 CNDDDB records of Mt. Diablo buckwheat in the study area.	Potential to occur. The Permit Area intersects 7 occurrences of this species. Most occurrences are based on historic records. Potential habitat for this species occurs where annual grassland is present in Solano and Contra Costa Counties.

Species Name	Status ^a Federal/State/ CRPR	Habitat Requirements	Flowering Phenology/ Life Form	Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
<i>Eriogonum umbellatum</i> var. <i>bahiiforme</i> Bay buckwheat	-/-/4.2	This species occurs on serpentine soils from 2,295 to 7,220 feet elevation.	July–September / Perennial herb	Based on herbarium records, there are 8 occurrences of Bay buckwheat in the study area.	Potential to occur. Potential habitat for this species occurs where oak woodland or montane coniferous forest, often on serpentine soils, is present in Sonoma, Napa, Contra Costa, Alameda, and Santa Clara Counties.
<i>Polygonum marinense</i> Marin knotweed	-/-/3.1	This species occurs in coastal salt and brackish marshes and swamps below 35 feet elevation.	April–October / Annual herb	Based on herbarium records, there are about 15 occurrences of Marin knotweed in the study area.	Potential to occur. Potential habitat for this species occurs where high elevation tidal marsh is present in Sonoma, Napa, Solano, Marin, and Alameda Counties.
Pontederiaceae – Pickerel-Weed Family					
<i>Heteranthera dubia</i> Water star-grass	-/-/2B.2	This species occurs in slow-moving water, below 4,920 feet elevation.	July–October / Perennial herb	There are 2 CNDDDB records of water star-grass in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where freshwater emergent wetlands are present in Marin and San Francisco Counties.
Potamogetonaceae – Pondweed Family					
<i>Potamogeton zosteriformis</i> Eel-grass pondweed	-/-/2B.2	This species occurs in ponds, lakes, streams, and marsh below 6,100 feet elevation.	June–July / Annual herb	There is 1 CNDDDB record of eel-grass pondweed in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where perennial lakes and ponds are present in Contra Costa County.
<i>Stuckenia filiformis</i> ssp. <i>alpina</i> Slender-leaved pondweed	-/-/2B.2	This species occurs in the shallow, clear water of lakes and drainage channels; 985 to 7,055 feet elevation.	May–July / Perennial herb	There are 7 CNDDDB records of slender-leaved pondweed in the study area.	Likely to occur. The Permit Area intersects 6 occurrences of this species. Potential habitat for this species occurs where perennial lakes and ponds are present in Sonoma, Solano, Contra Costa, Alameda, and San Mateo Counties.
Primulaceae – Primrose Family					
<i>Androsace elongata</i> ssp. <i>acuta</i> California androsace	-/-/4.2	This species occurs on moss-covered rock outcrops and open areas in adjacent grasslands from 490 to 4,280 feet elevation.	March–June / Annual herb	Based on herbarium records, there are about 16 occurrences of California androsace in the study area.	Potential to occur. Potential habitat for this species occurs where annual grassland in shallow soil is present in Contra Costa, Alameda, and Santa Clara Counties.
Pteridaceae – Brake Family					
<i>Aspidotis carlotta-halliae</i> Carlotta Hall's lace fern	-/-/4.2	This species occurs in crevices of serpentine outcrops from 330 to 4,595 feet elevation.	January– December / Perennial herb	Based on herbarium records, there are about 8 occurrences of Carlotta Hall's lace fern in the study area.	Potential to occur. Potential habitat for this species occurs where serpentine chaparral and closed-cone pine-cedar forest is present in Marin, Alameda, and Santa Clara Counties.
Ranunculaceae – Buttercup Family					
<i>Delphinium bakeri</i> Baker's larkspur	E/R/1B.1	This species occurs in coastal scrub, broadleaved upland forest, and valley and foothill grassland from 260 to 1,000 feet elevation.	March–May / Perennial herb	There are 6 CNDDDB records of Baker's larkspur in the study area.	Absent. The Permit Area intersects 4 occurrences of this species. Potential habitat for this species occurs where coastal scrub is present in Marin and Sonoma Counties (ICF 2016).
<i>Delphinium californicum</i> ssp. <i>interius</i> Hospital Canyon larkspur	-/-/1B.2	This species occurs in moist ravines and slopes in woodlands, chaparral, and coastal scrub from 640 to 3,575 feet elevation.	April–June / Perennial herb	There are 22 CNDDDB records of Hospital Canyon larkspur in the study area.	Likely to occur. The Permit Area intersects 5 occurrences of this species. Potential habitat for this species occurs where coastal scrub is present in Contra Costa, Alameda, and Santa Clara Counties.
<i>Delphinium luteum</i> Yellow larkspur	E/R/1B.1	This species occurs in rocky areas in coastal scrub, coast prairie, and chaparral below 330 feet elevation.	March–May / Perennial herb	There are 11 CNDDDB records of yellow larkspur in the study area.	Absent. The Permit Area intersects 5 occurrences of this species. Potential habitat for this species occurs where coastal scrub is present in Marin and Sonoma Counties (ICF 2016).
<i>Delphinium recurvatum</i> Recurved larkspur	-/-/1B.2	This species occurs in subalkaline soils in annual grassland and saltbush scrub from 10 to 2,590 feet elevation.	March–May / Perennial herb	There are 5 CNDDDB records of recurved larkspur in the study area.	Likely to occur. The Permit Area intersects 4 occurrences of this species. Potential habitat for this species occurs where annual grassland on alkaline soils or alkali desert scrub is present in Alameda, Contra Costa, and Solano Counties.
<i>Delphinium uliginosum</i> Swamp larkspur	-/-/4.2	This species occurs in open meadows and stream banks in serpentine chaparral from 1,310 to 1,970 feet elevation.	May–June / Perennial herb	Based on herbarium records, there are about 12 occurrences in the study area.	Potential to occur. Potential habitat for this species occurs where seeps or wet meadows are present in serpentine chaparral in Sonoma and Napa Counties.
<i>Myosurus minimus</i> ssp. <i>apus</i> Little mousetails	-/-/3.1	This species occurs in open meadows and stream banks in serpentine chaparral from 1,310 to 1,970 feet elevation.	March–June / Annual herb	There are 2 herbarium records of little mousetails in the study area.	Potential to occur. Potential habitat for this species occurs where vernal pools are present in Contra Costa County.
<i>Ranunculus lobbii</i> Lobb's aquatic buttercup	-/-/4.2	This species occurs in vernal pools and other wetlands in North Coast coniferous forest, woodlands below 1,640 feet elevation.	February–May / Annual herb	There are 89 herbarium records of Lobb's aquatic buttercup in the study area.	Potential to occur. Potential habitat for this species occurs where vernal pools are present in the study area.

Species Name	Status ^a Federal/State/ CRPR	Habitat Requirements	Flowering Phenology/ Life Form	Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
Rhamnaceae – Buckthorn Family					
<i>Ceanothus confusus</i> Rincon Ridge ceanothus	-/-/1B.1	This species occurs in volcanic or serpentine substrates in chaparral, closed-cone coniferous forests, and cis-montane woodlands from 245 to 3,480 feet elevation.	February–June / Perennial shrub	There are 28 CNDDDB records of Rincon Ridge ceanothus in the study area.	Likely to occur. The Permit Area intersects 12 occurrences of this species. Potential habitat for this species occurs where mixed chaparral is present in Napa and Sonoma Counties.
<i>Ceanothus decornutus</i> Nicasio ceanothus	-/-/1B.2	This species occurs in maritime chaparral, on serpentinite outcrops from 770 to 970 feet elevation.	March–May / Perennial shrub	There are 2 CNDDDB records of Nicasio ceanothus in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where mixed chaparral is present in Marin County.
<i>Ceanothus divergens</i> Calistoga ceanothus	-/-/1B.2	This species occurs on rocky serpentinite or volcanic substrates in chaparral from 560 to 3,115 feet elevation.	February–April / Perennial shrub	There are 22 CNDDDB records of Calistoga ceanothus in the study area.	Likely to occur. The Permit Area intersects 12 occurrences of this species. Potential habitat for this species occurs where mixed chaparral is present in Napa and Sonoma Counties.
<i>Ceanothus ferrisiae</i> Coyote ceanothus	E/-/1B.1	This species occurs in grassland, coastal scrub, and chaparral from 395 to 1,510 feet elevation.	January–May / Perennial shrub	There are 4 CNDDDB records of coyote ceanothus in the study area.	Present. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where mixed chaparral is present in Santa Clara County (ICF 2016).
<i>Ceanothus foliosus</i> var. <i>vineatus</i> Vine Hill ceanothus	-/-/1B.1	This species occurs in chaparral from 150 to 1,000 feet elevation.	March–May / Perennial shrub	There are 4 CNDDDB records of Vine Hill ceanothus in the study area.	Likely to occur. The Permit Area intersects 4 occurrences of this species. Potential habitat for this species occurs where mixed chaparral is present in Sonoma County.
<i>Ceanothus gloriosus</i> var. <i>exaltatus</i> Glory brush	-/-/4.3	This species occurs on sandy or rocky substrates below 1,640 feet elevation.	March–May / Perennial shrub	There are 42 herbarium records of glory brush in the study area.	Potential to occur. Potential habitat for this species occurs where mixed chaparral is present in Sonoma and Marin Counties.
<i>Ceanothus gloriosus</i> var. <i>gloriosus</i> Point Reyes ceanothus	-/-/4.3	This species occurs in coastal bluffs, Bishop pine forest, in sandy soils below 1,640 feet elevation.	March–May / Perennial shrub	There are 23 herbarium records of Point Reyes ceanothus in the study area.	Potential to occur. Potential habitat for this species occurs where mixed chaparral is present in Sonoma and Marin Counties.
<i>Ceanothus gloriosus</i> var. <i>porrectus</i> Mt. Vision ceanothus	-/-/1B.3	This species occurs in grassland, coastal prairie, coastal scrub, and Bishop pine forest, on sandy soils, from 80 to 1,000 feet elevation.	February–May / Perennial shrub	There are 18 CNDDDB records of Mt. Vision ceanothus in the study area.	Likely to occur. The Permit Area intersects 5 occurrences of this species. Potential habitat for this species occurs where mixed chaparral is present in Marin County.
<i>Ceanothus masonii</i> Mason's ceanothus	-/-/1B.2	This species occurs in chaparral, on serpentine ridges and slopes from 755 to 1,640 feet elevation.	March–April / Perennial shrub	There are 8 CNDDDB records of Mason's ceanothus in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where mixed chaparral is present in Marin County.
<i>Ceanothus purpureus</i> Holly-leaved ceanothus	-/-/1B.2	This species occurs on rocky, volcanic soil, in chaparral and oak woodland from 475 to 2,560 feet elevation.	February–June / Perennial shrub	There are 43 CNDDDB records of holly-leaved ceanothus in the study area.	Likely to occur. The Permit Area intersects 17 occurrences of this species. Potential habitat for this species occurs where mixed chaparral is present in Napa, Sonoma, and Solano Counties.
<i>Ceanothus rigidus</i> Monterey ceanothus	-/-/4.2	This species occurs on sandy soils, in chaparral and closed-cone pine forest below 1,310 feet elevation.	March–May / Perennial shrub	There are 3 CNDDDB records of Monterey ceanothus in the study area.	Potential to occur. Potential habitat for this species occurs where mixed chaparral is present in Marin and San Mateo Counties.
<i>Ceanothus sonomensis</i> Sonoma ceanothus	-/-/1B.2	This species occurs in sandy, volcanic, or serpentine substrates in chaparral from 705 to 2,625 feet elevation.	February–April / Perennial shrub	There are 43 CNDDDB records of Sonoma ceanothus in the study area.	Likely to occur. The Permit Area intersects 15 occurrences of this species. Potential habitat for this species occurs where mixed chaparral is present in Napa and Sonoma Counties.
Rosaceae – Rose Family					
<i>Horkelia cuneata</i> ssp. <i>sericea</i> Kellogg's horkelia	-/-/1B.1	This species occurs in coastal scrub and maritime chaparral, in sandy and gravelly places, from 35 to 655 feet elevation.	April– September / Perennial herb	There are 10 CNDDDB records of Kellogg's horkelia in the study area.	Likely to occur. The Permit Area intersects 8 occurrences of this species. Potential habitat for this species occurs where coastal scrub or mixed chaparral is present in Marin, San Francisco, San Mateo, and Alameda Counties.
<i>Horkelia marinensis</i> Point Reyes horkelia	-/-/1B.2	This species occurs in coastal dunes, coastal scrub, and perennial grassland from 15 to 2,475 feet elevation.	May–September / Perennial herb	There are 15 CNDDDB records of Point Reyes horkelia in the study area.	Likely to occur. The Permit Area intersects 6 occurrences of this species. Potential habitat for this species occurs where dunes, coastal scrub or perennial grassland is present in Marin, San Mateo, and Sonoma Counties.
<i>Horkelia tenuiloba</i> Thin-lobed horkelia	-/-/1B.2	This species occurs in moist areas in chaparral from 165 to 1,640 feet elevation.	May–July / Perennial herb	There are 16 CNDDDB records of thin-lobed horkelia in the study area.	Likely to occur. The Permit Area intersects 5 occurrences of this species. Potential habitat for this species occurs where chaparral is present in Marin and Sonoma Counties.

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<i>Potentilla hickmanii</i> Hickman's cinquefoil	E/E/1B.1	This species occurs in freshwater marshes, seeps, and in small streams in open areas in coastal scrub or forest from 35 to 490 feet elevation.	April–August / Perennial herb	There are 2 CNDDDB records of Hickman's cinquefoil in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where freshwater emergent wetland is present in San Mateo County.
<i>Potentilla uliginosa</i> Cunningham Marsh cinquefoil	-/-/1A	This species occurs in freshwater marsh from 100 to 130 feet elevation.	May–August / Perennial herb	There is 1 CNDDDB records of Cunningham Marsh cinquefoil in the study area.	Unlikely to occur. The Permit Area intersects 1 occurrence of this species; however, the only known occurrence of this species is possibly extirpated. Potential habitat for this species occurs where freshwater emergent wetland is present in Sonoma County.
Rubiaceae – Madder Family					
<i>Galium andrewsii</i> ssp. <i>gatense</i> Serpentine bedstraw	-/-/4.2	This species occurs in serpentine chaparral, woodlands, in open rocky places from 720 to 4,755 feet elevation.	April–June / Perennial herb	There are 25 herbarium records of serpentine bedstraw in the study area.	Potential to occur. Potential habitat for this species occurs where serpentine chaparral is present in Contra Costa, Alameda, and Santa Clara Counties.
Scrophulariaceae – Figwort Family					
<i>Limosella australis</i> Delta mudwort	-/-/2B.1	This species occurs in marshes and swamps below 10 feet elevation.	May–August / Perennial herb	There are 25 CNDDDB records of Delta mudwort in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where high elevation tidal marsh is present in Solano and Contra Costa Counties.
Themidaceae – Brodiaea Family					
<i>Brodiaea leptandra</i> Narrow-flowered brodiaea	-/-/1B.2	This species occurs in broadleaved upland forest, chaparral, and lower montane coniferous forest from 360 to 3,000 feet elevation.	June–July / Perennial herb	There are 39 CNDDDB records of narrow-flowered brodiaea in the study area.	Likely to occur. The Permit Area intersects 24 occurrences of this species. Potential habitat for this species occurs where mixed chaparral is present in Napa and Sonoma Counties.
<i>Triteleia lugens</i> Dark-mouthed triteleia	-/-/4.3	This species occurs in open areas in chaparral, foothill woodlands, broadleaved evergreen forest, and lower montane coniferous forest, from 330 to 3,280 feet elevation.	April–June / Perennial herb	There are about 6 herbarium records of dark-mouthed triteleia in the study area.	Potential to occur. Potential habitat for this species occurs where annual grassland or grassy areas in chaparral and montane hardwood-conifer forest is present in Napa and Solano Counties.
Thymelaeaceae – Mezereum Family					
<i>Dirca occidentalis</i> Western leatherwood	-/-/1B.2	This species occurs in chaparral, forest, and woodland habitats from 150 to 1,395 feet elevation.	January–April / Perennial shrub	There are 75 CNDDDB records of western leatherwood in the study area.	Likely to occur. The Permit Area intersects 35 occurrences of this species. Potential habitat for this species occurs where chaparral, woodland or forest habitat is present in Sonoma, Marin, San Mateo, Contra Costa, Alameda, and Santa Clara Counties.
Verbenaceae – Vervain Family					
<i>Abronia umbellata</i> ssp. <i>breviflora</i> Pink sand-verbena	-/-/1B.2	This species occurs in coastal dunes below 35 feet elevation.	June–October / Perennial herb	There are 16 CNDDDB records of pink sand-verbena in the study area.	Likely to occur. The Permit Area intersects 3 occurrences of this species. Potential habitat for this species occurs where dunes are present in Sonoma and Marin Counties.
Bryophyta – Mosses					
<i>Anomobryum julaceum</i> Slender silver moss	-/-/4.2	This species occurs in broadleaved upland forest, lower montane coniferous forest, and North Coast coniferous forest from 330 to 3,300 feet elevation.	N/A / Moss	There are 2 CNDDDB records of slender silver moss in the study area.	Likely to occur. The Permit Area intersects 2 occurrences of this species. Potential habitat for this species occurs where montane hardwood-conifer forest is present in Sonoma and Contra Costa Counties.
<i>Entosthodon kochii</i> Koch's cord moss	-/-/1B.3	This species occurs in cismontane woodlands on river banks, from 606 to 1,200 feet elevation.	N/A / Moss	There is 1 CNDDDB record of Koch's cord moss in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where montane hardwood-conifer forest is present in Marin County.
<i>Fissidens pauperculus</i> Minute pocket-moss	-/-/1B.2	This species occurs in North Coast coniferous forest, on stream banks and in dry streambeds from 35 to 3,920 feet elevation.	N/A / Moss	There are 7 CNDDDB records of minute pocket-moss in the study area.	Likely to occur. The Permit Area intersects 6 occurrences of this species. Potential habitat for this species occurs where valley/foothill riparian habitat is present in Sonoma, Marin, San Mateo, and Alameda Counties.
<i>Grimmia torenii</i> Toren's grimmia	-/-/1B.3	This species occurs in lower montane coniferous forest, woodlands, and open areas in chaparral, on boulders and rock walls, from 1,065 to 8,805 feet elevation.	N/A / Moss	There are 3 CNDDDB records of Toren's grimmia in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where chaparral or montane hardwood-conifer forest is present in Contra Costa and San Mateo Counties.
<i>Mielichhoferia elongata</i> Elongate copper moss	-/-/2B.2	This species occurs in cismontane woodland, in vernal moist areas on metamorphic rock from 1,640 to 4,264 feet elevation.	N/A / Moss	There is 1 CNDDDB record of elongate copper moss in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where oak woodland is present in Marin County.

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<i>Orthotrichum kellmanii</i> Kellman's bristle moss	-/-/1B.2	This species occurs in chaparral and woodlands, on sandstone outcrops from 1,115 to 2,245 feet elevation.	N/A / Moss	There is 1 CNDDDB record of Kellman's bristle moss in the study area.	Potential to occur. The Permit Area does not intersect any occurrences of this species. Potential habitat for this species occurs where chaparral or oak woodland is present in San Mateo County.
<i>Triquetrella californica</i> California triquetrella moss	-/-/1B.2	This species occurs in coastal scrub from 35 to 330 feet elevation.	N/A / Moss	There are 10 CNDDDB records of California triquetrella moss in the study area.	Likely to occur. The Permit Area intersects 9 occurrences of this species. Potential habitat for this species occurs where coastal scrub is present in Sonoma, Marin, San Francisco, San Mateo, and Contra Costa Counties.
Lichenophyta - Lichens					
<i>Bryoria spiralifera</i> Twisted horsehair lichen	-/-/1B.2	This species occurs in North Coast coniferous forest, on conifers below 100 feet elevation.	N/A / Fruticose lichen (epiphytic)	There are no CNDDDB occurrence records for twisted horsehair lichen in the study area.	Potential to occur. Potential habitat for this species occurs where mixed chaparral, coastal oak woodland, or closed-cone pine-cypress forest is present in the study area.
<i>Ramalina thaustra</i> Angel's-hair lichen	-/-/2B.1	This species occurs in North Coast coniferous forest, on dead twigs from 245 to 1,410 feet elevation.	N/A / Fruticose lichen (epiphytic)	There is 1 CNDDDB record of angel's-hair lichen in the study area.	Likely to occur. The Permit Area intersects 1 occurrence of this species. Potential habitat for this species occurs where montane hardwood-conifer forest is present in Sonoma County.
<i>Thamnia vermicularis</i> Whiteworm lichen	-/-/2B.1	This species occurs in coastal grassland, on sandstone outcrops near sea level.	N/A / Fruticose lichen (terricolous)	There is 1 CNDDDB record of whiteworm lichen in the study area.	Likely to occur. The Permit Area does not intersect any occurrence of this species. Potential habitat for this species occurs where perennial grassland is present in Marin County.
<i>Usnea longissima</i> Methuselah's beard lichen	-/-/4.2	This species occurs in North Coast coniferous forest and broadleaved upland forest; below 2,000 feet elevation	N/A / Fruticose lichen (epiphytic)	There are 17 CNDDDB records of Methuselah's beard lichen in the study area.	Likely to occur. The Permit Area intersects 10 occurrences of this species. Potential habitat for this species occurs where oak woodland, montane hardwood-conifer forest, or Douglas-fir forest is present in Sonoma County.

^a Status explanations:

Federal

- E = listed as endangered under the federal Endangered Species Act.
- T = listed as threatened under the federal Endangered Species Act.
- = no listing.

State

- E = listed as endangered under the California Endangered Species Act.
- T = listed as threatened under the California Endangered Species Act.
- = no listing.

California Rare Plant Rank (CRPR)

- 1A = presumed extinct in California.
- 1B = rare, threatened, or endangered in California and elsewhere.
- 2 = rare, threatened, or endangered in California but more common elsewhere.
- 3 = more information is needed about this plant.
- 4 = limited distribution, species on a watch list.

California Native Plant Society Code Extensions

- 0.1 = seriously endangered in California (more than 80% of occurrences threatened / high degree and immediacy of threat).
- 0.2 = fairly endangered in California (20-80% of occurrences threatened).

N/A = Not applicable (i.e., non-flowering moss or lichen)

Table 3.4-4. Special-Status Wildlife Species' Probability of Occurrence in the Permit Area

Species Name	Listing Status ^a	Habitat/Life History	Distribution/Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
Invertebrates				
<i>Branchinecta longiantenna</i> Longhorn fairy shrimp	FE	Found in small, shallow vernal pools, which range in depth from 2 to 12 inches and in water temperature from 50 to 68°F; vernal pools on chaparral covered mesas, ditches, road ruts.	Eastern margin of central Coast Ranges from Contra Costa County to San Luis Obispo County; disjunct population in Madera County; Altamont Pass area; Soda Lake on the Carrizo Plain; Kesterson National Wildlife Refuge.	Potential to occur. Suitable habitat is present in eastern portion of the Permit Area, northeast of Livermore, where only 2 occurrences have been documented in the Byron Hot Springs Quadrangle.
<i>Branchinecta conservatio</i> Conservancy fairy shrimp	FE	Large, deep vernal pools in annual grasslands.	Disjunct occurrences in Solano, Merced, Tehama, Ventura, Butte, Placer, and Glenn Counties; Central Valley.	Likely to occur. Suitable habitat is present in the northeast portion of the Permit Area; 13 occurrences have been documented in the Antioch North, Denverton, and Elmira Quadrangles, with most occurrences east of Travis Air Force Base.
<i>Branchinecta lynchi</i> Vernal pool fairy shrimp	FT	Inhabits ephemeral pools (vernal pools) in grassland or basalt flow depressions. Pools typically have grass or mud bottoms. Also occurs in other wetlands with habitat characteristics similar to those of vernal pools, including alkaline rain-pools, rock outcrop pools, and some constructed sites. Occupied habitats range from puddles of 6 square feet to pools exceeding 25 acres. Pools must stay inundated long enough (3 weeks under optimal conditions) for the species to complete its life cycle, but species does not use riverine, marine, or other permanent waters.	From Shasta County in the north throughout the Central Valley to Tulare County and west to the central Coast Ranges. Disjunct populations occur in San Luis Obispo, Santa Barbara, and Riverside Counties. Most known locations are in the Sacramento and San Joaquin Valleys and along the east margin of the central Coast Ranges.	Likely to occur. Suitable habitat is present in the eastern portions of the Permit Area, where 55 occurrences have been documented, mainly around Travis Air Force Base.
<i>Lepidurus packardii</i> Vernal pool tadpole shrimp	FE	Found in grass-bottomed swales on old alluvial soils underlain by hardpan, and in mud-bottomed pools with highly turbid water. Occupied habitats range in size from 50 square feet to 89 acres. Pools must dry out and re-inundate for cysts to hatch. Adult populations generally persist until the habitat dries up.	Endemic to Central Valley. Most populations occur in the Sacramento Valley. Also reported from the Sacramento River Delta to the east side of San Francisco Bay, and from scattered localities in the San Joaquin Valley from San Joaquin County to Merced County.	Likely to occur. Suitable habitat is present in the Permit Area. A total of 30 occurrences have been documented in the northeast and southeast portions of the study area; most records are from east of Travis Air Force Base, with a few located near Fremont.
<i>Syncaris pacifica</i> California freshwater shrimp	FE SE	In pool areas of low-elevation, low-gradient, permanent streams; among live tree roots of undercut banks, under overhanging woody debris or vegetation.	Endemic to Marin, Napa, and Sonoma Counties; extant populations in Lagunitas Creek in Marin County, Huichica Creek in Napa County, and Franz, East Austin, Sonoma, and Salmon Creeks in Sonoma County; tributary streams in the lower Russian River drainage, coastal streams flowing into the Pacific, streams draining into Tomales Bay, and those draining into Northern San Pablo Bay.	Likely to occur. Suitable habitat is present in the Permit Area; 20 occurrences have been documented in Napa and Sonoma Counties.
<i>Desmocerus californicus dimorphus</i> Valley elderberry longhorn beetle	FT	Hosted by elderberry shrubs (<i>Sambucus</i> spp.) in riparian forests and adjacent uplands that may also include cottonwoods (<i>Populus</i> spp.), willows (<i>Salix</i> spp.), ashes (<i>Fraxinus</i> spp.), oaks (<i>Quercus</i> spp.), and walnuts (<i>Juglans</i> spp.). Found in many different plant communities where elderberries grow but is most common in riparian woodlands and savannas, possibly because of the greater concentration of elderberries in these areas.	Throughout the Central Valley and foothills from the northern border of Shasta County to southern Kern County, and from the watershed of the Central Valley in the west to approximately 3,000 feet above sea level in the Sierra Nevada foothills.	Likely to occur. Suitable habitat is present in the Permit Area; 12 occurrences have been documented in Solano County.
<i>Elaphrus viridis</i> Delta green ground beetle	FT	Sparsely vegetated edges of vernal lakes and pools; occurs up to 250 feet from pools.	Restricted to Olcott Lake and other vernal pools at Jepson Prairie Preserve, Solano County.	Potential to occur. Suitable habitat is present in the Permit Area; 6 occurrences have been documented in the Dozier, Denverton, and Elmira Quadrangles on the northeastern portion of the study area, east of Travis Air Force Base.
<i>Euphydryas editha bayensis</i> Bay checkerspot butterfly	FT	Native grasslands on outcrops of serpentine soil; California plantain and owl's clover are host plants.	Vicinity of San Francisco Bay including San Francisco Peninsula in San Mateo County, and mountains near San Jose, Santa Clara County.	Likely to occur. Suitable habitat is present in the Permit Area; 13 occurrences have been documented from Santa Clara to Morgan Hill in Santa Clara County.
<i>Callophrys mossii bayensis</i> San Bruno elfin butterfly	FE	North-facing slopes and ridges facing Pacific Ocean from 600 to 1,100 feet elevation; rocky outcrops and cliffs in coastal shrub.	San Bruno Mountain, Montara Mountain, and northern end of Santa Cruz Mountains, San Mateo County; San Francisco Bay area, Contra Costa County, Marin County.	Potential to occur. Suitable habitat is present in the Permit Area; 6 occurrences have been documented along coastal ridges in San Mateo County.

Species Name	Listing Status ^a	Habitat/Life History	Distribution/Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
<i>Icaricia icarioides missionensis</i> Mission blue butterfly	FE	Hill and ridgetops, as well as slopes with south exposure with caterpillar food plants, <i>Lupinus</i> spp.	San Bruno Mountain, San Mateo County; Twin Peaks, San Francisco County; Fort Baker, Marin County.	Likely to occur. Suitable habitat is present in the Permit Area; 11 occurrences have been documented in the San Francisco South and Montara Mountain Quadrangles of San Francisco and San Mateo Counties.
<i>Apodemia mormo langei</i> Lange's metalmark butterfly	FE	Occurs in dense to moderately dense patches of food plant, wild buckwheat, in stabilized sand dunes.	Once found throughout the Antioch Dunes; range now reduced to less than 10 acres of Antioch Dunes in Contra Costa County.	Potential to occur. Suitable habitat is present in the Permit Area. Only 1 occurrence has been documented in the Antioch North Quadrangle in northeast Contra Costa County, near Antioch.
<i>Speyeria callippe callippe</i> Callippe silverspot butterfly	FE	Open hillsides where wild pansy (<i>Viola pendunculata</i>) grows; larvae feed on Johnny jump-up plants, whereas adults feed on native mints and nonnative thistles.	San Bruno Mountain, San Mateo County, and a single location in Alameda County; Contra Costa County.	Potential to occur. Suitable habitat is present in the Permit Area; 11 occurrences have been documented in the Cordelia, Benicia, Fairfield South, and San Francisco South Quadrangles in Solano and San Mateo Counties.
<i>Speyeria zerene behrensii</i> Behren's silverspot butterfly	FE	Habitats with larval food sources (blue violets) are required; coastal terrace prairie.	Pacific side of the Coast Ranges from Point Arena, Mendocino County, to Cape Mendocino, Humboldt County.	Unlikely to occur. Suitable coastal habitat is present in the Permit Area but the nearest known metapopulation occurs in Mendocino County, 13 miles outside of the study area.
<i>Speyeria zerene myrtleae</i> Myrtle's silverspot butterfly	FE	Inhabits coastal terrace prairie, coastal bluff scrub, and associated nonnative grassland habitats where the larval foodplant, typically <i>Viola adunca</i> , occurs; coastal dunes and bluffs.	Historically known from San Mateo County north to the mouth of the Russian River in Sonoma County. No butterflies have been observed recently at the known population sites near Pacifica and San Mateo in San Mateo County; Marin County and southwestern Sonoma County.	Potential to occur. Suitable habitat is present in the Permit Area; 14 occurrences have been documented in the Drakes Bay, Tomales, Valley Ford, Bodega Head, and Duncans Mills Quadrangles in Marin and Sonoma Counties.
<i>Bombus crotchii</i> Crotch bumble bee	SCE	Found in open grassland and scrub habitats. Requires nectar and pollen sources, as well as access to underground nesting/overwintering sites (e.g., abandoned rodent burrows) or soft, disturbed soil under vegetative debris.	Known range is nearly the entire State of California, from the Pacific coast east to the Sierra Nevada and into extreme western Nevada.	Likely to occur. Suitable habitat is present in the Permit Area. Most records are from south and east of the Bay Area. There are 11 occurrences documented in the Permit Area.
<i>Bombus occidentalis</i> Western bumble bee	SCE	Found in open grassland and meadows. Requires nectar and pollen sources, as well as access to underground nesting/overwintering sites (e.g., abandoned rodent burrows) or soft, disturbed soil under vegetative debris.	In California, this species is considered to be limited to high-elevation sites in northern and coastal areas.	Likely to occur. Suitable habitat is present in the Permit Area where there are 91 occurrences recorded.
Fish				
<i>Oncorhynchus kisutch</i> Coho salmon – Central California Coast ESU	FT SE	Occurs in coastal streams with water temperatures less than 59°F. Need cool, clear water with instream cover. Spawn in tributaries to large rivers or streams directly connected to the ocean (Moyle 2002). Spawning primarily occurs from November to January but can extend into March under drought conditions (Shapovalov and Taft 1954).	The Central California Coast ESU of coho salmon extends from Punta Gorda south to Soquel Creek in Santa Cruz County, California (National Marine Fisheries Service 2010).	Potential to occur. Suitable habitat is present in the Permit Area; 16 occurrences have been documented in western Marin County.
<i>Hypomesus transpacificus</i> Delta smelt	FT	Occurs in tidal marshes connected to floodplains of wetlands and upland areas. Low salinity water near 68°F, highly turbid, oxygen saturated, with a low ratio of contaminants.	Occurs in San Francisco Estuary and the Sacramento/San Joaquin River Delta, Contra Costa, Sacramento, Solano, and Yolo Counties. Range is San Pablo Bay upstream to Verona on the Sacramento River and to Mossdale on the San Joaquin River.	Potential to occur. Suitable habitat is present in the Permit Area; 13 occurrences have been documented in the study area along the San Francisco Bay.
<i>Thaleichthys pacificus</i> Eulachon (smelt)	FT	Occurs in ocean waters except during spawning runs. During spawning they are often found in lower reaches of snowmelt-fed rivers with temperatures of 39–50°F.	Range is from northern California to southwest Alaska and into the southeast Bering Sea. Inland most originate in the Columbia River Basin but has also been identified in the Sacramento River, Russian River, Humboldt Bay, and Klamath River in California.	Potential to occur. Suitable habitat is present in the Permit Area; however, only 1 occurrence has been documented in the San Quentin Quadrangle in the northwestern portion of the San Francisco Bay.
<i>Lavinia symmetricus parvipinnis</i> Gualala roach	SSC	Understanding of habitat requirements is lacking but it is assumed they are similar to those of Navarro roach.	Confined to the Gualala watershed and its tributaries.	Potential to occur. Species range borders the northwestern portion of the Permit Area; 4 occurrences have been documented in western Sonoma County.
<i>Mylopharodon conocephalus</i> Hardhead	SSC	Sacramento, San Joaquin, and Russian Rivers and tributaries (Moyle 2002).	Typically occurs in undisturbed, low- to mid-elevation streams and main stem Sacramento River and tributaries.	Potential to occur. Suitable habitat is present in the Permit Area; 2 occurrences have been documented in the Jimtown and San Francisco South Quadrangles of San Francisco County.

Species Name	Listing Status ^a	Habitat/Life History	Distribution/Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
<i>Spirinchus thaleichthys</i> Longfin smelt	FC ST	Occurs in nearshore waters to estuaries and lower portions of freshwater streams; requires water temperatures lower than 63–73°F (Moyle 2002).	Occurs in San Francisco Estuary and the Sacramento/San Joaquin River Delta, Humboldt Bay, and the estuaries of the Eel River and Klamath River offshore.	Potential to occur. Suitable habitat is present in the Permit Area; 23 occurrences have been documented throughout the San Francisco Bay.
<i>Lavinia symmetricus navarroensis</i> Navarro roach	SSC	Prefers pool habitats, with low water velocity, where it tends to be found throughout the water column (Moyle et al. 2015).	Confined to the Navarro River and its tributaries in California.	Potential to occur. Species range extends into the northern portion of the Permit Area; 2 occurrences have been documented in the Healdsburg and Mark West Springs Quadrangles of Sonoma County.
<i>Hysterocarpus traski pomom</i> Russian River tule perch	SSC	Requires clear, flowing water and abundant cover, such as beds of aquatic macrophytes, submerged tree branches, overhanging plants, and large boulders (Moyle et al. 2015).	Confined to the Russian River and its tributaries in Sonoma and Mendocino Counties in California.	Potential to occur. Suitable habitat is present in the Permit Area; 4 occurrences have been documented in the Jimtown, Healdsburg, and Guerneville Quadrangles of Sonoma County.
<i>Archoplites interruptus</i> Sacramento perch	SSC	Adapted for life in sloughs, slow moving rivers, and large lakes, including floodplain lakes, of the Central Valley (Crain and Moyle 2011).	Sacramento perch have been widely introduced outside their native range, mainly to alkaline waters where other game fishes generally do not survive. Within the study area, known to occur in Abbott's Lagoon, Lagoon Valley Reservoir, and Jewel Lake (Moyle et al. 2015).	Potential to occur. Suitable habitat is present in the Permit Area; 3 occurrences have been documented in Contra Costa County.
<i>Pogonichthys macrolepidotus</i> Sacramento splittail	SSC	Backwater habitat that is shallow, low velocity, suitable temperature, and which has food availability.	Endemic to California's Central Valley; largely confined to the Delta, Suisun Bay, Suisun Marsh, Napa River, Petaluma River, and other parts of the San Francisco Estuary, while spawning on upstream floodplains and channel edges (Moyle et al. 2004).	Potential to occur. Suitable habitat is present in the Permit Area; 12 occurrences have been documented in the study area along the northern portion of the San Francisco Bay.
<i>Oncorhynchus mykiss irideus</i> Steelhead, Central California Coast DPS	FT	Occurs in streams and rivers that are well-oxygenated and that provide cool, riverine habitat with water temperatures of 46–64°F (Moyle 2002). Habitat types are riffles, runs, and pools.	Riverine and stream habitat from just north of Ukiah in Mendocino County to just south of Aptos Creek in Santa Cruz County.	Potential to occur. Suitable habitat is present in the Permit Area; 28 occurrences have been documented in Napa, Sonoma, and Marin Counties.
<i>Oncorhynchus mykiss irideus</i> Steelhead, Central Valley DPS	FT	Occurs in streams and rivers that are well-oxygenated, and that provide cool, riverine habitat with water temperatures of 46–64°F (Moyle 2002). Habitat types are riffles, runs, and pools.	Riverine and stream habitat within the Sacramento-San Joaquin River drainages.	Potential to occur. Suitable habitat is present in the Permit Area; 3 occurrences have been documented in the northeast portion of Contra Costa County.
<i>Oncorhynchus mykiss irideus</i> Steelhead, South-Central California Coast DPS	FT	Occurs in streams and rivers that are well-oxygenated, and that provide cool, riverine habitat with water temperatures of 46–64°F (Moyle 2002). Habitat types are riffles, runs, and pools.	Riverine and stream habitat from just north of the Pajaro River in Santa Cruz County to just south of Arroyo Grande Creek in San Luis Obispo County.	Potential to occur. Suitable habitat is present in the Permit Area; 3 occurrences have been documented south and west of Gilroy, in Santa Clara County.
<i>Oncorhynchus tshawytscha</i> Chinook salmon, winter-run and spring-run of Sacramento River	FT ST	Occurs in cold streams and rivers that are clear and well-oxygenated. Optimum temperature for embryo survival is about 41–55°F (Moyle et al. 2008). Spawning occurs in streams and rivers with cobble and large gravel.	Sacramento River, tributary streams, and the Sacramento Delta.	Potential to occur. Suitable habitat is present in the Permit Area, through which the species is known to pass between the Sacramento River and the Pacific Ocean.
<i>Eucyclogobius newberryi</i> Tidewater goby	FE SSC	Generally found in benthic, brackish water in the lower stream reaches with fairly still water and low salinity (less than 12 parts per thousand). Prefers sandy substrate for breeding and areas with sparse vegetation.	Endemic to California, found primarily in waters of coastal lagoons, estuaries, and marshes. Found throughout its historic range (Smith River in Del Norte County to Agua Hedionda Lagoon in San Diego County), but resides at few locations. Absent from areas with steep coastlines and where streams do not form lagoons or estuaries.	Potential to occur. Suitable habitat is present in the Permit Area; 7 occurrences have been documented along the West Coast and 1 in the San Francisco Bay near the Oakland West Quadrangle.
<i>Lavinia symmetricus</i> Tomales roach	SSC	Primarily occurs in highly altered habitats that include warm, aggraded reaches with little riparian vegetation (e.g., Walker Creek).	Restricted to the western Marin County drainages of Lagunitas Creek and Walker Creek.	Potential to occur. Suitable habitat is present in the Permit Area; 4 occurrences have been documented in Marin County.

Species Name	Listing Status ^a	Habitat/Life History	Distribution/Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
Amphibians				
<i>Ambystoma californiense</i> California tiger salamander, Central California DPS	FT ST	Restricted to grasslands and low foothill regions that provide breeding habitat, including temporary ponds or pools, slower portions of streams, and some permanent waters. Unlikely to use permanent waters unless fish predators are absent. Requires dry-season refugia such as ground squirrel burrows within 1 mile of breeding sites.	Endemic to areas below 1,400 feet in the San Joaquin and Sacramento River valleys and bordering foothills. Also found in coastal valleys of central California. In the Central Valley, range extends from southern Sacramento County south to Tulare County.	Likely to occur. Suitable habitat is present in the Permit Area; 500 occurrences have been documented in Solano, Alameda, Contra Costa, and Santa Clara Counties.
<i>Ambystoma californiense</i> California tiger salamander, Sonoma County DPS	FE ST	Restricted to grasslands and low foothill regions that provide breeding habitat, including temporary ponds or pools, slower portions of streams, and some permanent waters. Unlikely to use permanent waters unless fish predators are absent. Requires dry-season refugia such as ground squirrel burrows within 1 mile of breeding sites.	Santa Rosa Plain in Sonoma County, California.	Likely to occur. Suitable habitat is present in the Permit Area; 79 occurrences have been documented in Sonoma County.
<i>Dicamptodon ensatus</i> California giant salamander	SSC	Coastal oak woodlands and coniferous forests. Adults are terrestrial but breed during the fall and spring in streams.	Outer Coast Ranges from near the southern border of Mendocino County south through Marin County, and the inner Coast Ranges in Napa, Sonoma, Lake, and Solano Counties. South of San Francisco Bay, occurs in the Santa Cruz Mountains in San Mateo, Santa Clara, and Santa Cruz Counties.	Likely to occur. Suitable habitat is present in the Permit Area; 113 occurrences have been documented in Marin, Sonoma, Napa, and San Mateo Counties.
<i>Aneides niger</i> Santa Cruz black salamander	SSC	Dry forests in the fog belt of the outer Coast Range. Found in or adjacent to streams in shallow water or leaf litter.	Woodlands in the Santa Cruz Mountains in western Santa Clara, northern Santa Cruz, and southernmost San Mateo Counties.	Potential to occur. Suitable habitat is present in the Permit Area; 38 occurrences have been documented in San Mateo and Santa Clara Counties.
<i>Taricha rivularis</i> Red-bellied newt	SSC	Primarily occurs in redwood forests along the coast, although the species also occurs in Douglas fir, tan oak, and madrone forests. Aquatic breeding habitat consists of moderate to fast-flowing mountain streams with rocky bottoms.	Coastal northern California in Sonoma, Lake, Mendocino, and southern Humboldt Counties, at elevations of 500–1,500 feet. One isolated population is known from the Stevens Creek watershed in Santa Clara County.	Likely to occur. Suitable habitat is present in the Permit Area; 59 occurrences have been documented in Sonoma and Santa Clara Counties.
<i>Spea hammondi</i> Western spadefoot	SSC	Shallow streams with riffles and seasonal wetlands, such as vernal pools in annual grasslands and oak woodlands, also temporary rain pools.	Sierra Nevada foothills, Central Valley, Coast Ranges, coastal counties in southern California; west of Sierran-desert range axis.	Potential to occur. Suitable habitat is present in the Permit Area; 4 occurrences have been documented in eastern Alameda County.
<i>Rana draytonii</i> California red-legged frog	FT SSC	Permanent and semi-permanent aquatic habitats, such as slow-moving streams or creeks and cold-water ponds, with emergent and submergent vegetation (shrubby riparian). May estivate in rodent burrows or dry mud cracks during dry periods.	Found along the coast and coastal mountain ranges of California from Mendocino County to San Diego County and in the Sierra Nevada from Tehama County to Fresno County; elevation near sea level to about 4,900 feet.	Likely to occur. Suitable habitat is present in the Permit Area; 871 occurrences have been documented throughout all counties of the study area.
<i>Rana boylei</i> Foothill yellow-legged frog	SC	Creeks or rivers in woodland, forest, mixed chaparral, and wet meadow habitats with rock and gravel substrate and low overhanging vegetation along the edge. Usually found near riffles with rocks and sunny banks nearby.	Occurs in the Klamath, Cascade, North Coast, South Coast, Transverse, and Sierra Nevada Ranges up to approximately 6,000 feet.	Likely to occur. Suitable habitat is present in the Permit Area; 138 occurrences have been documented throughout Alameda, Contra Costa, Marin, Napa, Santa Clara, San Mateo, Solano, and Sonoma Counties.
Reptiles				
<i>Actinemys marmorata</i> Western pond turtle	SSC	Occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with some watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests. Overwintering habitat consists of mud bottoms in ponds or a variety of upland areas in riparian or coniferous forest habitats.	Occurs from the Oregon border of Del Norte and Siskiyou Counties south along the coast to San Francisco Bay, inland through the Sacramento Valley, and on the western slope of Sierra Nevada. Southwestern population occurs along the central coast of California east to the Sierra Nevada and along the southern California coast inland to the Mojave and Sonora Deserts; range overlaps with that of the northwestern pond turtle throughout the Delta and in the Central Valley; elevation of about sea level to 6,700 feet.	Likely to occur. Suitable habitat is present in the Permit Area; 327 occurrences have been documented throughout all counties of the study area.
<i>Chelonia mydas</i> Green sea turtle	FT	Tropical and subtropical waters along continental coasts and islands between 30° North and 30° South; typically, in open ocean convergence zones, nest on beaches, feed in coastal benthic zones.	Baja California to southern Alaska, but most commonly from San Diego south.	Absent. No suitable habitat present in the Permit Area.

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<i>Dermochelys coriacea</i> Leatherback sea turtle	FE	Adults are pelagic and migratory. Females nest on beaches in tropical latitudes. Known foraging habitat includes oceanic and nearshore waters in temperate and boreal latitudes.	Pacific Ocean from Alaska to Chile. The coast of California, Oregon, and Washington.	Absent. No suitable habitat is present in the Permit Area.
<i>Phrynosoma blainvillii</i> Coast horned lizard	SSC	Requires sandy or loose soil and abundant ant colonies for foraging; habitat ranges from exposed gravelly-sandy substrate in riparian woodlands to dry uniform chamise chaparral to annual grassland or saltbrush.	Although the current range is more fragmented, historically was found along the Pacific Coast from the Baja California border west of the deserts and the Sierra Nevada, north to the Bay Area, and inland as far north as Shasta Reservoir, and south into Baja California. Ranges up onto the Kern Plateau east of the crest of the Sierra Nevada. Occurs from sea level to 8,000 feet in elevation.	Potential to occur. Suitable habitat is present in the Permit Area; 16 occurrences have been documented in Alameda and Contra Costa Counties.
<i>Gambelia sila</i> Blunt-nosed leopard lizard	FE SE FP	Open habitats with scattered low bushes on alkali flats, and low foothills, canyon floors, plains, washes, and arroyos; substrates may range from sandy or gravelly soils to hardpan.	San Joaquin Valley from Stanislaus County through Kern County and along the eastern edges of San Luis Obispo, San Benito, Monterey, Santa Barbara, and Ventura Counties.	Unlikely to occur. Species range is primarily outside of the Permit Area; no CNDDDB occurrences have been documented within the study area.
<i>Anniella pulchra</i> Northern California legless lizard	SSC	Occurs in moist warm loose soil with plant cover. Moisture is essential. Habitat consist of sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, or oaks. Leaf litter under trees and bushes in sunny areas, and dunes stabilized with bush lupine and mock heather often indicate suitable habitat. Uses surface objects such as rocks, boards, driftwood, and logs for cover.	Along the Coast, Transverse, and Peninsular Ranges from Contra Costa County to San Diego County with spotty occurrences in the San Joaquin Valley; elevation range extends from sea level to about 5,100 feet.	Potential to occur. Suitable habitat is present in the Permit Area; 6 occurrences have been documented in Alameda and Contra Costa Counties.
<i>Thamnophis gigas</i> Giant garter snake	FT ST	Sloughs, canals, low-gradient streams and freshwater marsh habitats where there is a prey base of small fish and amphibians; also found in irrigation ditches and rice fields; requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter.	Central Valley from the vicinity of Burrel in Fresno County north to Chico in Butte County; has been extirpated from areas south of Fresno; found at elevations from near sea level to 400 feet.	Potential to occur. Suitable habitat is present in the Permit Area; 10 occurrences have been documented in east Solano County.
<i>Arizona elegans occidentalis</i> California glossy snake	SSC	Occurs in arid scrub, grassland, and chaparral habitats, and rocky washes.	Occurs from the eastern part of the Bay Area south to northwestern Baja California; absent along the central coast. There are also old reports of this snake from the Santa Monica Mountains.	Potential to occur. Suitable habitat is present in the Permit Area; 5 occurrences have been documented in Alameda and Contra Costa Counties.
<i>Masticophis lateralis euryxanthus</i> Alameda whipsnake	FT ST	Valleys, foothills, and low mountains associated with northern coastal scrub or chaparral habitat; requires rock outcrops for cover and foraging. Also occurs in grassland areas near scrub and chaparral.	Restricted to Alameda, Contra Costa, San Joaquin, and Santa Clara Counties; fragmented into 5 disjunct populations throughout its range.	Likely to occur. Suitable habitat is present in the Permit Area; 138 occurrences have been documented. The occurrences are primarily in Contra Costa and Alameda Counties; 3 records are from Santa Clara County.
<i>Thamnophis sirtalis tetrataenia</i> San Francisco garter snake	FE SE FP	Favors densely vegetated ponds near open hillsides, lakes, slow-moving streams and marshy areas containing abundant vegetation, which it uses for cover; nearby upland habitat is important during fall and winter; requires upland habitat (south- or west-facing slopes) with suitable sites for basking.	Northern San Mateo County southward along the coast and the eastern slope of the Santa Cruz Mountains to the Santa Clara County line; near San Francisco Peninsula.	Likely to occur. Suitable habitat is present in the Permit Area; 36 occurrences have been documented in San Mateo County.
Birds				
<i>Pelecanus occidentalis californicus</i> California brown pelican	FP	Typically found in littoral ocean zones, just outside the surf line; nests on offshore islands.	Present along the entire coastline but does not breed north of Monterey County; extremely rare inland; regular breeders on Santa Barbara Island but range extends from Channel Islands National Park to Islas Los Coronados.	Unlikely to occur. Rarely nests inland; 1 occurrence of an offshore, communal roost has been documented in the Valley Ford Quadrangle outside of the study area.
<i>Gymnogyps californianus</i> California condor	FE SE FP	Requires large blocks of open savanna, grasslands, and foothill chaparral with large trees, cliffs, and snags for roosting and nesting; prefer remote hilly/mountainous regions with cliff sites and forest habitats.	Historically, coastal and rugged mountain ranges surrounding the southern San Joaquin Valley ranging from northern Los Angeles County to San Luis Obispo County in the western Sierra Nevada; currently, most individuals are in captive populations, but a few birds were recently released in the rugged portions of the Los Padres National Forest.	Unlikely to occur. Suitable habitat is present in the Permit Area; however, the study area is currently outside of the known range of the species.

Species Name	Listing Status ^a	Habitat/Life History	Distribution/Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
<i>Circus cyaneus</i> Northern harrier	SSC	Grasslands, meadows, marshes, and seasonal and agricultural wetlands and fields; prefers open habitats with adequate vegetative cover.	Occurs throughout lowland California. Has been recorded in fall at high elevations ranging from near sea level to at least 9,000 feet in Mono County; largely within coastal lowlands from Lake Earl in Del Norte County to Bodega Head in Sonoma County, but also inland at Lake Berryessa in Napa County.	Likely to occur. Suitable habitat is present in the Permit Area; 13 occurrences have been documented in Alameda, Contra Costa, Marin, Napa, and Solano Counties.
<i>Aquila chrysaetos</i> Golden eagle	FP BGEPA	Rolling foothills, mountain ranges, sage-juniper flats, and desert. Nests on cliffs and escarpments or in tall trees overlooking open country. Forages in annual grassland, chaparral, and oak woodland with plentiful medium and large-sized mammals.	Foothills and mountains throughout California; uncommon nonbreeding visitor to lowlands such as the Central Valley; ranges from sea level to around 11,500 feet.	Likely to occur. Suitable habitat is present in the Permit Area; 34 occurrences have been documented in Alameda, Contra Costa, Napa, Santa Clara, Solano, and Sonoma Counties,
<i>Haliaeetus leucocephalus</i> Bald eagle	SE FP BGEPA	In western North America, nests and roosts in coniferous forests, woodlands, grasslands, and wetland habitats within 1 mile of a lake, reservoir, stream, or the ocean; nests are normally built in upper canopy of large trees, such as conifers.	Nests in Siskiyou, Modoc, Trinity, Shasta, Lassen, Plumas, Butte, Tehama, Lake, and Mendocino Counties and in the Lake Tahoe Basin. Reintroduced into central coast. Winter range includes the rest of California, except the southeastern deserts, very high altitudes in the Sierra Nevada, east of the Sierra Nevada south of Mono County, and some rangelands and coastal wetlands.	Likely to occur. Suitable habitat is present in the Permit Area; 7 occurrences have been documented in Alameda, Contra Costa, Napa, and Santa Clara Counties.
<i>Buteo swainsoni</i> Swainson's hawk	ST	Nests in oaks or cottonwoods in or near riparian habitats; forages in grasslands, lightly grazed pastures and crops, irrigated pastures, and grain fields.	Lower Sacramento and San Joaquin Valleys, the Klamath Basin, and Butte Valley. Highest nesting densities occur near Davis and Woodland, Yolo County.	Likely to occur. Suitable habitat is present in the Permit Area; 308 occurrences have been documented throughout Alameda, Contra Costa, Napa, Santa Clara, Solano, and Sonoma Counties.
<i>Elanus leucurus</i> White-tailed kite	FP	Low foothills or valley areas with valley or live oaks, riparian areas, and marshes near open grasslands or cropland for foraging.	Lowland areas west of Sierra Nevada from the head of the Sacramento Valley south, including coastal valleys and foothills to western San Diego County at the Mexico border.	Likely to occur. Suitable habitat is present in the Permit Area; 30 occurrences have been documented in Alameda, Contra Costa, Marin, Napa, Santa Clara, San Mateo, Solano, and Sonoma Counties.
<i>Falco peregrinus anatum</i> American peregrine falcon	FP	Nests and roosts on protected ledges of high cliffs, usually adjacent to lakes, rivers, or marshes that support large prey populations; habitats vary from wetlands, woodlands, other forested habitats, and coastal habitats.	Permanent resident along the north and south Coast Ranges. May reside in the Cascade and Klamath Ranges and through the Sierra Nevada to Madera County during the summer. During winter, resides in the Central Valley south through the Transverse and Peninsular Ranges and the plains east of the Cascade Range.	Likely to occur. Suitable habitat is present in the Permit Area; 21 occurrences have been documented in Alameda, Contra Costa, Marin, Napa, San Mateo, Santa Clara, and Solano Counties.
<i>Rallus obsoletus obsoletus</i> California Ridgway's rail	FE SE FP	Marshes around the San Francisco Bay and east through the Delta to Suisun Marsh.	Restricted to salt marshes and tidal sloughs; usually associated with heavy growth of pickle-weed; feeds on mollusks removed from the mud in sloughs.	Likely to occur. Suitable habitat is present in the Permit Area; 72 occurrences have been documented in Alameda, Contra Costa, Marin, Napa, San Mateo, Santa Clara, Solano, and Sonoma Counties around the perimeter of San Francisco, San Pablo and Suisun Bays.
<i>Coturnicops noveboracensis</i> Yellow rail	SSC	Freshwater marshes, brackish marshes, coastal salt marshes with moist soil or low standing water, and grassy meadows; prefers densely vegetated marshes.	Historical records of nests in Mono County east of the Sierra Nevada and formerly Marin County on the coast; also records from winter, on the coast from Humboldt County to Orange County, where the Central Valley merges with the San Francisco Bay estuary.	Likely to occur. Suitable habitat is present in the Permit Area; 7 occurrences have been documented in Alameda, Contra Costa, Marin, Santa Clara, San Mateo, Solano, and Sonoma Counties.
<i>Laterallus jamaicensis coturniculus</i> California black rail	ST FP	Tidal salt marshes associated with heavy growth of pickleweed; also occurs in brackish marshes or freshwater marshes at low elevations.	Permanent resident in the San Francisco Bay and eastward through the Delta into Sacramento and San Joaquin Counties; small populations in Marin, Santa Cruz, San Luis Obispo, Orange, Riverside, and Imperial Counties.	Likely to occur. Suitable habitat is present in the Permit Area; 98 occurrences have been documented in all counties of the study Area.

Species Name	Listing Status ^a	Habitat/Life History	Distribution/Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
<i>Grus canadensis canadensis</i> Lesser sandhill crane	SSC	Forages primarily in croplands with waste grain; also frequents grasslands and emergent wetlands.	Does not breed in California; Winter range is concentrated in Merced County and the Sacramento-San Joaquin Delta. During winter, cranes also found regularly in Sacramento Valley, San Joaquin River National Wildlife Refuge, Tulare Basin, Carrizo Plain, and in smaller numbers in southern California south of the Salton Sea.	Potential to occur. Suitable foraging habitat and known winter roost sites present in the eastern portion of the study area.
<i>Grus canadensis tabida</i> Greater sandhill crane	ST FP	Prefers wet meadows, marshes, shallow ponds, hayfields, and grain fields for nesting, feeding, and roosting; during summer, is typically found in open terrain near shallow lakes or freshwater marshes; in winter, typically found in agricultural fields near bodies of fresh water.	Breeds in Siskiyou, Modoc, Lassen, Plumas, and Sierra Counties. Winter resident of the Central Valley, southern Imperial County, Lake Havasu National Wildlife Refuge, and the Colorado River Indian Reserve.	Potential to occur. Suitable foraging habitat in the Permit Area and known winter roost sites present in the eastern portion of the study area.
<i>Charadrius alexandrinus nivosus</i> Western snowy plover	FT SSC	Coastal beaches above the normal high tide limit in flat, open areas with sandy or saline substrates; vegetation and driftwood are usually sparse or absent. Inland, they require barren to sparsely vegetated ground at alkaline or saline lakes, reservoirs, ponds and riverine sand bars; also, along sewage, salt- evaporation, and agricultural wastewater ponds.	Nests along the entire coast of California from Del Norte to San Diego County adjacent to or near tidal waters, including along the mainland coast, peninsulas, offshore islands, and adjacent bays and estuaries. Nests at inland lakes throughout northeastern, central, and southern California, including Mono Lake and Salton Sea.	Potential to occur. Suitable habitat is present in the Permit Area; 11 occurrences have been documented at the margins of the San Francisco Bay, in Alameda, Marin, Napa, Santa Clara, San Mateo, and Sonoma Counties.
<i>Charadrius montanus</i> Mountain plover	SSC	Occupies open plains or rolling hills with short grasses or very sparse vegetation; nearby bodies of water are not needed; may use newly plowed or sprouting grain fields.	Does not breed in California; in winter, found in the Central Valley south of Yuba County, along the coast in parts of San Luis Obispo, Santa Barbara, Ventura, and San Diego Counties; parts of Imperial, Riverside, Kern, and Los Angeles Counties.	Potential to occur. Suitable habitat is present in the Permit Area; 4 occurrences have been documented in the Birds Landing Quadrangle of Solano County, in the northeastern portion the study area.
<i>Rynchops niger</i> Black skimmer	SSC	Nests on gravel bars and sandy beaches; forages in shallow, calm waters or on mud flats in estuaries; requires large areas of bare beach sufficiently isolated from terrestrial predators and other disturbances.	Common summer resident at the Salton Sea and coastal southern California; largest breeding population at Salton Sea, coastal Orange County, and south San Diego Bay.	Unlikely to occur. Suitable habitat is present in the Permit Area; however, only 2 occurrences have been documented in the study area, 1 each in Alameda and Santa Clara Counties.
<i>Sternula antillarum browni</i> California least tern	FE SE FP	Nests on sandy, upper ocean beaches, and occasionally uses sparsely vegetated mudflats; forages on adjacent surf line, estuaries, or the open ocean.	Nests on beaches along the San Francisco Bay and along the southern California coast from southern San Luis Obispo County south to San Diego County.	Likely to occur. Suitable habitat is present in the Permit Area; 10 occurrences have been documented near the San Francisco Bay in Alameda, Contra Costa, San Mateo, and Santa Clara Counties.
<i>Brachyramphus marmoratus</i> Marbled murrelet	FT SE	Occupies nearshore areas, estuaries, and sounds; uses mature, coastal coniferous forests for nesting; nearby coastal water for foraging; nests in conifer stands greater than 150 years old and may be found up to 35 miles inland; during winter, is found on subtidal and pelagic waters often well offshore.	Nesting sites from the Oregon border to Eureka and between Santa Cruz and Half Moon Bay; winter resident of nearshore and offshore waters along the entire California coastline.	Likely to occur. Suitable habitat is present in the Permit Area; 30 occurrences have been documented in San Mateo County.
<i>Coccyzus americanus</i> Western yellow-billed cuckoo	FT SE	Requires wide, dense riparian forests/woodlands with a thick understory of willows for nesting; sites with a dominant cottonwood overstory are preferred for foraging; may avoid valley-oak riparian habitats where scrub jays are abundant; utilizes orchards adjacent to streams.	Nests along the upper Sacramento, lower Feather, south fork of the Kern, Amargosa, Santa Ana, and Colorado Rivers.	Unlikely to occur. Suitable habitat is present in the Permit Area; 2 occurrences have been documented in Sonoma and Solano Counties.
<i>Athene cunicularia</i> Western burrowing owl	SSC	Level, open, dry, heavily grazed or low stature grassland or desert vegetation with available burrows; also found in coastal terrace prairies and sagebrush habitats.	Lowlands throughout south, central, and east California, including the Central Valley, northeastern plateau, southeastern deserts, and some coastal areas. Rare along the south coast.	Likely to occur. Suitable habitat is present in the Permit Area; 333 occurrences have been documented throughout the study area in Alameda, Contra Costa, Marin, Napa, Santa Clara, San Mateo, Solano, and Sonoma Counties.
<i>Strix occidentalis caurina</i> Northern spotted owl	FT ST	Dense old-growth or mature forests dominated by conifers with topped trees or oaks available for nesting crevices.	A permanent resident throughout its range; found in the North Coast, Klamath, and western Cascade Range from Del Norte County to Marin County.	Potential to occur. Suitable habitat in the Permit Area with a small population in Marin County.

Species Name	Listing Status ^a	Habitat/Life History	Distribution/Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
<i>Asio otus</i> Long-eared owl	SSC	Nests in abandoned crow, hawk, or magpie nests, usually in dense riparian stands of willows, cottonwoods, live oaks, or conifers usually open or adjacent to grasslands, meadows, or shrublands; key habitat components are dense cover, suitable nest platforms, and open foraging areas.	Permanent resident east of the Cascade Range from Placer County north to the Oregon border, east of the Sierra Nevada from Alpine County to Inyo County. Scattered breeding populations along the coast and in southeastern California. During winter, may be found throughout the Central Valley and southeastern California.	Unlikely to occur. Suitable habitat is present in the Permit Area; 1 occurrence has been documented in the Mindego Hill Quadrangle in Santa Clara County.
<i>Asio flammeus</i> Short-eared owl	SSC	Freshwater and salt marshes, lowland meadows, ungrazed grasslands and old pastures, and irrigated alfalfa or grain fields; needs dense tules or tall grass for nesting and daytime roosts.	Permanent resident along the Sierra Nevada north of Nevada County, in the plains east of the Cascades, and in Modoc and Mono County; small, isolated populations; occur in Great Basin region and locally in the Sacramento-San Joaquin River Delta, breeding in mainland southern California. Resident population in Suisun Marsh.	Potential to occur. Suitable habitat is present in the Permit Area; 4 occurrences have been documented in Alameda, Contra Costa, San Mateo, and Solano Counties.
<i>Progne subis</i> Purple martin	SSC	Nests in abandoned woodpecker holes in oaks, cottonwoods, and other deciduous trees in a variety of wooded and riparian habitats. Also nests in vertical drainage holes under elevated freeways and highway bridges or lapsed lava tubes; distributed in (redwood) forest and woodland areas at low to intermediate elevations.	Coastal mountains of Humboldt County south to San Luis Obispo County, west slope of the Sierra Nevada, and northern Sierra and Cascade ranges. Absent from the Central Valley except in Sacramento. Isolated, local populations in southern California.	Likely to occur. Suitable habitat is present in the Permit Area; 6 occurrences have been documented in Napa, Santa Clara, and Sonoma Counties.
<i>Riparia riparia</i> Bank swallow	ST	Nests in bluffs or banks, usually adjacent to water, where the soil consists of sand or sandy loam, along streams, coastal bluffs, and sand/gravel pits.	Occurs along the Sacramento River from Tehama County to Sacramento County, along the Feather and lower American Rivers, in the Owens Valley; and in the plains east of the Cascade Range in Modoc, Lassen, and northern Siskiyou Counties. Small populations near the coast from San Francisco County to Monterey County.	Potential to occur. Suitable habitat is present in the Permit Area; 2 occurrences have been documented in the southern coastal area of the study area, in San Francisco and San Mateo Counties.
<i>Lanius ludovicianus</i> Loggerhead shrike	SSC	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches; also requires impaling sites for prey manipulation, which makes the eastern side of the Cascades and Sierra Nevada ideal.	Most abundant in portions of the Central Valley, Coast Ranges, and southeastern deserts; also found in the San Joaquin Valley, south-central and south coasts, and the southeastern deserts; resident and winter visitor in lowlands and foothills throughout California. Rare on coastal slope north of Mendocino County, occurring only in winter.	Potential to occur. Suitable habitat is present in the Permit Area; 6 occurrences have been documented in Alameda and Contra Costa Counties.
<i>Vireo bellii pusillus</i> Least Bell's vireo	FE SE	Riparian thickets/dense willows with a well-developed understory either near water or in dry portions of river bottoms; nests along margins of bushes and forages low to the ground; may also be found using mesquite and arrow weed in desert canyons.	Small populations remain in southern Inyo, southern San Bernardino, Riverside, San Diego, Orange, Los Angeles, Ventura, and Santa Barbara Counties. Found at the San Joaquin River National Wildlife Refuge (San Joaquin and Stanislaus Counties) in 2005.	Unlikely to occur. Suitable habitat is present in the Permit Area; 1 occurrence has been documented in the Chittenden Quadrangle, in Santa Clara County.
<i>Melospiza melodia maxillaris</i> Suisun song sparrow	SSC	Brackish and tidal marshes and channels supporting cattails, tules, various sedges, and pickleweed.	Restricted to the extreme western edge of the Delta, between the cities of Vallejo and Pittsburg near Suisun Bay.	Potential to occur. Suitable habitat is present in the Permit Area; 15 occurrences have been documented in Contra Costa and Solano Counties.
<i>Geothlypis trichas sinuosa</i> Saltmarsh common yellowthroat	SSC	Freshwater marshes in summer and salt or brackish marshes in fall and winter; requires tall grasses, tules, and willow thickets for nesting and cover.	Found only in the Bay Area in Marin, Napa, Sonoma, Solano, San Francisco, San Mateo, Santa Clara, and Alameda Counties; range includes coastal riparian and wetland areas of western Marin County, the tidal marsh system of San Pablo Bay, the tidal marsh system of southern San Francisco Bay, and coastal riparian and wetland areas in San Mateo County.	Likely to occur. Suitable habitat is present in the Permit Area; 51 occurrences have been documented throughout Alameda, Contra Costa, Marin, Napa, Santa Clara, San Mateo, Solano, and Sonoma Counties.

Species Name	Listing Status ^a	Habitat/Life History	Distribution/Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
<i>Icteria virens</i> Yellow-breasted chat	SSC	Nests in dense riparian habitats with a well-developed shrub layer and an open canopy, dominated by willows, alders, Oregon ash, tall weeds, blackberry vines, and grapevines.	Summer resident and migrant in coastal California and Sierra Nevada foothills, east of the Cascades in northern California, along the Colorado River, and very locally inland in southern California; numerous in northwestern region of the state.	Potential to occur. Suitable habitat is present in the Permit Area; 2 occurrences have been documented, 1 each in Santa Clara and Solano Counties.
<i>Ammodramus savannarum</i> Grasshopper sparrow	SSC	Occurs in short to medium height dry grasslands with scattered shrubs in the Central Valley and foothills and south coast; found in prairies and pastures scattered in largely forested areas along North Coast.	Central Valley and foothills, west slope of Sierra Nevada, Coast Ranges, and coastal areas from Del Norte County south to San Diego County; rare breeder in the Shasta Valley area of Siskiyou County.	Potential to occur. Suitable habitat is present in the Permit Area; 6 occurrences have been documented in Alameda, Santa Clara, Solano, and Sonoma Counties.
<i>Agelaius tricolor</i> Tricolored blackbird	SC	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grain fields; habitat must be large enough to support 50 pairs; probably requires water at or near the nesting colony; colonies found in silage and grain fields near dairies in the San Joaquin Valley; during winters, is found in grasslands and agricultural fields with low-growing vegetation.	Permanent resident in the Central Valley from Butte County to Kern County. Breeds at scattered coastal locations from Marin County south to San Diego County; and at scattered locations in Lake, Sonoma, and Solano Counties. Rare nester in Siskiyou, Modoc, and Lassen Counties and most extensively concentrated in and around the Sacramento-San Joaquin River Delta and coastal areas, including Monterey and Marin Counties.	Likely to occur. Suitable habitat is present in the Permit Area; 78 occurrences have been documented in portions of Alameda, Contra Costa, Marin, Napa, Santa Clara, Solano, and Sonoma Counties.
<i>Setophaga petechia</i> Yellow warbler	SSC	Nests in riparian areas with willows, cottonwoods, Oregon ash, or alders. Also nests in montane shrubs in open ponderosa pine and mixed conifer forest, and in montane chaparral.	Breeds throughout California except the Central Valley, the Mojave Desert region, and high altitudes in the Sierra Nevada. During winter, found along the Colorado River and in parts of Imperial and Riverside Counties.	Potential to occur. Suitable habitat is present in the Permit Area. There are records of 2 occurrences, 1 each in Alameda and Marin Counties.
<i>Melospiza melodia pusillula</i> Alameda song sparrow	SSC	Relatively large brackish marshes associated with pickleweed; may nest in tall vegetation or among the pickleweed.	Found only in marshes along the southern portion of the San Francisco Bay; confined to tidal salt marsh habitat located on the fringes of the south arm of San Francisco Bay east to El Cerrito, south to Alviso, and west to San Francisco.	Potential to occur. Suitable habitat is present in the Permit Area; 17 occurrences have been documented in Alameda, San Mateo, and Santa Clara Counties.
<i>Melospiza melodia</i> Song sparrow ("Modesto" population)	SSC	Found in saline emergent wetlands; uses tidal sloughs within pickleweed marshes; requires tall bushes (usually grindelia) along sloughs for cover, nesting, and songposts; forages over mudbanks and in the pickleweed.	Found in San Pablo Bay and around central coastal California and the Central Valley area.	Potential to occur. Suitable habitat is present in the Permit Area; 19 occurrences have been documented at the east end of the San Francisco Bay in Solano County.
<i>Melospiza melodia samuelis</i> San Pablo song sparrow	SSC	Found in saline emergent wetlands; uses tidal sloughs within pickleweed marshes; requires tall bushes (usually grindelia) along sloughs for cover, nesting, and songposts; forages over mudbanks and in the pickleweed.	Found in San Pablo Bay and around central coastal California and the Central Valley area.	Potential to occur. Suitable habitat is present in the Permit Area; 19 occurrences have been documented in Contra Costa, Marin, Napa, Solano, and Sonoma Counties.
Mammals				
<i>Sorex ornatus sinuosus</i> Suisun shrew	SSC	Tidal, salt, and brackish marshes containing pickleweed, grindelia, bulrushes, or cattails. Requires driftwood or other objects for nesting cover; contiguous upland habitats may provide important refuge during flooding of salt marshes.	Restricted to the north shore of San Pablo and Suisun Bays (both in Solano County), from Sonoma Creek and Tubbs Island, Sonoma County on the west, eastward to Grizzly Island, Solano County.	Potential to occur. Suitable habitat is present in the Permit Area; 4 occurrences have been documented in Sonoma and Solano Counties.
<i>Lasiurus blossevillii</i> Western red bat	SSC (WBWG-High)	Found primarily in riparian and wooded habitats. Occurs at least seasonally in urban areas. Day roosts in trees within the foliage. Found in fruit orchards and sycamore riparian habitats in the Central Valley.	Coastal areas from the Bay Area south, plus the Central Valley and surrounding foothills, with a limited number of records from southern California, extending as far east as western Riverside and central San Diego counties, upper Sacramento River near Dunsmuir, Siskiyou County.	Potential to occur. Suitable habitat is present in the Permit Area; 8 occurrences have been documented in Contra Costa, Marin, Napa, Solano, and Sonoma Counties.
<i>Corynorhinus townsendii</i> Townsend's big eared bat	SSC (WBWG-High)	Roosts in caves, tunnels, mines, buildings, and other cave-like spaces. Will night roost in more open settings, including under bridges.	Widespread throughout California, from low desert to mid-elevation montane habitats.	Potential to occur. Suitable habitat is present in the Permit Area; 67 observations have been documented in all counties of the study area.

Species Name	Listing Status ^a	Habitat/Life History	Distribution/Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
<i>Myotis thysanodes</i> Fringed myotis	SSC (WBWG-High)	Found in a wide variety of habitats from low desert scrub to high elevation coniferous forests. Day and night roosts in caves, mines, trees, buildings, and rock crevices; has been found in mixed deciduous/coniferous forest and in both redwood and giant sequoia habitat.	Found the length of the state, from the coast (including Santa Cruz Island) to 5,900 feet in the Sierra Nevada. Records exist for the high desert and east of the Sierra Nevada; however, the majority of known localities are on the west side of the Sierra Nevada.	Potential to occur. Suitable habitat is present in the Permit Area; 5 observations have been documented in Napa, San Mateo, and Sonoma Counties.
<i>Antrozous pallidus</i> Pallid bat	SSC (WBWG-High)	Occurs in a variety of habitats from desert to coniferous forest. Most closely associated with oak, yellow pine, redwood, and giant sequoia habitats in northern California and oak woodland, grassland, and desert scrub in southern California. Relies heavily on trees for roosts.	Occurs throughout California, except the high Sierra, from Shasta County to Kern County and the northwest coast, primarily at lower and mid elevations (up to 6,000 feet).	Likely to occur. Suitable habitat is present in the Permit Area; 35 occurrences have been documented in Alameda, Contra Costa, Napa, Santa Clara, San Mateo, and Sonoma Counties.
<i>Aplodontia rufa phaea</i> Point Reyes mountain beaver	SSC	North-facing slopes of ridges or gullies below 1,000 feet where there is abundant moisture, thick undergrowth of sword ferns and thimbleberries, and soft soil for burrowing.	Known only from the Point Reyes area of Marin County.	Potential to occur. Suitable habitat is present in the Permit Area; 9 CNDDDB occurrences have been documented in western Marin County.
<i>Aplodontia rufa nigra</i> Point Arena mountain beaver	SSC	North-facing, wooded slopes of ridges or gullies where there is abundant moisture, thick under-growth, and soft soil for burrowing.	Known only from Alder Creek in the Point Arena area of Mendocino County.	Absent. Permit Area is outside of the species range.
<i>Neotoma fuscipes annectens</i> San Francisco dusky-footed woodrat	SSC	Present in chaparral habitat and in forest habitats with a moderate understory.	West side of Mount Diablo to coast and San Francisco Bay; Monterey County.	Potential to occur. Suitable habitat is present in the Permit Area; 33 observations have been documented in areas surrounding the San Francisco Bay, in Alameda, Contra Costa, Santa Clara, and San Mateo Counties.
<i>Arborimus pomo</i> Sonoma tree vole	SSC	Inhabits coastal old-growth forests of Douglas-fir, redwood, or montane hardwood-conifer species.	Occurs along the North Coast Ranges from Mendocino County to the Oregon border, and in the coastal lowlands from the Klamath Mountains to Sonoma County.	Likely to occur. Suitable habitat is present in the Permit Area; 27 occurrences have been documented in Sonoma County.
<i>Microtus californicus sanpabloensis</i> San Pablo California vole	SSC	Restricted to salt marsh habitats; annual grassland, saline emergent wetland.	Known only from San Pablo Creek, near San Pablo Bay, Contra Costa County.	Unlikely to occur. Suitable habitat is present in the Permit Area. 8 CNDDDB occurrences have been documented in the tidal zone, immediately northwest of Richmond in Contra Costa County.
<i>Reithrodontomys raviventris</i> Salt marsh harvest mouse	FE SE FP	Salt marshes with a dense plant cover of pickle-weed and fat hen; adjacent to an upland site.	San Francisco, San Pablo, and Suisun Bays; the Delta and Bay Area.	Likely to occur. Suitable habitat is present in the Permit Area; 142 occurrences have been documented in areas around the San Francisco Bay and in the northern portion of the study area, in Alameda, Contra Costa, Marin, Napa, Santa Clara, San Mateo, Solano, and Sonoma Counties.
<i>Zapus trinotatus orarius</i> Point Reyes jumping mouse	SSC	Moist, marshy coastal meadows with grasses and forbs, loose, humus-filled dark soils associated with coast redwood forests, thickets of deciduous woody vegetation along streams and seepage areas, and, less frequently, in grassy areas beneath open-canopied coniferous forests.	Confined to the Point Reyes and Marin Headlands Peninsulas in Marin County.	Potential to occur. Suitable habitat is present in the Permit Area; 5 occurrences have been documented in Marin County.
<i>Vulpes macrotis mutica</i> San Joaquin kit fox	FE ST	Associated with grassland, scrub, valley oak woodland, row crops, irrigated and unirrigated pasture, orchards, and vineyards; often steppe or desert climates.	Principally occurs in the San Joaquin Valley and adjacent open foothills to the west, extending from Kern County north to Contra Costa County.	Likely to occur. Suitable habitat is present in the Permit Area; 42 occurrences have been documented in in Alameda, Contra Costa, and Santa Clara Counties.
<i>Pekania pennanti</i> Fisher, West Coast DPS	SC	Late successional coniferous forests and montane riparian habitats; areas without frequent deep, fluffy snow.	Coastal mountains from Del Norte County to Sonoma Counties, east through the Cascades to Lassen County, and south in the Sierra Nevada to Kern County.	Unlikely to occur. Although the historic range of this species extended into Marin County, the current range of this species is outside of the Permit Area.
<i>Taxidea taxus</i> American badger	SSC	Occurs in a wide variety of open, arid habitats but are most commonly associated with grasslands, savannas, and mountain meadows near timberline; they require sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground.	Throughout California, except for the humid coastal forests of northwestern California in Del Norte and the northwestern Humboldt Counties.	Likely to occur. Suitable habitat is present in the Permit Area; 79 occurrences have been documented in all counties of the study area.

Species Name	Listing Status ^a	Habitat/Life History	Distribution/Known Locations	Probability of Occurrence in at Least One Portion of the Permit Area
<i>Enhydra lutris nereis</i> Southern sea otter	FT FP	Coastal waters, typically within 1 kilometer of shoreline. Often associated with kelp beds; forage in rocky and soft-sediment communities or near the ocean floor.	Occurs approximately from the vicinity of Half Moon Bay south to Gaviota, California. Approximately 20 otters, including pups, are at San Nicolas Island as a result of translocation efforts to establish an experimental population; San Miguel Island.	Absent. No suitable habitat is present in the study area.
<i>Puma concolor</i> Mountain Lion, Central Coast ESU	SCT	Species is carnivorous and generally nocturnal. Known from irregular, rocky terrain and large areas of riparian vegetation. Dens in thickets or caves.	The Central Coast ESU occurs in mountainous areas, from the San Francisco Bay Area and south into southern California.	Potential to occur. Suitable habitat is present in the Permit Area.

^a Explanation of federal and state listing codes:

Federal listing codes:

- FE = Federally Endangered Species
- FT = Federally Threatened Species
- PT = Proposed Threatened
- Candidate E = Candidate Endangered
- Candidate T = Candidate Threatened
- DPS = Distinct Population Segment
- BGEPA = Bald and Golden Eagle Protection Act

California listing codes:

- SE = State-listed as Endangered
- ST = State-listed as Threatened
- FP = Fully Protected species
- SSC= Species of Special Concern
- SCE= State Candidate as Endangered
- SCT= State Candidate as Threatened

Additional codes:

- WBWG = Western Bat Working Group
- High = Highest priority for conservation action

Table 3.4-5. Designated Critical Habitat in the Study Area

Species with Critical Habitat in Study Area	Designation List Date	Total Critical Habitat in California (acres) ^a
Plant		
Franciscan manzanita	January 21, 2014	229
Soft bird's beak	May 14, 2007	2,276
Suisun thistle	May 14, 2007	2,052
Baker's larkspur	April 17, 2003	1,829
Yellow (golden) larkspur	April 17, 2003	2,523
Contra Costa wallflower	April 26, 1978	305
Contra Costa goldfields	June 18, 1997	14,730
Antioch Dunes evening primrose	April 26, 1978	305
Wildlife		
Conservancy fairy shrimp	February 10, 2006	161,786
Longhorn fairy shrimp	February 10, 2006	13,557
Vernal pool fairy shrimp	February 10, 2006	590,247
Vernal pool tadpole shrimp	February 10, 2006	228,785
Delta green ground beetle	August 8, 1980	969
Bay checkerspot butterfly	August 26, 2008	18,292
Delta smelt	January 18, 1995	818,953
Chinook salmon	March 23, 1999	2,663
Steelhead	January 2, 2006	8,861
Tidewater goby	November 20, 2000	12,058
California tiger salamander (Central California DPS)	August 10, 2004	199,107
California tiger salamander (Sonoma County DPS)	September 30, 2011	47,381
California red-legged frog	March 17, 2010	1,640,363
Alameda whipsnake	October 2, 2006	154,834
Western snowy plover	December 7, 1999	14,829
Marbled murrelet	May 24, 1996	597,071
Northern spotted owl	June 26, 1990	2,100,382

^a Critical habitat designations for individual species may overlap with one another in portions of the study area.

Wildlife Corridors

Wildlife corridors are defined as areas that connect suitable habitat for species movement or dispersal between multiple habitats in a region otherwise fragmented by developed or rugged terrain, changes in vegetation, or human disturbance. These corridors provide (but are not required to contain) sufficient habitat for all life history requirements of a species, especially habitat for reproduction (Rosenberg et al. 1995, 1997). Wildlife corridors are important because they provide access to mates, food, and water; allow the dispersal of individuals away from areas with high population density; and facilitate the gene flow between populations. Wildlife corridors are

considered sensitive areas by resource and conservation agencies. Terrestrial wildlife species tend to travel along natural water features or stretches of land that simultaneously provide a foraging source and protective cover from predators. Terrestrial and riparian habitat connectivity in the Permit Area has been mapped by Spencer et al. (2010), where larger areas of natural upland and aquatic habitats are likely important for wildlife movement. These areas represent larger blocks of natural, undeveloped land and include generally rugged terrain comprised of shrubland, grassland, woodland, and wetland/riparian habitat types. Due to the overall extent of gas and electric facilities in the Permit Area, a variety of natural terrestrial habitats and water features, such as stream channels and rivers, are crossed by both overhead facilities (e.g., electric transmission or distribution lines) and/or underground facilities (e.g., gas pipelines and/or power lines). These facilities do not create an impassable barrier to terrestrial or aquatic species migration and are generally concentrated in urban/developed portions of the Permit Area.

Although not specifically defined, travel corridors are presumed for Bay checkerspot butterfly. Bay checkerspot butterfly adults are believed to migrate between important habitat locations within and between the west and south Bay Area (*Federal Register* Vol. 73, No. 166, 50406-50452). PG&E facilities are present in and between these areas.

The study area is also located within the Pacific Flyway, which is one of the six major north-to-south migration routes for waterfowl in the U.S., Mexico, and Canada. The Pacific Flyway links breeding grounds in the north to more southerly wintering areas and is therefore utilized by bird species during migration. The multiple waterbodies within the area provide rest and forage areas for many birds during their migratory seasons. Terrestrial wildlife species tend to travel along natural water features that provide a foraging resource and protective cover from predators.

Some limited portions of the Permit Area may be used by Monarch butterflies as they aggregate for overwintering during September–March in a variety of trees (often Monterey pine, Monterey cypress, or eucalyptus) along the Pacific Coast. These overwintering sites are typically within approximately 1.5 miles of the Pacific Ocean or San Francisco Bay (Pelton et al. 2016). Two high-priority overwintering sites are located in the Permit Area and include San Leandro Golf Course and Ardenwood Historic Farm, both in Alameda County. Other important sites include: Stinson Beach, Purple Gate/Bolinas, Fort Baker/Golden Gate National Recreation Area (Marin County); Albany Hill (Alameda County); and Bodega Dunes Campground (Sonoma County) (Pelton et al. 2016).

Known and potential nursery sites/rookeries are also present for a variety of shorebirds, waterfowl, and marine mammal species. Bird rookeries include salt marsh and lagoon habitats such as Bolinas Lagoon, Palo Alto Marsh Baylands Preserve, Don Edwards San Francisco Bay National Wildlife Refuge, Bothin Marsh Preserve, San Pablo Bay National Wildlife Refuge, and Grizzly Island Wildlife Area. In addition, portions of downtown Oakland serve as the largest black-crowned night-heron (*Nycticorax nycticorax*) rookery in the Permit Area. For marine mammals, the largest concentration of harbor seals (*Phoca vitulina*) in California is known in the coastal zone from San Francisco Bay to Point Reyes National Seashore, where pupping occurs March–June. Northern elephant seals (*Mirounga angustirostris*) breed and pup in portions of the same area December–March.

Wetlands and Jurisdictional Waters

As described in Section 3.10, *Hydrology and Water Quality*, surface waters in the study area drain approximately 7,099 square miles of land in the Bay Area, which comprises the San Francisco Bay Basin. The San Francisco Bay is divided into four subregions: Suisun Bay, North Bay/San Pablo Bay,

Central Bay, and South Bay, where surface waters include freshwater rivers, streams, lakes, estuarine waters, and coastal waters. Estuarine waters include the San Francisco Bay Delta from the Golden Gate to the Sacramento and San Joaquin Rivers, and the lower reaches of various streams that flow directly into the bay, such as the Napa and Petaluma Rivers in the North Bay and Coyote and San Francisquito Creeks in the South Bay. While not every jurisdictional water in the Permit Area is named or included, a list of major rivers and streams, identified from the National Hydrography Dataset and understood to be under state and/or federal jurisdiction (along with their associated tributaries), are listed below by county. These and other wetlands or jurisdictional waters may be in proximity to utility facilities or be intersected (i.e., crossed, either overhead or underground) by such facilities at one or more locations.

- Alameda County: Alameda Creek, San Leandro Creek, San Lorenzo Creek.
- Contra Costa County: San Pablo Creek.
- Marin County: Corte Madera Creek, Lagunitas Creek, Gallinas Creek, Miller Creek, Novato Creek.
- Napa County: Huichica Creek, Napa River.
- San Francisco City and County: None.
- San Mateo County: Cordilleras Creek, San Mateo Creek, Sanchez Creek.
- Santa Clara County: Adobe Creek, Coyote Creek, Guadalupe River, Llagas Creek (drains to the Pacific Ocean via the Pajaro River), Los Gatos Creek, Permanente Creek, San Francisquito Creek, Steven's Creek.
- Solano County: Green Valley Creek, Napa River, Putah Creek, Suisun Creek.
- Sonoma County: Petaluma River, Russian River, Santa Rosa Creek, Sonoma Creek.

3.4.2 Environmental Impacts

3.4.2.1 Methods for Analysis

Habitat in the Permit Area was quantified using a predictive model to help determine the extent of covered species' habitat and to quantify potential impacts as a result of covered activities (Pacific Gas and Electric Company 2017a). Using available geographic information system (GIS) data, Hot Zone¹ and other sensitive habitat layers were created to identify potential or known occupied covered species habitat. Focused desktop analysis and field surveys were performed for some plant species over limited portions of the Permit Area to confirm presence of favorable habitat conditions (ICF 2016). The likelihood that covered activities would affect covered species' habitat was used to determine the need for incidental take authorization and development of impact avoidance and minimization measures (AMMs).

¹ Hot zone is a term defined in PG&E's Bay Area HCP as an area containing a known localized population of HCP-covered wildlife species with a small and well-defined range and where species would be most likely to be affected should covered activities be implemented there. In addition to multiple species covered by the HCP, hot zones were created for California freshwater shrimp and California tiger salamander (in the Santa Rosa Plain, a portion of Solano County, and Palo Alto)—two of the three species to be covered by the ITP. These Hot Zones are mapped and incorporated into PG&E's GIS system for identification of such habitats and prescription of conservation measures.

*Temporary impacts*² refer to ground and/or vegetation disturbance resulting in effects lasting 12 months or less.³ Temporary impacts result from vegetation clearing, soil excavation, soil stockpiling, repair work to the ROW and existing access roads, and work at staging/laydown areas. Some of the largest temporary impacts resulting from O&M and minor new construction activities would be related to the electric transmission infrastructure—mainly, reconductoring. These activities, although infrequent, are larger and include establishment of work sites for pulling, tensioning, and related equipment for replacing conductors and/or strengthening towers. Other O&M activities are carried out more frequently, but with smaller amounts of anticipated temporary disturbance.

*Permanent impacts*⁴ refer to ground and/or vegetation disturbance that results in effects lasting 12 months or more⁵ and includes impacts that result in the conversion of habitat to a facility footprint. O&M and minor new construction activities that may result in permanent impacts include the expansion of existing substation or pressure limiting station facilities as well as installation of new (rather than replacement of existing) fencing, erosion control measures, gas pipeline valves and equipment, electric transmission and distribution poles or towers, and ROW management. However, the specific locations of required permanent facility installations or expansion (related to either O&M or minor new construction) are generally unknown until local industrial or residential capacity or service obligations are identified. Potential impacts of all covered activities identified in Chapter 2 are assumed to be uniformly distributed across urban, agricultural, and natural land cover types. Because PG&E has been conducting O&M activities in the study area for more than 30 years, the O&M impacts described in this section represent baseline environmental conditions that would not change following the approval of the ITP.

PG&E would implement the AMMs, practices, and other measures listed below to avoid and minimize impacts on special-status species, sensitive natural communities, and jurisdictional water features.

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures

In addition to the BMPs for vegetation management activities (Table 2-3), PG&E would apply the following AMMs listed in PG&E's Bay Area O&M HCP:

PG&E Field Protocols

- Field Protocol (FP)-01: Hold annual training on habitat conservation plan requirements for employees and contractors performing covered activities in the Permit] Area that are applicable to their job duties and work.
- 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.

² These are also referred to as short-term impacts or disturbance.

³ This definition is consistent with the definition of short-term impacts in the Bay Area O&M HCP.

⁴ These are also referred to as long-term impacts or disturbance.

⁵ This definition is consistent with the definition of long-term impacts in the Bay Area O&M HCP.

- 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-05: Notify conservation land owner at least 2 business days prior to conducting covered activities on protected lands (state and federally owned wildlife areas, ecological reserves, or conservation areas); more notice will be provided if possible or if required by other permits. If the work is an emergency, as defined in Permittee's Utility Procedure ENV-8003P-01, PG&E will notify the conservation land owner within 48 hours after initiating emergency work. While this notification is intended only to inform the conservation land owner, PG&E will attempt to work with the conservation land owner to address landowner concerns.
- FP-06: Minimize potential for covered species to seek refuge or shelter in pipes and culverts. Inspect pipes and culverts, of diameter wide enough to be entered by a covered species that could inhabit the area where pipes are stored, for wildlife species prior to moving pipes and culverts. Immediately contact a qualified biologist if a covered species is suspected or discovered.
- FP-07: Vehicle speeds on unpaved roads will not exceed 15 miles per hour (mph).
- FP-08: Prohibit trash dumping, firearms, open fires (such as barbecues), hunting, and pets (except for safety in remote locations) at work sites.
- FP-09: During fire season in designated State Responsibility Areas, equip all motorized equipment with federally approved or state-approved spark arrestors. Use a backpack pump filled with water and a shovel and fire-resistant mats and/or windscreens when welding. During fire "red flag" conditions as determined by the California Department of Forestry and Fire Protection, curtail welding. Each fuel truck will carry a large fire extinguisher with a minimum rating of 40 B:C. Clear parking and storage areas of all flammable materials.
- FP-10: Minimize the activity footprint 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 (BMPs; 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 waterbodies, 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 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 the covered activity disturbs 0.1 acre or more of habitat for a covered species in grasslands, the field crew will revegetate the area with a commercial "weed free" 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. If refueling must be conducted closer to wetlands, construct a secondary containment area subject to review by an

environmental field specialist and/or biologist. Maintain spill prevention and cleanup equipment in refueling areas.

- FP-16: Maintain a buffer of 250 feet from the edge of vernal pools and 50 feet from the edge of wetlands, ponds, or riparian areas. 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 HCP administrator to minimize impacts by flagging access, requiring foot access, restricting work until dry season, or requiring a biological monitor during the activity.
- 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.

Hot Zone HCP Avoidance and Minimization Measures

- Hot Zone-1: Work will avoid pools and streams. Field crew will prevent any damage to the bank and streamside vegetation during placement or movement of materials on the stream banks. Streamside vegetation overhanging into pools or runs will, to the maximum extent practical, not be removed, trimmed, or otherwise modified. [For California freshwater shrimp].
- Hot Zone-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. Covered activities that cannot avoid vernal pool impacts will be completed when pools are clearly dry. [For California tiger salamander (both Central California and Sonoma County DPSs)].

Species-Specific HCP Avoidance and Minimization Measures

The following three AMMs would apply to activities G9–11, G14–15, E9 (reconductoring), and E12–E15 (pole and tower line construction and substation expansion).

- Wetland-1: Identify vernal pools and establish buffers. Maintain a buffer of 250 feet around vernal pools and vernal pool complexes. 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 biologist or HCP 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. Additional minimization measures may be implemented with prior concurrence from USFWS.
- 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 biologist or HCP 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. Additional minimization measures may be implemented with prior concurrence from USFWS.

In addition to the above BMPs and AMMs from PG&E's Bay Area O&M HCP, PG&E would also implement the following applicant proposed measures (APMs) to reduce impacts on biological resources associated with O&M and minor new construction activities.

APM BIO-1: Prevent or minimize spread of invasive weeds

The following would be implemented to prevent the spread of invasive weeds during all phases of covered activities, as appropriate:

- During covered activities involving ground disturbance, mud and/or accumulated soils would be removed from equipment and vehicles, to the extent feasible. Vehicles and equipment would be cleaned or washed before entering a new work site.
- Vehicles would be stored on paved or cleared areas whenever possible.
- Certified weed-free mulch, straw, hay bales, or equivalent materials would be used where necessary for covered activities.

APM BIO-2: Protect covered wildlife encountered while performing covered activities

Any covered wildlife species encountered during the course of a covered activity would be allowed to leave the area unharmed or, if conditions warrant, moved out of immediate danger. Encounters with a special-status species would be reported to PG&E Environmental staff. PG&E would maintain records of all covered wildlife species encountered during permitted activities. Encounters with covered wildlife species would be documented and provided to CDFW in an annual report. If a covered wildlife species is encountered during the course of operations, the following information would be reported for each species:

- The locations (i.e., narrative, vegetation type, and maps) and dates of observations.
- The general condition of individual health (e.g., apparent injuries).
- If the species is moved, the location where the species was captured and the location where it was released.

APM BIO-3: Design and site minor new construction projects to avoid sensitive areas

New, permanent facilities as part of minor new construction activities would be sited and designed to avoid impacts on sensitive vegetation types, sensitive natural communities, and unique plant assemblages, as well as occupied habitat and suitable habitat for special-status species to the extent feasible. If impacts on these areas cannot be avoided, PG&E will determine if additional permitting is required to conduct the work and obtain the required permits (e.g., LSAA). If impacts are expected on covered species' habitat, Mitigation Measure BIO-1 (MM BIO-1) will be implemented to mitigate for habitat impacts.

APM BIO-4: Avoid special-status plants

Occurrences of special-status plant species would be avoided to the extent practicable and would include performance of project activities in special-status plant habitat after senescence. When special-status plant species cannot be avoided, PG&E will follow the requirements of California Fish and Game Code Sections 1913(b) and 1913(c) concerning notification; whereby PG&E will notify CDFW to provide an opportunity to salvage such species.

APM BIO-5: Erect wildlife exclusion fencing

Prior to construction or commencement of any activity that, in the absence of fencing, is likely to adversely affect covered species, exclusion fencing for the species would be installed around the perimeter of the activity footprint,⁶ or otherwise to ensure species protection.

Any exemption or modification of exclusion fencing requirements would be based on the specifics of the activity, site-specific population, or habitat parameters. Sites with low population density and disturbed, fragmented, or poor habitat would likely be candidates for fencing requirement exemptions or modifications. Substitute measures, such as onsite biological monitors in the place of the fencing requirement, would be performed as appropriate.

Prior to fencing, the qualified individual would ensure (to the extent possible) that covered special-status species are absent from the activity footprint. After an area is fenced, PG&E is responsible for ensuring that covered special-status species fencing is maintained and opened/closed appropriately during project activities and regularly inspected for damage, which would be repaired as soon as possible.

APM BIO-6: Protect nesting birds

All vegetation clearing and ground-disturbing activities would be conducted outside of the nesting season (generally March 1 to August 31) to the extent feasible. If this is not feasible, qualified⁷ individual would determine if pre-construction surveys, nest buffers, and/or monitoring are needed. Nesting bird surveys would be scheduled to occur within a timeframe prior to construction that is suitable for the detection of recently established nests. If active nests containing eggs or young are found, the qualified biologist would establish an appropriate nest buffer in accordance with PG&E's Nesting Bird Management Plan. Nest buffers would be species-specific and can range from 15 to 100 feet for passerines and 50 to 300 feet for raptors, depending on the planned activity's level of disturbance, site conditions, and the observed bird behavior. Established buffers would remain until the young have fledged or the nest is no longer active. Active nests would be periodically monitored until the young have fledged or all construction is finished.

APM BIO-7: Protect breeding and pupping bats

When feasible, activities directly affecting bat roosting habitat would be conducted outside of the bat breeding/pupping season (generally, April through mid-September). If work that would affect known bat breeding sites must be done in the bat breeding/pupping season, PG&E would evaluate known or suspected breeding/roosting sites (e.g., bridges, mines, caves, trees with hollows, palm trees, snags, buildings, long and dark culverts, rock outcrops, dense tree canopies, and flaking tree bark). If roosting bats are detected, PG&E would avoid conducting construction activities that may directly affect the active roost site, including the following:

⁶ An activity footprint is the area of ground disturbance associated with the pre-construction, construction, operation, implementation, maintenance, and decommissioning of an activity, including associated linear and non-linear components (e.g., staging areas, access routes and roads, gen-ties, pipelines, other utility lines, borrow pits, disposal areas). The footprint may also be considered synonymous with the covered activity site.

⁷ A qualified individual would have experience conducting nesting bird surveys and would be able to accurately identify nesting behavior.

- As necessary, an exclusionary buffer would be maintained around active roosts. The size of the buffer may be modified at the discretion of the qualified biologist based on the species' sensitivity to disturbance from O&M activities and the status of the roost.
- As necessary, a qualified biologist would monitor active roost site buffers during O&M activities to determine if roosting activity is influenced by noise or vibrations until a qualified biologist has determined if the young bats are volant (i.e., able to fly).

APM BIO-8: Avoid Alameda whipsnake in core habitat

Prior to the start of construction in core habitat, the work area will be surveyed for Alameda whipsnakes by a biologist. If a whipsnake is encountered during construction, activities that present a risk to the snake will stop until the snake has moved out of the construction area.

MM BIO-1: Acquire, preserve, and/or enhance suitable habitat for mitigation

PG&E will acquire, preserve, and/or enhance potential habitat, or purchase bank credits for California freshwater shrimp, California tiger salamander, and Alameda whipsnake to fully mitigate for the potential take of these species. Habitat mitigation will be provided for covered species based on acreages of estimated and actual habitat losses in consistent with *jump start*⁸ and *stay ahead*⁹ mitigation approaches. Mitigation for habitat disturbance from temporary and permanent impacts would be provided at the following ratios:

- 3:1 ratio for permanent impacts on modeled habitat for California freshwater shrimp, California tiger salamander (both Central California and Sonoma County DPS), and Alameda whipsnake (3 acres mitigated for every 1 acre permanently affected).
- 1:1 ratio for temporary impacts on modeled habitat for California freshwater shrimp and modeled upland habitat for California tiger salamander (Sonoma County DPS).
- 1:1 ratio for temporary impacts on modeled breeding habitat for California tiger salamander (both Central California and Sonoma County DPS).
- 0.5:1 ratio for temporary impacts on modeled upland habitat for California tiger salamander (Central California DPS) (0.5 acres mitigated for every 1 acre temporarily affected) when mitigation is provided according to *jump start* and *stay ahead* provisions. For the first 5 years, mitigation that is not in place prior to any impacts will be at a 1:1 ratio.
- 0.5:1 ratio for temporary impacts on non-core (movement) habitat for Alameda whipsnake (0.5 acres mitigated for every 1 acre temporarily affected) when mitigation is provided according to *jump start* and *stay ahead* provisions. For the first 5 years, mitigation that is not in place prior to any impact will be at a 1:1 ratio.
- 1:1 ratio for temporary impacts on Alameda whipsnake core or perimeter core habitat.

By March 31 of each year, PG&E would submit an annual report to CDFW summarizing the mitigation ratios and credits that were debited from its mitigation credit portfolio for covered activities during the previous calendar year, as well as detailed information from APM BIO-2.

⁸ Land acquisition, preservation, and/or habitat enhancement efforts that are made in advance of permit issuance.

⁹ PG&E will "stay ahead" of its mitigation obligations by calibrating the mitigation credits that may be necessary for future years based on information from the Annual Report for the prior year.

Significance Criteria

In accordance with Appendix G of the State CEQA Guidelines, the potential significance of impacts on biological resources from the proposed project and implementation of covered activities was evaluated for each of the following criteria:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS.
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFW or USFWS.
- Have a substantial adverse effect on federally protected wetlands as defined by CWA Section 404 (including marsh, vernal pool, coastal) through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state HCP.

3.4.2.2 Impact Discussion

Impact BIO-1: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS (Less-than-Significant Impact with Mitigation)

The O&M activities required for existing gas and electric transmission and distribution infrastructure have generally been occurring for decades, with the majority of the facilities having been constructed during the 1960s and 1970s. These activities are ongoing and would not change from those currently required for the existing system. Even minor new construction is generally associated with existing infrastructure in urbanized or previously disturbed areas. Thus, minimal impacts on sensitive species would result.

As explained in the analysis that follows, O&M and minor new construction activities in wetlands and riparian areas that support special-status plant and wildlife species would be avoided without acquisition of appropriate permits from agencies with jurisdiction over specific activities in wetlands and other waters.

Plants

Given the geographic extent of the study area, focused special-status plant surveys were not performed except at locations where impacts on threatened or endangered plants could result (ICF 2016) from O&M activities. Where field surveys were not performed, available CNDDDB and CNPS *Inventory of Rare and Endangered Plants* (California Native Plant Society 2018) data were utilized in

conjunction with GIS and aerial photography to develop a list of special-status plant species that may be present in the study area.

The assembled list of special-status plants includes those plants known or assumed to be present in the study area and is composed of 413 special-status plant species. Of these species, 271 are CRPR List 1 species, 26 are CRPR List 2 species, 1 is a CRPR List 3 species, and 105 are CRPR List 4 species. Using desktop analysis, along with field surveys over a portion of the Permit Area (ICF 2016), 28 species were determined to be present, 207 species were determined to be likely to occur, 134 species were determined to have a potential to occur, and 31 species were determined to be unlikely to occur (ICF 2016). Thirteen of the special-status plant species were determined to be absent due to range restrictions or lack of suitable habitat in the study area.

Under the provisions of California Fish and Game Code Section 1913(b), the incidental removal of endangered or rare plant species is not prohibited within a ROW to allow a public utility to fulfill its obligation to provide service to the public; however, to the extent feasible PG&E will notify CDFW and provide the opportunity to salvage rare plants in advance of covered activities. In addition, it is assumed that over decades of performance of these activities, plant populations are generally not in conflict with typical O&M activities or otherwise tolerate regular, periodic impacts of such activities; for example, once facilities and access routes have been installed and utilized, ongoing O&M does not continue to alter habitat. PG&E would continue to follow California Fish and Game Code Section 1913(b) and implement APMs to avoid and minimize O&M and minor new construction activity impacts on special-status plants. Thus, minimal impacts related to special-status plants would occur. O&M and minor new construction activities that could affect special-status plant species, as well as the measures implemented to avoid and minimize impacts, are described in the following paragraphs. O&M and minor new construction activities in wetlands and riparian areas that support special-status plant species would be avoided without acquisition of appropriate permits from agencies with jurisdiction over specific activities in wetlands and other waters. If such permits were required and obtained, direct impacts on wetland special-status plant species could occur; however, activities would be subject to additional measures to further avoid and minimize direct impacts on such species.

PG&E's O&M and minor new construction activities result in various levels of surface disturbance, as described in Chapter 2. Grading, excavation, and vehicle and foot traffic associated with O&M and minor new construction activities in the study area have the potential to result in the direct loss of special-status plant species. While O&M activities typically occur within existing facility ROWs and existing access roads, minor new construction activities can extend into special-status plant species habitat, away from existing ROWs or facility footprints. Equipment and vehicles may introduce noxious weeds that compete with special-status species or may result in petroleum product or other chemical spills that negatively affect special-status plant species and habitat. In addition, impacts such as increased fugitive dust could reduce the growth and vigor of special-status plant species.

PG&E would incorporate the AMMs from PG&E's Bay Area O&M HCP to avoid and minimize potential impacts on biological resources, including FP-01 through FP-17. Specifically, implementing the worker education program in accordance with FP-01, as well as the providing project-specific direction from the environmental release-to-construction and environmental screening and review process (see Section 2.9, Overview of PG&E's Environmental Review Process), would decrease the likelihood of special-status plants being inadvertently disturbed during covered activities because personnel would be aware of special-status plants in relevant portions of the Permit Area. Disturbance would be minimized to the smallest practical area pursuant to FP-02, FP-03, FP-04, and

FP-10. As described in FP-14, PG&E would restore habitat where more than 0.10 acre of special-status species (i.e., grassland) habitat may be affected by covered activities. The weed management actions would protect special-status plant species from competition with invasive plant species, as well as decrease alterations of the habitat, which could facilitate the establishment of invasive weeds. With implementation of these measures, project activities would be unlikely to have a substantial adverse effect on special-status plants, and direct and indirect impacts would be less than significant.

PG&E would also implement specific APMs designed to further avoid and minimize impacts on special-status plants. PG&E would conduct habitat assessments, pursuant to its environmental review process described in Section 2.9, when planned O&M or minor new construction activities would occur in potential habitat. PG&E would take weed management actions during all phases of activities to decrease the potential introduction of invasive weeds in accordance with APM BIO-1. PG&E would site and design new facilities to avoid impacts on unique plant assemblages, occupied habitat, and suitable habitat for special-status species, in accordance with APM BIO-3. Under APM BIO-4, special-status plant species would be avoided to the maximum extent practicable. The covered activities described herein are not anticipated to result in increased impacts on special-status plant species from the current baseline. Implementation of the aforementioned APMs would further reduce potential direct and indirect impacts on special-status plant species.

Invertebrates

Invertebrates associated with vernal pool habitat in the Permit Area include Delta green ground beetle, conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp. Each of these species has the potential to inhabit vernal pools within the Permit Area. Ground-disturbing activities such as grading or excavating could result in mortality of vernal pool invertebrates by crushing or burying shrimp cysts or beetle larvae, pupae, and adults. However, O&M activities or minor new construction are unlikely to result in direct mortality or injury of vernal pool invertebrates because PG&E does not typically conduct work within vernal pools. Ground-disturbing activities could result in habitat loss or alteration by changing the topography of vernal pools, degrading water quality from increased sedimentation or accidental spills, increased construction-related dust, and herbicide use. Invasive weeds could be propagated by seeds introduced from other locations via construction equipment or vehicles, which could reduce habitat quality within vernal pools. PG&E will incorporate AMMs from PG&E's Bay Area O&M HCP to avoid and minimize potential impacts on biological resources in vernal pool habitat, specifically FP-01 through FP-05, FP-07, FP-08, FP-10, FP-11, FP-12, and FP-14 through FP-16, as described under *PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures*. FP-01 requires annual training on HCP requirements for utility employees and contractors; FP-02 requires that vehicles and equipment be parked on existing roads or in other designated areas; FP-03 and FP-04 require use of existing ROW and minimization of disturbance and limits access routes to minimize impacts on vegetation and other natural features; FP-05 requires notification to the conservation land owner prior to work on protected lands; FP-07 restricts speed on unpaved roads (15 mph) to minimize dust; FP-08 prohibits dumping of trash at work sites; FP-10 reduces the activity footprint and time onsite to reduce potential for take of species; FP-11 requires erosion and sediment controls to prevent construction site runoff; FP-12 requires establishment of an appropriate location for covered soil stockpiles; FP-14 requires revegetation of grassland areas where covered activity results in 0.1 acre or more of disturbance; FP-15 prohibits vehicle and equipment refueling within 250 feet of vernal pools or within a secondary containment area; and

FP-16 requires a buffer of 250 feet from the edge of vernal pools, access route identification, foot access, seasonal restriction on activity and/or a biological monitor. Collectively, these measures help reduce potential direct and indirect impacts on these species. In addition, PG&E would implement the HCP's Hot Zone-6 and Wetland-1, which require identification of vernal pools and maintenance of buffers around vernal pools and vernal pool complexes. Habitat for these species is mapped as sensitive in PG&E's screening system and, as federally listed species, any impacts on these species are addressed under PG&E's existing federal permit. Because these measures will be incorporated into the project, potential direct and indirect impacts on vernal pool invertebrates would be less than significant.

California freshwater shrimp requires perennial streams with undercut banks, exposed roots, overhanging vegetation, and woody debris that provide refugia from swift currents and cover from predators. O&M activities and minor new construction within occupied stream channels or on channel banks could result in injury or mortality of larvae and adults and the loss or degradation of habitat. Because PG&E does not typically conduct work within the channel of a perennial stream, death or injury from in-channel work is unlikely. However, construction or vegetation management activities on or near stream banks occupied by California freshwater shrimp could collapse overhanging banks if vehicles, equipment, and personnel are working too close to the stream bank; adults and larvae could be killed or injured. Ground-disturbing activities adjacent to streams could result in sediment entering streams occupied by California freshwater shrimp, and leaks or spills from construction equipment and vehicles could accidentally enter occupied streams and affect water quality. Habitat restoration or enhancement activities related to California freshwater shrimp compensatory mitigation under MM BIO-1, while ultimately beneficial to a variety of species, could also result in injury or mortality of California freshwater shrimp individuals. PG&E, in cooperation with the USFWS and CDFW, modeled habitat for California freshwater shrimp; there are approximately 1,602 acres of modeled habitat distributed across Sonoma County (67%), Marin County (18%), and Napa County (15%) in the Permit Area (Pacific Gas and Electric Company 2017a). Over the 30-year permit term, O&M and minor new construction activities would result in permanent loss of 0.3 acre of California freshwater shrimp habitat and temporary loss of 2.0 acres of habitat. These impacts would be distributed across Marin, Napa, and Sonoma Counties. California freshwater shrimp habitat is identified and mapped in PG&E's systems as a Hot Zone, which indicates where PG&E would implement PG&E's Bay Area O&M HCP AMMs, including FP-01 through FP-05, FP-07, FP-08, FP-10, FP-11, FP-12, and FP-14 through FP-17, Wetland-02, and Hot Zone-1. FP-01 requires annual training on HCP requirements for utility employees and contractors; FP-02 requires that vehicles and equipment be parked on existing roads or in other designated areas; FP-03 and FP-04 require use of existing ROW and minimization of disturbance and limits access routes to minimize impacts on vegetation and other natural features; FP-05 requires notification to the conservation land owner prior to work on protected lands; FP-07 restricts speed on unpaved roads (15 mph) to minimize dust; FP-08 prohibits dumping of trash at work sites; FP-10 reduces the activity footprint and time onsite to reduce potential for take of species; FP-11 requires erosion and sediment controls to prevent construction site runoff; FP-12 requires establishment of an appropriate location for covered soil stockpiles; FP-14 requires revegetation of grassland areas where covered activity results in 0.1 acre or more of disturbance; FP-15 prohibits vehicle and equipment refueling within 100 feet of streams or within a secondary containment area; FP-16 requires a buffer of 50 feet from the edge of riparian areas, access route identification, foot access, seasonal restriction on activity and/or a biological monitor; and FP-17 requires that trees be felled away from any exclusion zone, which would include freshwater shrimp habitat. In addition, Wetland-02 requires a buffer of 50 feet around riparian areas or a biological monitor and Hot Zone-

1 requires PG&E to avoid pools and streams that may be habitat for the species and where streamside vegetation would, to the extent possible, not be removed, pruned, or modified.

Because of the limited distribution of California freshwater shrimp and its habitat, even relatively small habitat losses that result from covered activities could be significant. Thus, impacts on this species or habitat would be mitigated through the acquisition, preservation, and/or enhancement of habitat through MM BIO-1, from which other special-status freshwater species may also benefit. With mitigation, impacts on California freshwater shrimp would be less than significant.

Valley elderberry longhorn beetle is closely associated with its host plant, elderberry, which occurs throughout the Permit Area; however, the range of the beetle is currently restricted to eastern Alameda, Contra Costa, and Solano Counties. Removal of elderberry shrubs occupied by beetle larvae or pruning of occupied stems (greater than 1-inch diameter at ground level) could result in mortality of larvae or adults. Elderberry shrub removals are avoided to the extent practicable and, in addition to implementation of FP-01 through FP-17, O&M and minor new construction activity impacts on valley elderberry longhorn beetle are addressed in PG&E's *Valley Elderberry Longhorn Beetle Conservation Plan* and associated federal permit, which requires annual employee training on elderberry identification, tracking and reporting impacts on elderberry to the USFWS, and providing compensatory mitigation for habitat impacts. With the continued implementation of the valley elderberry longhorn beetle program, impacts on valley elderberry longhorn beetle will continue to be less than significant.

Six special-status butterfly species are likely to occur or have potential to occur in the Permit Area: Bay checkerspot butterfly, San Bruno elfin butterfly, Mission blue butterfly, Lange's metalmark butterfly, Callippe silverspot butterfly, and Myrtle's silverspot butterfly. The occurrence of these species (as eggs or larvae) is associated with presence of a relatively limited array of preferred host plants on which larvae feed. Aside from female deposition of eggs on preferred host plants, adults generally seek nectar on a wider variety of flowers. Potential impacts on special-status butterfly species include the loss of larval host and nectar sources and direct mortality of larvae and adults as a result of O&M and minor new construction activities. PG&E will incorporate butterfly-specific, Hot Zone measures identified from PG&E's Bay Area O&M HCP, including FP-01 through FP-17, as described under *PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures*. Specifically, FP-01 through FP-04, FP-05, FP-07, FP-09, FP-10, FP-12, and FP-14 would avoid and minimize impacts on special-status butterflies. FP-01 requires annual training on HCP requirements; FP-02 requires that vehicles and equipment be parked on existing roads or in other designated areas; FP-03 and FP-04 require use of existing ROW and minimization of disturbance and limits access routes to minimize impacts on vegetation and other natural features; FP-05 requires notification to the conservation land owner prior to work on protected lands; FP-07 restricts speed on unpaved roads (15 mph) to reduce potential for collisions; FP-09 reduces fire risk in wildland areas; FP-10 reduces the activity footprint and time onsite to reduce potential for take of species; FP-12 requires establishment of an appropriate location for covered soil stockpiles; and FP-14 requires revegetation of grassland areas where covered activity results in 0.1 acre or more of disturbance. In addition, under the environmental review process described in Section 2.9, PG&E would identify whether planned O&M or minor new construction activities would occur in special-status butterfly habitat and require measures to avoid, to the extent possible, impacts on larval host plants of special-status butterfly species and impacts on adults. Habitat for these species is mapped as sensitive in PG&E's screening system and, as federally listed species, any impacts on these species are addressed under PG&E's existing federal permit. With implementation of the HCP AMMs and PG&E's screening procedures and permit requirements, potential direct and indirect impacts on

special-status butterflies as a result of O&M and minor new construction activity would be less than significant.

Two special-status bumble bees are likely to occur in the Permit Area: Crotch bumble bee and western bumble bee. Both require nectar and pollen sources and access to nesting or overwintering sites, including abandoned rodent burrows or disturbed soils under woody or debris. Individuals of these species, including adults, pupae, larvae, or eggs could be crushed or killed if nests or underground overwintering sites are crushed by vehicles, equipment, or foot traffic or under stockpiled soil. Above ground, adults could be injured or killed by moving vehicles or equipment. PG&E will incorporate AMMs from PG&E's Bay Area O&M HCP, including FP-01 through FP-04, FP-07, FP-10, FP-11, FP-12, and FP-14, as described under *PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures*. FP-01 requires annual training on HCP requirements; FP-02 requires that vehicles and equipment be parked on existing roads or in other designated areas; FP-03 and FP-04 require use of existing ROW and minimization of disturbance and limits access routes to minimize impacts on vegetation and other natural features; FP-07 restricts speed on unpaved roads (15 mph) to reduce potential for collisions; FP-10 reduces the activity footprint and time onsite to reduce potential for take of species; and FP-12 requires establishment of an appropriate location for covered soil stockpiles. With these measures incorporated into the project, potential impacts on special-status bumble bees would be less than significant.

Fish

Many of the larger, more significant water features within the study area, including estuaries, rivers, and creeks, are known, or have the potential, to support a variety of special-status fish species. Generally, O&M or minor new construction activities do not occur in these waters without acquiring required permits from agencies who have jurisdiction over specific activities in such waters. While overhead facilities are typically outside of these areas, directional boring (for certain pipeline activities) occurs below streams or channels, where USACE or CDFW typically requires a "frac-out" plan as a standard permit condition (see APM HYDRO-1 in Section 3.9, *Hydrology and Water Quality*). Although suitable aquatic habitat for special-status fish species occurs within the Bay Area, direct impacts on fish and fish habitat are not anticipated by this project, because O&M or minor new construction activities would not occur within the water features without acquisition of appropriate permits for impacts involving jurisdictional waters. Without permits, fish could be injured or killed by temporary dewatering activity or habitat could be degraded by excavation of lake or stream bed, bank, or channel. If permits were required and obtained, they would include measures to further avoid and minimize direct impacts on special-status fish and fish habitat such as seasonal work restrictions and specific dewatering protocols. In addition, impacts on estuaries, rivers, and streams and the special-status fish species that they contain would be avoided by implementing water quality BMPs.

BMPs implemented by PG&E for the protection of surface waters (including waterbodies with defined bed/banks as well as vernal pools and swales) are described in PG&E's *Good Housekeeping Activity Specific Control Plan* (also discussed in Section 3.10). The manual includes a wide variety of measures that are implemented based on site conditions and the nature of the activity. Commonly used measures include the following, which are currently being implemented in the study area:

- Conduct activities near water features during the dry season. If work is necessary during the rainy season, it would be conducted during dry spells between rain events to the extent feasible.

- Refuel at least 100 feet from water features. Vehicles operating adjacent to water features would be inspected and maintained daily to prevent leaks.
- Keep spill cleanup kits on site (with fueling and maintenance vehicles) and accessible at all times.
- Train all personnel with regard to the location, use, and contents of the spill kits. If a spill occurs, clean it up immediately with absorbents, notify the Environmental Field Specialist, and dispose of the materials properly.
- Minimize hazardous material storage onsite and store hazardous liquids, wastes, and all chemicals in watertight containers with appropriate secondary containment. Contain and protect stockpiled waste materials and cover liquid pollutant containment BMPs prior to rain, at the end of each day, and during non-work days.
- Monitor BMPs daily during construction activities. Repair, replace, and/or maintain BMPs to correct any deficiencies.
- Return work areas to their pre-existing contours and conditions upon completion of work. Restoration work, including revegetation and soil stabilization, would be evaluated upon completion of work and performed as needed.

Implementation of these BMPs and any required permit measures would minimize impacts on water quality by controlling potential pollutants, including sediment, and runoff discharges from the site. PG&E would also continue to comply with the requirements of SWRCB's Order No. 2009-0009-DWQ (as amended by 2010-0014-DWQ and 2012-0006-DWQ) (Construction General Permit), which requires the implementation of a stormwater pollution prevention plan (SWPPP) for activities disturbing 1 acre or more of land and/or partially outside of the existing ROW. Stormwater discharge for activities that disturb areas less than 1 acre and/or are wholly within the existing ROW would continue to be addressed through the application of the BMPs for water quality described above.

To specifically address erosion and siltation for activities that disturb less than 1 acre of land, PG&E would return water features to their approximate pre-construction grade and would manage disturbed areas with a combination of temporary and permanent vegetative stabilization measures, including reseeded where appropriate in accordance with PG&E's BMPs for water quality. Where appropriate, PG&E would also continue to install and maintain a stabilized entrance and exit to work areas, as well as restore disturbed entrance and exit areas to their approximate pre-construction contours following the completion of minor new construction activities. In addition, PG&E would minimize the disturbance area, soil erosion, and removal of vegetation in accordance with PG&E's applicable Bay Area O&M HCP AMMs, including FP-02, FP-03, FP-04 and FP-10. As a result, potential impacts on fish would not be substantially adverse and would be less than significant. FP-16 and Wetland-2, which require maintenance of work buffers around riparian habitat, would also be implemented. Therefore, O&M and minor new construction activities would not affect water quality in occupied fish habitat downstream of the activities.

PG&E's BMPs for water quality require the monitoring and reporting of environmental impacts associated with construction or operational activities to ensure regulatory compliance and protection of resources. PG&E would continue to coordinate with and obtain any required authorizations from USACE, CDFW, and RWQCB on a per-activity basis (as required) when working within special-status fish habitat. O&M activities within fish habitat would be conducted in

accordance with the additional permit measures. Therefore, O&M and minor new construction activities are not anticipated to have any effect on special-status fish species, and any impacts would be less than significant.

Amphibians

Special-status amphibians that may occur within the study area include California tiger salamander (Central California DPS and Sonoma County DPS), California giant salamander, Santa Cruz black salamander, red-bellied newt, western spadefoot, California red-legged frog, and foothill yellow-legged frog.

California tiger salamander and western spadefoot breeding habitat consists of ephemeral freshwater sources, primarily vernal pools and stock ponds. Following breeding, these species disperse into nearby upland habitat where burrows are used for shelter and aestivation. California giant salamander, Santa Cruz black salamander, and red-bellied newt are typically associated with coastal oak woodland or coniferous forests (Thomson et al. 2016). Adults are terrestrial but move into streams or creeks to breed. California red-legged frog uses aquatic habitat (consisting of ponds or drainages) in grassland and woodland habitats year-round. Adults may take refuge during dry periods in rodent holes or leaf litter in annual grassland, oak woodland, chaparral, and riparian habitats and may move through these habitats during overland migration to and from aquatic habitat. Foothill yellow-legged frog is typically associated with shallow, flowing streams with some form of rock or cobble substrate (Lind et al. 2016). The species is rarely observed far from perennial water sources (Nussbaum et al. 1983) but suitable breeding and foraging land cover types adjacent to perennial streams include riparian and coniferous forests, coastal scrub, and wet meadow types (California Wildlife Habitat Relationships 2000).

As a matter of current practice, PG&E avoids and minimizes the siting of facilities and work areas in riparian and wetland areas. As discussed in Impact BIO-3, any necessary state and federal permits are acquired prior to work in a riparian or wetland habitat. If PG&E were to perform work in a riparian area near potentially occupied aquatic habitat, a PG&E biologist would minimize the work area to the greatest extent possible to reduce the potential for the injury or mortality of amphibian species. PG&E facilities are generally not located within water because water can erode or degrade facilities and restrict accessibility for maintenance and repair. Where facilities cross streams or other aquatic areas, overhead facilities (electric transmission and distribution lines) typically span drainages and the ground infrastructure components (poles or towers) are usually located outside of riparian areas. In these cases, the impacts on special-status amphibian breeding habitat would be minimal, because aquatic habitat would not be affected or disturbed. Gas lines or underground electric lines that cross streams are typically co-located along bridges, tunneled under waterways, or span the stream or drainage. O&M work on these facilities is usually completed with minimal impact on the aquatic habitat or associated riparian areas. Vegetation management in riparian areas could remove suitable habitat for special-status amphibians and injure or kill individuals if they were present during the activity. As discussed in the previous section for fish, O&M or minor new construction activities would not occur within a jurisdictional water feature without acquisition of appropriate permits for such impacts, where special-status amphibians could be injured or killed by personnel or equipment during covered activities in aquatic habitat. Indirectly, species could be affected by degraded water quality from erosion or contamination from a spill.

Upland habitat for these species is also present in the Permit Area and activities such as grading, trenching, or excavation could result in direct mortality or injury of California tiger salamander or

western spadefoot adults (e.g., those occupying burrows or soil crevices), particularly when these activities are implemented close to wetland habitats such as vernal pools and stock ponds. In an attempt to minimize direct mortality in an area that will be trenched, there may be instances where, in support of larger (more than 0.1 acre) O&M or minor new construction activities, PG&E would excavate potential California tiger salamander burrows to relocate individuals or otherwise attempt to reduce the potential for mortality at an area requiring trenching or other excavation activity.

Vehicles and equipment traveling to and from work areas within dispersal or upland habitat for special-status species could potentially crush or injure adults or juveniles when they are in terrestrial habitats. Frogs, salamanders, and spadefoot toads typically disperse at night when humidity is high or during periods of rainfall from fall through spring. Except in emergency conditions, crews perform O&M and minor new construction activities during daytime hours; therefore, the potential for death or injury of dispersing amphibians is low. A storm-related emergency would be the exception, when construction crews could be active at night and could take adult and juvenile amphibians that happen to be dispersing into or through the area. Maintenance and refueling of heavy equipment could result in the inadvertent release of sediment and hazardous substances into species habitat. Increased sedimentation or accidental spills of toxic fluids from vehicles or equipment could reduce the suitability of aquatic or adjacent upland habitat for special-status amphibians. Habitat restoration or enhancement activities related to California tiger salamander compensatory mitigation under MM BIO-1, while ultimately beneficial to a variety of special-status amphibians, could also result in injury or mortality of individuals of these species.

In special-status amphibian aquatic or upland habitat PG&E will incorporate AMMs from PG&E's Bay Area O&M HCP, including FP-01 through FP-08, FP-10 through FP-17, and Wetland-02. FP-01 requires annual training on HCP requirements for utility employees and contractors; FP-02 requires that vehicles and equipment be parked on existing roads or in other designated areas; FP-03 and FP-04 require use of existing ROW and minimization of disturbance and limits access routes to minimize impacts on vegetation and other natural features, including small mammal burrows; FP-05 requires notification to the conservation land owner prior to work on protected lands; FP-06 requires inspection of pipes and culverts, prior to movement; FP-07 restricts speed on unpaved roads (15 mph) to minimize dust; FP-08 prohibits dumping of trash at work sites; FP-10 reduces the activity footprint and time onsite to reduce potential for take of species; FP-11 requires erosion and sediment controls to prevent construction site runoff; FP-12 requires establishment of an appropriate location for covered soil stockpiles; FP-13 requires daily inspection and installation of escape ramps in trenches or excavations; FP-14 requires revegetation of grassland areas where covered activity results in 0.1 acre or more of disturbance; FP-15 prohibits vehicle and equipment refueling within 100 feet of streams or within a secondary containment area; FP-16 requires a buffer of 50 feet from the edge of riparian areas, access route identification, foot access, seasonal restriction on activity and/or a biological monitor; and FP-17 requires that trees be felled away from any exclusion zone. In addition, Wetland-02 requires a buffer of 50 feet around riparian areas or a biological monitor. If permits were required and obtained for work in a jurisdictional water feature, they would include measures to further avoid and minimize direct impacts on special-status amphibians and habitat.

PG&E modeled habitat for California tiger salamander, in cooperation with the USFWS and CDFW. There are approximately 41,152 acres of modeled habitat distributed across the Permit Area (Pacific Gas and Electric Company 2017a). For California tiger salamander (Central California DPS), it is estimated that over the 30-year permit term, O&M and minor new construction activity would result in the permanent loss of 2 acres of breeding habitat and 298 acres of upland habitat and the

temporary loss of 25 acres of breeding habitat and 3,800 acres of upland habitat. Modeled habitat for the Sonoma County DPS encompasses approximately 2,404 acres in the Permit Area (Pacific Gas and Electric Company 2017a). For this DPS, O&M and minor new construction activities would result in an estimated permanent loss of 13 acres of breeding habitat and temporary loss of 80 acres of habitat. To avoid and minimize impacts on California tiger salamander (Central California DPS and Sonoma County DPS) and other amphibians, PG&E would incorporate FP-01 through FP-17 from PG&E's Bay Area O&M HCP. In addition, habitat assessments would be conducted pursuant to PG&E's environmental review process described in Section 2.9, when planned O&M or minor new construction activities would occur in potential habitat. PG&E would site and design new facilities to avoid impacts on occupied and suitable habitat for special-status species, in accordance with APM BIO-3. In addition to these measures, PG&E would restore habitat where more than 0.10 acre of special-status species grassland habitat may be affected by covered activities, as described in FP-14. PG&E would also implement APM BIO-5 for longer-term activities, requiring installation and maintenance of wildlife exclusion fencing and/or the presence of an onsite biological monitor. In addition, work buffers around suitable vernal pool, wetland, and riparian habitat would be implemented through Wetland-1 and Wetland-2. In areas determined as sensitive California tiger salamander habitat (through PG&E's California tiger salamander Hot Zone mapping), Hot Zone-6 would be implemented, requiring limited work activity (i.e., foot access only) unless a biologist identifies access routes for vehicles and equipment that minimize impacts on covered species, and limiting timing of activities to the dry season.

Even with the aforementioned measures, impacts on California tiger salamander (Central California DPS and Sonoma County DPS) breeding and upland habitat that result from covered activities could be significant, given that populations of these species are isolated and loss of existing habitat is increasing. To ensure that such impacts are reduced to less-than-significant levels, impacts will be mitigated in accordance with MM BIO-1, through the acquisition, preservation, and/or enhancement of California tiger salamander habitat, which may benefit other special-status amphibian species not covered by the ITP (i.e., California red-legged frog). Habitat for these species is mapped as sensitive in PG&E's screening system and any impacts on federally listed species are addressed under PG&E's existing federal permit. With the implementation of MM BIO-1 and the other measures described, potential direct and indirect impacts on special-status amphibian species would be less than significant.

Reptiles

Seven special-status reptiles may occur in the Permit Area. Species that may occur within sparsely vegetated habitat types in the Permit Area include Alameda whipsnake, coast horned lizard, California legless lizard, and California glossy snake. Alameda whipsnake are primarily found in scrub and chaparral habitat. Coast horned lizard and California legless lizard require the presence of fine, loose soils and occur in sage scrub, dunes, alluvial scrub, annual grassland, chaparral, oak woodland, riparian woodland, coniferous forest, and saltbush scrub (Thomson et al. 2016). California glossy snake is nocturnal and occur in grasslands, fields, coastal sage scrub, and chaparral (Thomson et al. 2016). Two species of garter snake that may occur within the Permit Area are San Francisco garter snake and giant garter snake. San Francisco garter snake inhabits primarily permanent freshwater wetlands and adjacent open water, using these areas for feeding, and adjacent grasslands and shrublands for upland cover and breeding within the western portion of the study area. Giant garter snake may occur in the eastern portion of the study area and inhabit agricultural wetlands and other waterways, including irrigation and drainage canals, ricelands,

marshes, sloughs, ponds, small lakes, and low-gradient streams, as well as adjacent upland areas. Both species of garter snake occupy rodent burrows. Western pond turtle may occur throughout the study area and is usually found in stagnant or slow-moving freshwater habitats and associated upland habitats for nesting, overwintering, and overland dispersal (Jennings and Hayes 1994).

Most small-scale O&M activities involve small areas and few personnel and vehicles. Special-status reptiles (adults or juveniles) would likely move away from the source of disturbance, and activities would not typically require the removal of vegetation. Smaller-scale activities are generally conducted year-round from existing roads and have limited impacts on natural vegetation. There is a greater potential for larger-scale O&M activities and minor new construction to adversely affect individuals of the species, when movement of vehicles, removal of scrub or chaparral vegetation, or grading of roads during the day could result in the mortality of Alameda whipsnake, coast horned lizard, California legless lizard, and California glossy snake. Construction activities that include grading, trenching, or excavation could result in death or injury of adults, juveniles, or eggs. Adults and hatchlings of coast horned lizard and California legless lizard could be crushed by construction vehicles and equipment and also could potentially crush California glossy snakes by collapsing small burrows. Habitat restoration or enhancement activities related to Alameda whipsnake compensatory mitigation under MM BIO-1, while ultimately beneficial to a variety of special-status reptiles, could also result in injury or mortality of individuals of these species.

Suitable aquatic and upland habitat for San Francisco garter snake may be removed or temporarily disturbed by O&M or minor new construction activities, which could result in the injury, mortality, or disturbance of giant garter snakes. Ground-disturbing activities (grading, trenching, or excavating) could crush or bury newborn, juvenile, and adult San Francisco garter snakes and giant garter snakes in upland areas and as well as snakes using adjacent aquatic areas for dispersal, basking, foraging, or sheltering. Construction vehicles and equipment traveling to and from work areas also could potentially kill garter snakes when traveling through upland habitats or crush them by collapsing small burrows that snakes may be using for cover, hibernation, or dispersal.

Aquatic and upland (overwintering, nesting) habitat for western pond turtle may be removed or temporarily disturbed by O&M or minor new construction activities and individuals may be killed, injured, or disturbed by activities that remove suitable aquatic or upland habitat. Construction activities (such as grading and movement of heavy equipment) could result in the destruction of pond turtle nests containing eggs or young individuals if affected areas are being used for egg deposition.

PG&E, in cooperation with USFWS and CDFW, modeled habitat for Alameda whipsnake, identifying core habitat (where the snake is most likely to occur), perimeter core habitat (the area immediately surrounding core habitat), and dispersal habitat (suitable habitat beyond perimeter core habitat), drawing from information described by USFWS (2011a) and in the *East Contra Costa Habitat Conservation Plan/Natural Community Conservation Plan* (East Contra Costa County Habitat Conservation Plan Association 2006). There are approximately 10,800 acres of habitat in the Permit Area (Pacific Gas and Electric Company 2017a). According to the modeling, over the 30-year permit term, O&M and minor new construction activities would result in an approximate permanent loss of 34 acres of core habitat, 25 acres of perimeter core habitat, and 27 acres of dispersal habitat. Covered activities would result in an approximate temporary loss of 13 acres of core habitat, 70 acres of perimeter core habitat, and 329 acres of dispersal habitat. PG&E would implement FP-01 through FP-17 from PG&E's Bay Area O&M HCP designed to avoid and minimize impacts on Alameda whipsnake and other special-status reptiles. FP-01 requires annual training on HCP

requirements for utility employees and contractors; FP-02 requires that vehicles and equipment be parked on existing roads or in other designated areas; FP-03 and FP-04 require use of existing ROW and minimization of disturbance and limits access routes to minimize impacts on vegetation and other natural features; FP-05 requires notification to the conservation land owner prior to work on protected lands; FP-06 requires inspection of pipes and culverts, prior to movement to prevent harm to animals; FP-07 restricts speed on unpaved roads (15 mph) to minimize dust and reduce potential for running over snakes; FP-08 prohibits dumping of trash at work sites; FP-09 reduces fire risk in wildland areas; FP-10 reduces the activity footprint and time onsite to reduce potential for take of species; FP-11 requires erosion and sediment controls to prevent construction site runoff; FP-12 requires establishment of an appropriate location for covered soil stockpiles; FP-13 requires daily inspection and installation of escape ramps in trenches or excavations to reduce potential for entrapment of species; FP-14 requires revegetation of grassland areas where covered activity results in 0.1 acre or more of disturbance; FP-15 prohibits vehicle and equipment refueling within 100 feet of streams or within a secondary containment area; FP-16 requires a buffer of 50 feet from the edge of riparian areas, access route identification, foot access, seasonal restriction on activity and/or a biological monitor; and FP-17 requires that trees be felled away from any exclusion zone. In addition, work buffers around suitable wetland and riparian habitat would be implemented through Wetland-2. In areas determined as sensitive Alameda whipsnake habitat (through PG&E's Alameda whipsnake Hot Zone mapping), APM BIO-8 would be implemented, requiring a pre-activity survey for Alameda whipsnake in core habitat. PG&E would also conduct habitat assessments, pursuant to its environmental review process described in Section 2.9, to identify when planned O&M or minor new construction activities would occur in potential habitat.

To further reduce potentially significant impacts, PG&E would site and design new facilities to avoid impacts on occupied and suitable habitat for special-status species, in accordance with APM BIO-3. PG&E would also implement APM BIO-5 for longer-term activities, requiring installation and maintenance of wildlife exclusion fencing and/or the presence of an onsite biological monitor. Nevertheless, given the restricted range of the species, impacts on Alameda whipsnake habitat that result from covered activities could still be significant. To reduce impacts to less-than-significant levels, MM BIO-1 would be implemented to acquire, preserve, and/or enhance Alameda whipsnake habitat, which may benefit other special-status reptile species. Habitat for these species is mapped as sensitive in PG&E's screening system and any impacts on other federally listed species that may be present in the Permit Area are addressed under PG&E's existing federal permit. With the implementation of the HCP AMMs, APMs, and mitigation measure, potential direct and indirect impacts on special-status reptile species would be less than significant.

Birds

Thirty special-status avian species¹⁰ are likely to occur or have the potential to occur in portions of the Permit Area, depending on the species' ranges and specific habitat requirements. This section describes the potential impacts on special-status bird species and other protected¹¹ nesting bird species that may result from the continuation of the O&M activities and the implementation of minor new construction activities. Following the discussion of potential impacts, this section also discusses

¹⁰Additional information on each species' distribution and life history is provided in Table 3.4-4.

the general and specific protection measures and HCP AMMs that PG&E will continue to implement to avoid and minimize impacts on special-status birds.

PG&E's O&M and minor new construction activities may result in temporary impacts on habitat and temporary impacts on bird behavior due to increased noise, increased visual disturbances, and ground vibrations. Vegetation trimming or removal within and immediately adjacent to nesting habitat could result in the disruption of nesting behavior or loss of nests. Permanent impacts on habitat could result from installation of new facilities (e.g., a new wooden distribution pole, gas pipeline electronic testing station); however, these impacts would be small and distributed across a broad area. Most O&M activities are implemented in previously disturbed or urbanized areas and in existing gas and electric ROWs and existing access roads. Therefore, impacts on suitable nesting and foraging habitat are anticipated to be minimal. Furthermore, covered activities would involve continuing O&M on existing gas and electric infrastructure and would not result in a substantial increase in disturbance to nesting and foraging habitat.

Aerial patrols of utility infrastructure, as well as specific O&M activities on existing electric infrastructure, may require the occasional use of fixed-wing aircraft, helicopters, and possibly drones. Drones would be used for inspections in areas with poor access or thick vegetation, and they would comply with all applicable rules and regulations. The use of drones within nesting bird habitat has the potential to disturb or alter the behavior of nesting birds. Any disturbance to incubating birds could cause nest abandonment and failure. However, the use of fixed-wing aircraft, helicopters, and drones for inspecting telecommunication sites is infrequent and does not typically require hovering in one location. Further, they are generally operated at high elevations and well above nesting habitat. Therefore, impacts from aerial inspections are expected to be less than significant.

To help avoid and minimize impacts on nesting birds, PG&E has developed an Avian Protection Plan (APP) (Pacific Gas and Electric Company 2017b). The APP is implemented by biologists and other staff working on electric transmission and distribution facilities, as well as other PG&E activities near active bird nests (defined as nests containing eggs or young). PG&E is required to comply with federal and state laws and regulations that prohibit take of birds, including eggs or young, in active nests. Implementation of the APP includes the following:

- Utilizing avian-safe configurations for construction of new electric power facilities (i.e., poles), including framing for raptor protection (by increased separation of energized components), to the extent feasible.
- Utilizing insulation or other bird protection materials on exposed equipment leads during equipment repairs or pole retrofits.
- Providing a step-wise approach for reducing impacts on nesting birds that include:
 - Desktop review of activities by a biologist to determine the potential to impact nesting birds.
 - If, during nesting season, there is potential for an activity to impact nesting birds, pre-construction nesting bird surveys are performed.

¹¹ Many common bird species are also protected under the MBTA and Sections 3503, 3503.5, 3513, and 3800 of the California Fish and Game Code.

- When nesting birds are identified during surveys, nest buffers are assigned for the activity, depending upon species, nest phase, work activity duration, and other environmental factors (e.g., presence of visual screening).
- For certain species (threatened, endangered, or state fully protected), PG&E will confer with USFWS and/or CDFW when a standard buffer cannot be observed for a nesting species and covered activities cannot be reasonably modified.

The APP also addresses efforts to reduce collision and electrocution risks to California condor throughout areas where condors are known to congregate naturally and as part of the Ventana Wildlife Society condor release program. The APP formalizes ongoing training requirements for utility employees. Training includes introduction to federal and state laws that protect birds; facility design to reduce avian interactions; information on identification of active bird nests; and reporting requirements pertinent to PG&E's Special Purpose Utility Permit, issued by the USFWS.

As summarized previously, PG&E would incorporate FP-01 through FP-17 from PG&E's Bay Area O&M HCP, as described under *PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures*, for all O&M activities. Specifically, FP-01 through FP-04, FP-06 through FP-10, and FP-17 would avoid and minimize impacts on birds. FP-01 requires annual training on HCP requirements for utility employees and contractors; FP-02 requires that vehicles and equipment be parked on existing roads or in other designated areas; FP-03 and FP-04 require use of existing ROW and minimization of disturbance and limits access routes to minimize impacts on vegetation and other natural features; FP-06 requires inspection of pipes and culverts, prior to movement; FP-07 restricts speed on unpaved roads (15 mph) to minimize dust; FP-08 prohibits dumping of trash at work sites; FP-09 reduces fire risk in wildland areas; FP-10 reduces the activity footprint and time onsite to reduce potential for take of species; and FP-17 requires that trees be felled away from any exclusion zone, which would include active bird nests. PG&E would also implement its standard nesting bird protection measures to avoid and minimize disturbance to nesting birds to ensure compliance with applicable federal and state laws. With the implementation of the HCP AMMs as well as PG&E's standard nesting bird management practices, O&M and minor new construction impacts on special-status bird species and other protected bird species would be less than significant.

To further reduce less-than-significant impacts, APM BIO-6 summarizes the nesting bird protection measures and includes the following steps required for work activities during the avian nesting season (generally March 1 through August 31).

- A desktop review is conducted as part of the environmental review and planning process prior to initiating O&M activities that result in new surface disturbance or that may require vegetation trimming or removal in locations with suitable habitat for nesting birds.
- A biologist considers the type of O&M activity and location to determine if there are constraints to planned activities related to nesting birds.
- Depending on the activity type, time of year, and the results of the desktop review, a pre-construction nesting bird survey may be conducted to determine if there are active nests.
- Nesting bird surveys are conducted by a qualified biologist and are scheduled to occur within a timeframe prior to construction that is suitable for the detection of recently established nests.
- If active nests containing eggs or young are found, the qualified biologist establishes an appropriate nest buffer.

- Nest buffers are species-specific and range from 15 to 100 feet for passerines and 50 to 300 feet for raptors (2,640 feet for golden and bald eagle) depending on the planned activity's level of disturbance (low, medium, or high), site conditions, and the observed bird behavior. If necessary, buffer distances are flagged and communicated to crews before and during construction activities, and until the completion of construction activities in the vicinity of nests.
- Established buffers remain until work in the area has ended or a biologist determines the young have fledged or the nest is no longer active. Active nests are periodically monitored until the biologist has determined the young have fledged or all construction is finished. Vegetation removal by hand may be allowed within nest buffers or in areas of potential nesting activity, with a biologist's supervision. The biologist has authority to stop work if nesting pairs exhibit signs of disturbance.

Mammals

Thirteen special-status mammal species are likely to occur or have potential to occur in the Permit Area. These species include four bats (western red bat, Townsend's big eared bat, fringed myotis, and pallid bat), as well as Suisun shrew, Point Reyes mountain beaver, San Francisco dusky-footed woodrat, Sonoma tree vole, salt marsh harvest mouse, Point Reyes jumping mouse, San Joaquin kit fox, American badger, and mountain lion¹².

Pruning or removal of trees for O&M or minor new construction during the maternity season of bats (April 1 through September 15) and during the beginning of the hibernation period (November 1) may affect trees that provide suitable roosting habitat (cavities, crevices, furrowed bark, and foliage) for some special-status bats (western red bat, fringed myotis, pallid bat). Tree removal or pruning and noise associated with O&M and minor new construction activities could result in the injury, mortality, or disturbance of roosting bats if they are present in cavities, crevices, furrowed bark, or foliage of trees. Construction disturbance adjacent to bridges or other structures in the study area could disturb bats that may roost on these structures (pallid bat or maternity colonies of non-special-status bats). Mortality of roosting bats during the maternity season or hibernation period that results from tree removal or pruning trimming or other disturbances could affect individuals but is not expected to result in a substantial reduction in the local populations of these species. Existing ROWs have been subject to ongoing vegetation management activities and impacts on special-status bats would be less than significant.

Suisun shrew and salt marsh harvest mouse are known from marsh habitats in the Permit Area. O&M or minor new construction activity, including operation of equipment for land clearing, repair, or construction, could result in injury or mortality of these species. Noise and mechanical activity could result in temporary impacts on these species. To avoid and minimize impacts on marsh habitat and these special-status mammals, PG&E would incorporate FP-01 through FP-17 from PG&E's Bay Area O&M HCP, as described under *PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures*, for all O&M and minor new construction activities. Specifically, PG&E would implement FP-01 through FP-08, and FP-10 through FP-17 to avoid and minimize impacts on Suisun shrew and salt marsh harvest mouse. FP-01 requires annual training on HCP requirements for utility employees and contractors; FP-02 requires that vehicles and

¹² Additional information on each species' distribution and life history is provided in Table 3.4-4.

equipment be parked on existing roads or in other designated areas; FP-03 and FP-04 require use of existing ROW and minimization of disturbance and limits access routes to minimize impacts on vegetation and other natural features; FP-05 requires notification to the conservation land owner prior to work on protected lands; FP-06 requires inspection of pipes and culverts, prior to movement to check for wildlife; FP-07 restricts speed on unpaved roads (15 mph) to minimize dust and reduce chances for vehicular collisions with wildlife; FP-08 prohibits dumping of trash at work sites that may attract predators; FP-10 reduces the activity footprint and time onsite to reduce potential for take of species; FP-11 requires erosion and sediment controls to prevent construction site runoff; FP-12 requires establishment of an appropriate location for covered soil stockpiles; FP-13 requires daily inspection and installation of escape ramps in trenches or excavations to reduce risk of species entrapment; FP-14 requires revegetation of grassland areas where covered activity results in 0.1 acre or more of disturbance; FP-15 prohibits vehicle and equipment refueling within 100 feet of streams or wetlands unless it is within a secondary containment area; FP-16 requires a buffer of 50 feet from the edge of wetland areas, access route identification, foot access, seasonal restriction on activity and/or a biological monitor; and FP-17 requires that trees be felled away from any exclusion zone.

In addition to habitat assessments, pursuant to PG&E's environmental review process described in Section 2.9, marsh habitat is mapped as sensitive in PG&E's screening system and marsh habitat for special status mammals would be buffered according to Wetland-2 of the HCP AMMs. With the implementation of the aforementioned measures, potential direct and indirect impacts on special-status mammal species would be less than significant. To further reduce less-than-significant impacts, APM BIO-7 would help identify, minimize, and avoid impacts on roosting bats during O&M and minor new construction activities.

The Point Reyes mountain beaver and the Point Reyes jumping mouse are restricted to the Point Reyes peninsula in Marin County. Mountain beaver create complex burrow systems in densely vegetated gullies. The jumping mouse is found in coastal meadows and in coniferous and riparian forests, and it uses burrows or dense vegetation for refugia. Sonoma tree vole occurs in coastal old-growth forests. The San Francisco dusky-footed woodrat occurs in chaparral and forest with a moderate understory and creates stick nests, primarily on the ground, although some occur in the tree canopy. Each of these special-status mammal species has the potential to occur in the Permit Area. Although vehicles and equipment associated with O&M or minor new construction activities could injure or kill an individual special-status mammal, this group is primarily nocturnal and most covered activities would occur during daylight hours. However, activities that include grading, trenching, or excavation could result in death or injury of adults and young of Point Reyes mountain beaver or Point Reyes jumping mouse if these species are present. Vegetation pruning or removal could destroy or remove the nests of Point Reyes jumping mouse, Sonoma tree vole, and San Francisco dusky-footed woodrat.

To avoid and minimize impacts on these special-status mammals and their habitat, PG&E would incorporate FP-01 through FP-17 from PG&E's Bay Area O&M HCP for all covered activities. FP-01 requires annual training on HCP requirements for utility employees and contractors; FP-02 requires that vehicles and equipment be parked on existing roads or in other designated areas; FP-03 and FP-04 require use of existing ROW and minimization of disturbance and limits access routes to minimize impacts on vegetation and other natural features; FP-05 requires notification to the conservation land owner prior to work on protected lands; FP-06 requires inspection of pipes and culverts, prior to movement; FP-07 restricts speed on unpaved roads (15 mph) to minimize dust; FP-08 prohibits dumping of trash at work sites; FP-09 would reduce fire risk in wildland areas

susceptible to fire; FP-10 reduces the activity footprint and time onsite to reduce potential for take of species; FP-11 requires erosion and sediment controls to prevent construction site runoff; FP-12 requires establishment of an appropriate location for covered soil stockpiles; FP-13 requires daily inspection and installation of escape ramps in trenches or excavations; FP-14 requires revegetation of grassland areas where covered activity results in 0.1 acre or more of disturbance; FP-15 prohibits vehicle and equipment refueling within 100 feet of streams or within a secondary containment area; FP-16 requires a buffer of 50 feet from the edge of riparian areas, access route identification, foot access, seasonal restriction on activity and/or a biological monitor; and FP-17 requires that trees be felled away from any exclusion zone.

In addition to habitat assessments, PG&E's environmental review process described in Section 2.9 would require buffering of wetland and riparian habitat for special-status mammals (mountain beaver) according to Wetland-2 from PG&E's Bay Area O&M HCP. With the implementation of the aforementioned measures, potential direct and indirect impacts on special-status mammal species would be less than significant.

Three larger special-status mammals, San Joaquin kit fox, American badger, and mountain lion have been known to occur in many portions of the Permit Area. Although there are few recent observations and mortality is unlikely as a result of covered activities, adults and young of San Joaquin kit fox and American badger could be killed or injured during ground-disturbing activities in grassland habitats if occupied dens collapse. Vehicles associated with O&M or minor new construction activities could kill individuals of any of these species while moving through work areas. Kit fox natal and pupping dens would be particularly vulnerable to disturbance from activities between March 1 and August 31. As for the smaller special-status mammals, FP-01 through FP-17 from PG&E's Bay Area O&M HCP would be implemented for all covered activities. FP-01 requires annual training on HCP requirements for utility employees and contractors; FP-02 requires that vehicles and equipment be parked on existing roads or in other designated areas; FP-03 and FP-04 require use of existing ROW and minimization of disturbance and limits access routes to minimize impacts on vegetation and other natural features, including mammal burrows; FP-05 requires notification to the conservation land owner prior to work on protected lands; FP-06 requires inspection of pipes and culverts, prior to movement; FP-07 restricts speed on unpaved roads (15 mph) to minimize dust and reduce risk of vehicle collision with wildlife; FP-08 prohibits dumping of trash at work sites that may attract these species; FP-09 would reduce fire risk in wildland areas susceptible to fire; FP-10 reduces the activity footprint and time on-site to reduce potential for take of species; FP-11 requires erosion and sediment controls to prevent construction site runoff; FP-12 requires establishment of an appropriate location for covered soil stockpiles; FP-13 requires daily inspection and installation of escape ramps in trenches or excavations to reduce risk of wildlife entrapment; FP-14 requires revegetation of grassland areas where covered activity results in 0.1 acre or more of disturbance to reduce erosion and sedimentation; FP-15 prohibits vehicle and equipment refueling within 100 feet of streams or within a secondary containment area; FP-16 requires a buffer of 50 feet from the edge of riparian areas, access route identification, foot access, seasonal restriction on activity and/or a biological monitor; and FP-17 requires that trees be felled away from any exclusion zone. In addition, PG&E conducts its environmental review process, described in Section 2.9, to identify when planned O&M or minor new construction activities would occur in potential habitat. After surveys are conducted as part of this process, San Joaquin kit fox and American badger dens would be avoided to the extent practicable. If a potential kit fox or badger den is in conflict (i.e., subject to direct impacts) with a covered activity for which there is no alternative, CDFW would be consulted to determine if additional take coverage would be required to

complete the project. With the implementation of the aforementioned measures, potential direct and indirect impacts on American badger, San Joaquin kit fox, and mountain lion would be less than significant.

Critical Habitat

Portions of the PG&E utility infrastructure in the Permit Area cross critical habitat designated for a variety of plant and wildlife species as shown in Table 3.4-6.

Table 3.4-6. Critical Habitat in Permit Area

Species with Critical Habitat	Approximate Acreage of Critical Habitat in Permit Area (acres) and percentage of total in California (%)
Plant	
Franciscan manzanita	10 (4.4%)
Soft bird's beak	20 (0.9%)
Suisun thistle	20 (1.0%)
Baker's larkspur	56 (3.0%)
Yellow (golden) larkspur	19 (0.8%)
Contra Costa wallflower	42 (13.7%)
Contra Costa goldfields	1,136 (7.7%)
Antioch Dunes evening primrose	42 (13.7%)
Wildlife	
Conservancy fairy shrimp	324 (0.2%)
Longhorn fairy shrimp	12 (0.1%)
Vernal pool fairy shrimp	1,133 (0.2%)
Vernal pool tadpole shrimp	606 (0.3%)
Delta green ground beetle	32 (3.3%)
Bay checkerspot butterfly	1,731 (9.5%)
Delta smelt	20,293 (2.5%)
Chinook salmon	2 (0.1%)
Steelhead	70 (0.8%)
Tidewater goby	12 (0.1%)
California tiger salamander (Central California DPS and Sonoma County DPS)	6,210 (2.6%)
California red-legged frog	10,353 (0.6%)
Alameda whipsnake	4,240 (2.7%)
Western snowy plover	88 (0.6%)
Marbled murrelet	342 (0.1%)
Northern spotted owl	224 (0.0%)

Source: U.S. Fish and Wildlife Service 1978a and b, 1980, 2002, 2003a and b, 2006a through f, 2007a and b, 2008, 2010, 2011b and c, 2012, 2013a and b

^a Critical habitat designations for individual species overlap in portions of the study area; therefore, the approximate distance crossed by PG&E pipelines is counted more than once in portions of overlapping critical habitat for different species.

Temporary impacts on designated critical habitat resulting from O&M or minor new construction activities may occur during soil excavation, soil stockpiling, ROW access road repair, vegetation removal, and work at staging/laydown areas. Impacts in critical habitat areas would be primarily temporary disturbances and short in duration. Minimal amounts of permanent habitat disturbance (i.e., conversion of habitat to a facility footprint) would result from covered activities. Activities that may result in new permanent impacts on critical habitat would include the minimal expansion of existing facilities, including, for example, installation of new wood poles, pipeline cathodic protection, or electronic testing stations. In general, routine O&M activities are located on existing facilities in areas that have been previously disturbed, such as existing gas and electric transmission and distribution ROWs and access roads where suitable habitat for a special-status species is limited. Therefore, ongoing O&M activities would not create significant impacts on designated critical habitat. Minor new construction activities could also be implemented in designated critical habitat for a special-status species; however, because of the relatively small proportion of temporary and permanent impacts associated with this activity, significant impacts on critical habitat are not likely.

The O&M activities required for the existing gas and electric transmission and distribution infrastructure have been ongoing for decades and continue to be implemented on existing facilities. In addition, PG&E would implement the applicable AMMs from PG&E's Bay Area O&M HCP, as identified under *PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures*. FP-01 through FP-17 would be applied to all O&M and minor new construction activities. FP-01 would address potential impacts on critical habitat by requiring a worker education program that would cover site-specific biological resources. The area of disturbance would be confined to the smallest practical area, and work area boundaries would be delineated with flagging or other markings to minimize surface disturbance under FP-02, FP-03, FP-04, and FP-10. If a covered activity in critical habitat is unavoidable, PG&E would implement habitat restoration where 0.10 acre or more of special-status species grassland habitat may be affected by ground disturbance or vegetation removal during pre-construction, construction, operations, and decommissioning activities, in accordance with FP-14.

In order to reduce potentially significant impacts, PG&E would implement additional measures that specifically address impacts on critical habitat. In accordance with APM BIO-1, PG&E would implement weed management actions to prevent the spread of invasive weeds and nonnative species that could potentially alter critical habitats. In addition, PG&E would minimize the removal of vegetation and new site disturbance and would consider soil erosion and deposition, soil compaction, and disturbance to topography. In accordance with APM BIO-3, project siting and design would avoid unique plant assemblages, climate refugia, and occupied and suitable habitat for special-status species. In accordance with APM BIO-4, special-status plant occurrences would also be avoided to the maximum extent practicable.

To ensure that impacts are mitigated to a less-than-significant level, PG&E is proposing MM BIO-1, which provides mitigation for disturbance from permanent impacts on California tiger salamander and Alameda whipsnake critical habitat at a 3-to-1 ratio. With the implementation of MM BIO-1, along with the previously mentioned measures, potential impacts on critical habitat for these species would be less than significant.

Through MM BIO-1, PG&E would have an obligation to acquire mitigation lands at predetermined ratios on an ongoing basis for California tiger salamander, Alameda whipsnake, and California freshwater shrimp. Activities required for land management typically include vehicle use in or near

upland habitat, regular pedestrian surveys or sampling, installation and maintenance of fencing, and use of handheld equipment to manage vegetation and invasive species and otherwise enhance or restore habitat. In the course of acquiring, managing, monitoring, and enhancing mitigation lands consistent with a CDFW-approved management plan, take of covered species could result. However, acquisition, preservation, and management of mitigation lands would provide for the long-term benefit of California tiger salamander, Alameda whipsnake, and California freshwater shrimp, as well as other wildlife or plant species that share this habitat.

The total amount of permanent disturbance associated with minor new construction is estimated at 168.3 acres over 30 years. Although specific locations are not known, it can be assumed that service extensions will be located in proportion to existing modeled habitat throughout the Permit Area, and impacts would be similar to those described in the PG&E's Bay Area O&M HCP. It can also be assumed that some O&M and minor new construction activities associated with electric transmission may be the subject of separate CEQA analysis through the California Public Utilities Commission's General Order 131-D process.

Although the HCP AMMs and APMs identified under *PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures* are primarily designed to address impacts on California freshwater shrimp, California tiger salamander, and Alameda whipsnake, the implementation of these measures would avoid and minimize impacts on many sensitive habitats. Therefore, with implementation of these measures, O&M activities would not adversely modify designated critical habitat for these species. Impacts would be primarily temporary disturbances and short in duration, and minimal amounts of permanent habitat disturbance to critical habitat would result from O&M activities. In addition, temporarily disturbed areas would be restored in a manner that would assist in the reestablishment of biological values. Therefore, potential impacts on critical habitat for Alameda whipsnake, California tiger salamander, and other species would be less than significant.

Impact BIO-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFW or USFWS (Less-than-Significant Impact)

The Permit Area crosses 21 natural communities considered to be sensitive as designated by a state ranking of S1, S2, or S3. Three additional natural communities are identified in the Permit Area and remain to be assessed and assigned a ranking by CDFW, specifically North Central Coast California Roach/Stickleback/Steelhead Stream, North Central Coast Steelhead/Sculpin Stream, and Sacramento-San Joaquin Coast Lagoon. All wetland and riparian communities are considered sensitive natural communities. Therefore, the following 23 sensitive natural communities are known in the Permit Area:

- Alkali Meadow
- Alkali Seep
- Central Dune Scrub
- Cismontane Alkali Marsh
- Coastal and Valley Freshwater Marsh
- Coastal Brackish Marsh

- Coastal Terrace Prairie
- Monterey Pine Forest
- Northern Claypan Vernal Pool
- Northern Coastal Salt Marsh
- Northern Hardpan Vernal Pool
- Northern Interior Cypress Forest
- Northern Maritime Chaparral
- Northern Vernal Pool
- Serpentine Bunchgrass
- Stabilized Interior Dunes
- Sycamore Alluvial Woodland
- Valley Needlegrass Grassland
- Valley Oak Woodland
- Valley Sink Scrub
- Wildflower Field
- Riparian (unclassified)
- Wetland (unclassified)

In the Permit Area, with the exception of unclassified riparian and wetland communities (which would generally be avoided, as discussed elsewhere in this section), the amount of land cover in the Permit Area for each of these sensitive natural communities represents less than 10% of identified acreage in California. Alkali Meadow (9.4%), Alkali Seep (8.7%), and Serpentine Bunchgrass (9.8%) represent the highest proportion of these communities in the Permit Area. Less than 5% of identified acreage in California for each of the remaining sensitive natural community types is represented in the Permit Area (Table 3.4-2).

Impacts on sensitive natural communities may result from temporary disturbance in areas that have been previously disturbed, such as existing gas and electric transmission and distribution facility ROWs and existing access roads. Temporary disturbances to sensitive natural communities include impacts during vegetation management, soil excavation, soil stockpiling, repair work to ROW access roads, and work at staging/laydown areas. Permanent impacts are those impacts that result in the conversion of small areas (usually less than 0.1 acre) within sensitive natural communities to a facility footprint. Activities that may result in permanent impacts include the expansion of existing facilities, including limited expansion of existing substations or gas facilities, installation of new electric poles or towers, pipeline cathodic protection systems, or erosion control structures. Because a majority of utility facilities is concentrated in urban or pre-disturbed settings, O&M and minor new construction activities would result in a minimal amount of permanent habitat disturbance, and the majority of impacts on sensitive natural communities, as a result of covered activities, would be temporary. It is estimated that minor new construction would be distributed across the same landscape as existing facilities and ROWs, with the distinction that some minor new construction would extend beyond existing ROW or facility footprint. However, with the relatively small

proportion of temporary and permanent impacts associated with this activity, and the already limited interface of existing facilities within or adjacent to sensitive natural communities, significant impacts on sensitive communities are not likely.

Impacts from covered activities on sensitive natural communities are expected to be small, localized, and primarily temporary in nature. Thus, minimal impacts on sensitive natural communities identified in local or regional plans, policies, or regulations are anticipated. Minimal impacts could include the alteration of soil, topography, or vegetation, which could change the plant and wildlife species present in sensitive natural communities. All habitats containing water features are identified as sensitive natural communities and impacts on water features could change the ecological functions of these communities. As part of the HCP AMMs, PG&E would implement FP-01 through FP-11 for all covered activities. FP-01 would reduce impacts on sensitive natural communities through worker education programs tailored to specific activities and site-specific biological resources; FP-02, FP-03, FP-04, and FP-10 would confine work areas, soil disturbance, and vegetation removal to the smallest area possible, while avoiding special habitat features to the extent possible; and FP-15, FP-16, Hot Zone-1, Hot Zone-6, Wetland-1, and Wetland-2 would require maintenance of buffers around wetland and riparian areas. To further avoid and minimize the potential to adversely affect sensitive natural communities, PG&E would conduct habitat restoration where 0.10 acre or more of special-status species grassland habitat may be affected by ground disturbance or vegetation removal during pre-construction, construction, operations, and decommissioning activities in accordance with FP-14. In addition, PG&E would prevent sedimentation and toxic material runoff into water features, as well as the alteration of water features, by continuing to comply with the Construction General Permit and through the continued implementation of PG&E's BMPs for water quality as described above. With these measures, direct and indirect impacts on sensitive natural communities would be less than significant.

PG&E would further reduce less-than-significant impacts through implementation of APM BIO-1, reducing the potential for the introduction of nonnative plant species through weed management actions. In addition, project siting and design would, to the maximum extent practicable, avoid impacts on vegetation types, unique plant assemblages, and climate refugia, as well as suitable habitat for special-status species as described in APM BIO-3.

Impact BIO-3: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means (Less-than-Significant Impact)

Depending on the size, type, and location of O&M or minor new construction activity, agency-required permits may include water quality certifications from the RWQCB under Section 401 of the CWA, authorization from USACE under Section 404 of the CWA, and/or an LSAA from CDFW under Section 1600 of the California Fish and Game Code. Impacts would be mitigated accordingly on a permit-by-permit basis. Impacts that may affect jurisdictional water features (including, but not limited to, marsh, vernal pool, coastal, etc.) could result from directional drilling (or microtunneling) for below-grade channel crossing of linear utilities, pipeline coating replacement, pipeline repair, electric pole or tower repair, road maintenance, erosion control, culvert installation, and road crossings. These activities and their associated impacts are described in Section 3.9.

Degradation of state or federal jurisdictional water features could also result from erosion and sedimentation from various ground-disturbing activities, as well as the introduction of noxious

weed species that could compromise the integrity of the habitat. Likewise, vehicles and equipment working in close proximity to waters could cause the discharge of hazardous materials into waters.

To avoid and minimize these potential impacts, PG&E would implement BMPs for impacts that are less than 1 acre and/or are wholly within the existing ROW or would comply with the Construction General Permit, which requires the implementation of a SWPPP for construction activities disturbing 1 or more acres of land. In addition, stormwater discharge for activities that disturb smaller areas would continue to be addressed through the application of PG&E's BMPs for water quality. In addition, PG&E would comply with the requirements from its Statewide Natural Gas Utility Discharge Permit (Statewide Permit) issued by the SWRCB in January 2018. The Statewide Permit covers planned, unplanned, and emergency discharges that would result from the hydrostatic testing of new or existing gas pipelines, dewatering from trenches, and other discharges resulting from construction and O&M of natural gas facilities.

PG&E's BMPs for water quality also require the monitoring and reporting of environmental impacts associated with construction or operational activities to ensure regulatory compliance and protection of resources. If required by the type and nature of the activity affecting the state or federal jurisdictional water feature, PG&E would provide notification or apply for coverage under appropriate permits prior to beginning an activity within a jurisdictional water feature. PG&E's implementation and compliance with the conditions and measures of the issued permits—as detailed in Section 3.10—would reduce impacts by limiting construction work areas within streams, protecting channels and banks from potential erosion, providing for restoration of streams, and requiring that installation of any structure would not affect water flow.

To specifically address erosion and siltation for activities that disturb less than 1 acre, PG&E would return water features to their pre-construction grade and cover disturbed soil areas with a combination of temporary and permanent vegetative stabilization measures, including reseeding where appropriate. PG&E would continue to install and maintain a stabilized entrance and exit to work areas and restore disturbed entrance and exit areas following the completion of construction. Furthermore, implementation of the SWPPP for activities disturbing 1 acre or more would also reduce potential impacts on water quality by minimizing erosion and limiting sediment transport from the study area. In addition, PG&E would implement FP-01 through FP-11 from PG&E's Bay Area O&M HCP for all covered activities. Under FP-01, a worker education program would provide identification of and information on legal protections for resources in the Permit Area, including water features. Under FP-02, FP-03, FP-04, and FP-10, PG&E would limit the work area and resulting soil and vegetation disturbance to the smallest practicable area; FP-11 and FP-12 would address potential soil erosion and sedimentation. In addition, FP-14 further details habitat restoration where 0.10 acre or more of sensitive habitats (i.e., grassland) may be affected by ground disturbance during covered activities. Through implementation of these measures and the aforementioned BMPs for water quality and coordination with agencies, no substantial adverse effects on wetlands would occur and potential impacts on wetland habitats and other jurisdictional water features would be less than significant.

To further reduce less-than-significant impacts, PG&E would implement weed management actions as described in APM BIO-1 during all phases of activities and avoid the potential impacts of invasive weeds on water features. PG&E would also conduct siting and design for new permanent facilities to avoid unique plant assemblages and suitable habitat for special-status species that are often characteristics of water features, in accordance with APM BIO-3.

Impact BIO-4: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites (Less-than-Significant Impact)

To maintain safe and effective operations and maintenance of gas and electric utility infrastructure, PG&E has managed gas and electric facility ROWs since their construction, preventing excessive vegetation growth. Because overhead electric facilities and underground gas facilities are not barriers to wildlife movement, these managed utility corridors have accommodated wildlife movement throughout many areas. However, impacts on native wildlife movement or native wildlife nursery sites, may result from temporary disturbance in proximity to these areas which have been previously disturbed by the installation, operation, and maintenance of existing gas and electric facility ROWs and access roads, decades ago. The repair of facilities, the presence of construction equipment and personnel, and associated noise could divert wildlife using linkages or interrupt behavior at nesting or nursery sites in proximity to work activity at certain times of the year. Road maintenance and other covered activities may temporarily change terrain conditions. Vegetation clearing may reduce cover for certain transitory wildlife from predators, introduce invasive plant species and change linkage habitat conditions, although this clearing has occurred repeatedly and will not be substantially different from baseline conditions.

A majority of O&M activities are small, localized, and primarily temporary in nature. While the conversion of linkage habitat to a facility footprint during O&M or minor new construction could permanently change native wildlife movement, aboveground structures that may be installed would have small footprints (e.g., less than 50 square feet for an electric transmission tower installation, or up to 2,614 square feet for adding fencing to an existing gas facility). The largest footprint for permanent disturbance would be for the minor expansion of an existing substation, which would not eliminate existing corridors that may exist at or near such facilities. The Pacific Flyway for avian species, or flight corridors for Bay checkerspot butterfly, would not be affected by O&M of existing facilities.

PG&E would implement FP-01 through FP-17 from PG&E's Bay Area O&M HCP for all covered activities to reduce potential impacts on native wildlife movement. These measures would require the following.

- Conduct environmental training.
- Minimize ground disturbance.
- Flag work area boundaries.
- Require crews to stay within designated work areas.
- Prevent the spread of invasive weeds.
- Minimize the removal of vegetation.
- Evaluate activities disturbing 0.10 acre or more.

Implementation of these measures would reduce the amount of disturbance to linkage habitat, while also protecting species actively moving through the study area. In addition, habitat evaluations would ensure that behaviors necessary for the survival of special-status species (e.g., breeding, nesting, burrowing, migration, foraging) are not significantly disrupted by the planned activity and associated noise.

To minimize the potential to adversely affect sensitive wildlife movement areas, including water features and identified linkages, PG&E would implement habitat restoration where 0.10 acre of grassland habitat may be affected by ground disturbance, in accordance with FP-14. PG&E would also minimize creation or development of new access roads, and any new access road considered within suitable habitat or identified linkages for special-status species would be temporary or unpaved to avoid negatively affecting function of any known or identified linkages. As discussed previously under Impact BIO-1, O&M and minor new construction activities within water features would be avoided and impacts on fish and fish habitat are not anticipated. Because no new infrastructure is anticipated to be installed in a watercourse, activities are not expected to impede fish or aquatic species movement. Habitat disturbance near stream channels or rivers would be temporary and watercourses would be restored to pre-construction conditions. Covered activities are not known to cut off or restrict the access of a wildlife species to a known breeding or nursery site. With incorporation of the aforementioned measures, impacts on fish and wildlife species movements through the study area would be less than significant.

To further reduce project impacts during siting and design for new facilities, PG&E would avoid impacts to the extent feasible in occupied and suitable habitat and identified linkages for special-status species in accordance with APM BIO-3. To minimize and avoid impacts on nursery sites, APM BIO-6 would be implemented for birds; APM BIO-7 would be implemented for bats.

Impact BIO-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (No Impact)

Although not subject to local regulation, the covered activities generally would not conflict with any local policies or ordinances protecting biological resources. PG&E strives to be consistent with local requirements for the protection of biological resources, where feasible, while remaining consistent with safety considerations. Local plans and policies continue to be considered during the environmental review process. There would be no impact.

Impact BIO-6: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan (Less-than-Significant Impact)

There are multi-jurisdictional and collaborative efforts for conservation in the implementation or planning stages within the study area, including East Contra Costa County HCP/NCCP, the Santa Clara Valley HCP/NCCP, the Solano HCP, and the San Bruno Mountain Area HCP. These HCP/NCCPs include biological goals and objectives for covered species and are generally designed to avoid, minimize and mitigate impacts on covered species from development and urbanization projects.

Where PG&E's Permit Area overlaps with the service area of these other plans, covered activities could conflict with management actions within these other plans. However, PG&E's O&M activities are unlikely to impede the goals and objectives of these plans, because PG&E would avoid siting new facilities within protected areas so minor new construction activities do not conflict with adopted HCP/NCCPs. PG&E may participate with HCP/NCCP managers to leverage and expand the regional species and habitat conservation benefits associated with these plans. For example, PG&E has gas and electric facilities within the San Bruno Mountain HCP area and works with the San Mateo to manage facilities in compliance with the HCP.

There may be some instances where conservation land managers may request PG&E to execute its work differently, but these differences do not rise to the level of an inherent conflict with the provisions of an adopted HCP/NCCP, since those plans would have been drafted to acknowledge PG&E's obligation to maintain its facilities in safe operating condition according to state and federal laws, and exempt from any conflicting local discretionary regulations. PG&E's Bay Area O&M HCP authorizes take of federally listed species in the Permit Area incidental to the covered activities and APMs discussed in this EIR, subject to implementation of applicable AMMs. PG&E's ITP authorizes take of state listed species in the Permit Area incidental to the covered areas, subject to implementation of measures specifically designed to protect sensitive resources and listed species. PG&E's compliance with its take authorizations reduces the likelihood of conflict with these plans. As a result, PG&E's project would not conflict with the provisions of an adopted HCP/NCCP or other local, regional, or state HCP and impacts would be less than significant.

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3.5 Cultural Resources

3.5.1 Existing Conditions

3.5.1.1 Regulatory Setting

Federal

National Historic Preservation Act

Any activity that requires a federal action or permit (e.g., Clean Water Act Section 404 permit, conditional use permit from a federal land manager) is subject to compliance with Section 106 of the National Historic Preservation Act (16 United States Code [USC] Section 470 et seq.). Section 106 requires an analysis of potential impacts on historic properties. Under the act, resources that are eligible for listing on the National Register of Historic Places (NRHP) are considered historic.

Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (25 USC Sections 3001–3013) requires federal agencies to consult with the appropriate Native American tribes prior to any activity that could result in the intentional or inadvertent excavation of human remains and funerary objects on federal and tribal lands. The act requires development of a Plan of Action.

Archaeological Resource Protection Act

Cultural resources on federal lands are protected by the Archaeological Resource Protection Act (16 USC Sections 470aa–mm), which regulates the excavation of archaeological sites on federal and Indian lands, and the removal and disposition of archaeological resources.

State

California Register of Historical Resources

Under Section 21083.2 of the California Environmental Quality Act (CEQA), a unique archaeological resource is an object, artifact, structure, or site that can be clearly shown to have a high probability of meeting any of the following criteria.

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
2. Is associated with the lives of persons important in our past.
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic value.
4. Has yielded, or may be likely to yield, information important in precontact or history.

Under Section 21084.1, an historical resource is a resource listed on, or eligible for listing on, the California Register of Historical Resources (CRHR). Eligible resources include properties that are

listed on the NRHP. In addition, Points of Historical Interest nominated since January 1998 are jointly listed as Points of Historical Interest and in the CRHR.

Resources listed in a local historic register or deemed significant in a historical resources survey, as provided under Public Resources Code Section 5024.1(g), are presumed to be historically or culturally significant unless the preponderance of evidence demonstrates that they are not. A resource that is not listed on the CRHR, determined to be ineligible for listing on the CRHR, not included in a local register of historical resources, or not deemed significant in a historical resources survey may nonetheless be historically significant, as determined by the lead agency (Public Resources Code Sections 21084.1 and 21098.1).

Native American Historic Resource Protection Act (Assembly Bill 52)

Assembly Bill (AB) 52, the Native American Historic Resource Protection Act (Public Resources Code Sections 5097–5097.993), sets forth a proactive approach intended to reduce the potential for delay and conflicts between Native American and development interests. AB 52 established that tribal cultural resources (TCRs) must be considered under CEQA and also provided additional Native American consultation requirements for lead agencies. A TCR is a site, feature, place, cultural landscape (geographically defined in terms of size and scope), sacred place, or object that is considered of cultural value to a California Native American tribe. A TCR is a resource on or eligible for the CRHR or a local historic register, or a resource that the lead agency determines meets the CRHR listing criteria. The lead agency may choose, at its discretion and with input from a Native American tribe, to treat a resource as a TCR if there is substantial evidence to support the determination. AB 52 also mandates lead agencies to consult with tribes, if requested by the tribe, and sets the principles for conducting and concluding consultation.

A substantial adverse change to a TCR constitutes a significant effect on the environment unless mitigation reduces such effect to a less-than-significant level.

California Health and Safety Code and Public Resources Code

Broad provisions for the protection of Native American cultural resources are contained in California Health and Safety Code, Division 7, Part 2, Chapter 5, Sections 8010 through 8030.

Several provisions of the Public Resources Code also govern archaeological finds of human remains and associated objects. Procedures are detailed under Public Resources Code Sections 5097.98 through 5097.996 for actions to be taken whenever Native American remains are discovered. Furthermore, Section 7050.5 of the California Health and Safety Code states that any person who knowingly mutilates or disinters, wantonly disturbs, or willfully removes human remains in or from any location other than a dedicated cemetery without authority of law is guilty of a misdemeanor, except as provided in Section 5097.99 of the Public Resources Code. Any person removing human remains without authority of law or written permission of the person or persons having the right to control the remains under Public Resources Code Section 7100 has committed a public offense that is punishable by imprisonment.

Local

Because the California Public Utilities Commission (CPUC) has exclusive jurisdiction over project siting, design, and construction, the project is not subject to local land use and zoning regulations or

discretionary permits. The following discussion of regulations that designate local historic resources is provided for informational purposes and to assist with CEQA review.

Many San Francisco Bay Area (Bay Area) counties and cities have adopted optional historic preservation general plan elements or enacted local ordinances that recognize and preserve historic sites. At least 19 Bay Area cities participate in the Certified Local Government Program through the California Office of Historic Preservation. The program is a partnership among local governments, the Office of Historic Preservation, and the National Park Service, which is responsible for administering the National Historic Preservation Program. Participating cities include Alameda, Benicia, Berkeley, Campbell, Danville, Los Altos, Los Gatos, Napa, Oakland, Palo Alto, Redwood City, Richmond, San Francisco, San Jose, Santa Clara, Saratoga, Sausalito, Sunnyvale, and Vallejo.

3.5.1.2 Environmental Setting

Precontact

Archaeological investigations demonstrate evidence of human occupation of the Bay Area during the early Holocene period; older archaeological traces may exist on the submerged continental shelf or below the waters and sediments of San Francisco Bay. Anthropologists recorded that the first native Californians lived on the Sonoma County coast (Duncan's Landing), in the Los Vaqueros area of Alameda County, and at sites in Santa Clara County. As the San Francisco, San Pablo, and Suisun Bays emerged, denser human settlements followed; the chronology of the archaeological sites follows the establishment of tidal wetlands around the bay. The Bay Area was once occupied by dense Native American settlements consisting of Miwok, Ohlone (formerly known as Costanoan), Northern Valley Yokuts, Coast Miwok, Southern Patwin, Wappo, and Pomo tribal groups.

Nelson conducted the first intensive survey of archaeological sites in the Bay region from 1906 to 1908 (Moratto 1984). Nelson explored the San Francisco Bay shoreline and adjacent coast from the Russian River to Half Moon Bay, and documented 425 earth mounds and shell heaps. The most important archaeological sites documented in the San Francisco Bay region through the work of Nelson are along the bayshore of Alameda and Contra Costa Counties, including the Emeryville Shellmound (Ala-309), the Ellis Landing Site (CCo-295), and the Fernandez Site (CCo-259). These sites provided the basis for the first model of cultural succession in central California. Abundant shellmounds were recorded in this littoral zone, and archaeologists have since recovered nonobsidian lithics, bay oyster and mussel shells, human burial remains, charmstones, incised bone tubes, red ochre, cobble mortars, and Olivella saucer and saddle beads, among others. An important feature of the bayshore shellmounds is their great volume, which implies either recurrent settlement over long spans of time or sedentism (a term applied to the transition from nomadic to permanent, year-round settlement) by large populations.

An aboriginal cultural sequence was devised for Marin County in 1954 by Beardsley based on 16th-century exotic artifacts in shellmounds located at Point Reyes (Beardsley 1948). It is composed of three distinct horizons: the Windmillier Facies, representing the Early Horizon; the McClure Facies, representing the Middle Horizon in the Coastal Province and linked to the Ellis Landing Facies on the Bay; the Mendoza, and the Estero Facies, representing the Late Horizon. Middle Horizon coastal deposits have been found to extend below present ground and water levels; antecedent Early Horizon components underlying these may still lie undisturbed for ultimate discovery and excavation. Urban growth in the Bay Area has damaged or destroyed more than 50% of the estimated 9,675 archaeological sites formerly present.

The Early Horizon consists of sites that lie on subsurface clay knolls that barely protrude through silts accumulated on the flat valley floor. The deposit mass is extremely indurated where stones and bones alike are encrusted with mineral deposits, and chemical alteration has occurred. Associated artifacts include Olivella and Haliotis shells, red ocher, bone splinter awls, bird-bone tubes, and various ceremonial implements. The most striking cultural trait is the burial position and orientation; more than 90% of the remains discovered are buried face down in extended positions, arms at the sides and legs together as though tied, and the head always oriented to the west. Excavations at Borax Lake, by archaeologists Post and Harrington, resulted in the discovery of 15 fluted points on the surface and five subsurface points being recovered during excavation; all are dated to the Early Horizon. Subsurface investigations also revealed stone crescents, square-stemmed and leaf shaped projectile points, manos, milling slabs, and single-edged blades (Wallace 1978).

The Middle Horizon is characterized by infrequent round-bottom mortars, shaped pestles, numerous crude stone sinkers, net mesh gauges, long, heavy projectile points, finely chipped stone drills, quartz crystals with pitch, abundant bone artifacts, and baked-earth steaming ovens. Depth of deposit in Coastal Province components has a range of 2–24 feet; much of this variation is due to a more permanent habitation, greater percentage of thick-shelled mollusks in the diet of certain localities, or similar factors related to length of occupation.

The Late Horizon (Phase I) settlements are found in all parts of the Bay Area. This horizon is characterized by Olivella beads, new Haliotis ornament shapes, and domestic utensils rather than ceremonial or ornamental objects. Burials associated with this horizon are found to include charred basketry, fibers, acorns, and other remains below the skeleton, indicating pre-internment burnings of offerings in the grave pit.

Ethnography

At the time of European contact, the Bay Area was inhabited by six groups—the Ohlone, Coast Miwok, Northern Valley Yokuts, Wappo, Pomo, and Southern Patwin.

Ohlone

The precontact inhabitants of the Bay Area were collectively known as the Costanoans, which is a linguistic designation that covered approximately 50 separate and politically autonomous nations or tribelets. The term *Costanoan* is derived from the Spanish word *Costaños*, or “coast people,” and designates a linguistic family of eight languages. Modern descendants of the Costanoan prefer to be known as Ohlone and formed a corporate entity in 1971, the Ohlone Indian Tribe. The two terms are used interchangeably in much of the ethnographic literature.

The Ohlone tribal groups that occupied the east shore of San Francisco Bay between Richmond and San Jose numbered approximately 2,000 people in 1770 and spoke a language called Chochenyo. The tribal group that occupied the San Francisco peninsula, today’s San Francisco and San Mateo Counties, numbered approximately 1,400 people in 1770. They spoke a language known as Ramaytush. Tribal groups occupying the area from the Pacific Coast to the Diablo Range and from the southern San Francisco peninsula to Point Sur spoke the other seven languages of the Ohlone family.

The basic unit of Ohlone political organization was the tribelet, consisting of one or more socially linked villages and smaller settlements within a recognized territory. Tribelet leadership was vested

in a chief and a council of elders who served mainly as advisers to the community; principal villages were established at the juncture of two or more biotic communities. Archaeologists have documented specific trading patterns among the Ohlone tribes. Several hundred different types of trade items have been documented for various trade networks within California. Shells and shell beads were the most frequently reported trade items. An important trade item to the Ohlone was cinnabar, which was quarried at the New Almaden area of Santa Clara County.

Northern Valley Yokuts

Ethnographic work with the Northern Valley Yokuts is lacking. Because of the early decimation of the aboriginal populations, most information regarding this group is gleaned from translated accounts by Spanish military men and missionaries.

Northern Valley Yokuts territory is defined roughly by the crest of the Diablo Range on the west and the foothills of the Sierra Nevada on the east. The Yokuts may have been fairly recent arrivals in this area, perhaps having been pushed out of the foothills about 500 years ago. Northern Yokuts territory includes portions of Contra Costa and Alameda Counties; however, populations were concentrated along waterways and on the more hospitable east side of the San Joaquin River.

Population estimates for the Northern Valley Yokuts vary from 11,000 to more than 31,000 individuals. Villages, or clusters of villages, made up tribelets. The number of tribelets is estimated at 30 to 40, with each tribe speaking its own dialect of the Yokuts language. Combined with the Southern Valley Yokuts and the Foothill Yokuts dialects, these tongues formed the Yokutsan linguistic family of the Penutian Stock.

Principal settlements were located on the tops of low mounds on or near the banks of the larger watercourses. Settlements were composed of single-family dwellings, sweathouses, and ceremonial assembly chambers. Dwellings were small and lightly constructed, semi-subterranean, and oval. The public structures were large and earth covered. Sedentism was fostered by the abundance of riverine resources in the area.

Most Northern Valley Yokuts groups had their first contact with Europeans in the early 1800s when the Spanish began exploring the Sacramento–San Joaquin River Delta. The gradual erosion of Yokuts culture began during the Mission Period (1769–1832). Spanish missionaries forced European habits and tastes onto the Native Americans, and introduced European diseases, which played a large role in the decimation of the native population. Over time, people left the missions either to return to their native group or to form new associations. Eventually, tribal and territorial adjustments were set in motion. Native American populations were further displaced by the California Gold Rush, which began in 1849. As a result of losing their ancestral lands, many Yokuts resorted to wage labor on farms and ranches. Others were resettled on land set aside for them on the Fresno and Tule River reserves.

Coast Miwok

The Coast Miwok tribal group inhabited the Bay Area from present-day Sausalito north to Duncan's Point, including Bodega Bay, Tomales Bay, and San Pablo Bay eastward to Sonoma. The Coast Miwoks most likely inhabited the area for 5,000 years until the arrival of white settlers. At the time of European contact, the Coastal Miwok population was estimated around 1,500. The term *Miwok* refers to an ethnographic grouping of people who shared similar cultural and linguistic traits, and does not refer to a politically unified entity.

The basic unit of Coast Miwok political organization was the village community, or tribelet, composed of several small villages with an area of 200 to 300 square miles. Tribelets ranged in size from 40 to 200 members with the chief of the tribelet residing in the community's principal village. The Miwoks lived in dome and conical shaped houses that were covered with redwood boards, grass, or tule. The grass houses had a willow frame covered with bundled grass and a tule mat or animal hide was used to mark the entrance to the home. Other structures common to the Miwok people included sweathouses and roundhouses used primarily for ceremonies and purification rituals. Archaeological evidence suggests that Miwoks inhabited areas near bays, streams, and lagoons that provided an abundance of food.

The Coast Miwok food sources depended on the seasons and what was available to them; they ate most of their food fresh, although some fish and eggs were dried. In spring, the Miwok diet consisted of harvested buckeye nuts, fresh native clover, sap of black and white oaks, and honey from bees; in the summer they harvested kelp at low tide; and in the fall hazelnuts and peppernuts were gathered and prepared. The Coast Miwok diet was also supplemented by deer, elk, antelope, rabbits, ducks, geese, and rodents. The ocean provided food year round, including crab, mussels, clams, and oysters; after the meat was eaten, women would use the shells as ornaments. There is archaeological evidence showing a highly developed monetary system, based on the exchange of disk clam-shell beads and the existence of trade between neighboring tribal groups.

The first documented European contact in Coast Miwok territory was by Sir Francis Drake in 1579. Drake was followed by Rodriguez Cermeno 16 years later in 1595. The Spanish settlers established missions and forced evangelization of the Coast Miwok from the missions at San Francisco, San Rafael, and Sonoma. The introduction of European diseases almost completely wiped out the Coast Miwok populations.

Southern and Kashaya Pomo

The Pomo tribal group consisted of seven distinct languages and cultures. Two of these language and culture groups, the Kashaya and Southern Pomo, have territories almost exclusively in modern Sonoma County.

The Kashaya occupied a region of about 30 miles along the coastline and roughly 5–13 miles inland. This area covers the mouth of the Russian River, the Austin Creek watershed, and the southern headwaters of the Gualala River. The first contact the Kashaya had with Europeans was with the Russian-American Company around the time of the founding of Fort Ross in 1812. The deadly small pox epidemic of 1837 entered California at Fort Ross and quickly moved through areas in Sonoma County to the Sacramento Valley, decimating already stressed Native American populations. As ranchers of Mexican and Euro-American descent moved into the area, the Kashaya settled in communities on ranches.

The Southern Pomo occupied a region that extended south of the current city of Santa Rosa north about 40 miles to the Sonoma County border, and from an area near Geyserville bordering the Wappo on the east to the border with the Kashaya along Austin Creek watershed. They held a roughly 15-mile length of the coastline to the immediate north of the Kashaya around Stewart's Point to the mouth of the Gualala River. The Southern Pomo acculturation experience was much harsher than that of the Kashaya. Missionization, slave raids by settlers, disease, and a more intense settlement of their territory by immigrants led to a quick decimation of the Southern Pomo peoples.

Three basic structure types were constructed by all Pomo groups: dwellings, temporary shelters, and semi-subterranean houses. The Kashaya constructed their buildings from the readily available redwood, creating conical dwellings of redwood slabs. The Southern Pomo created a pole and thatched grass structure for family houses. Simple brush shelters were used in the summer and in temporary camps. Sweathouses and dance/assembly houses were semi-subterranean and earth covered. Acorns were stored in the house structures in large baskets instead of granaries.

Wappo

The Wappo occupied two discontinuous areas in modern day Napa, Sonoma, and Lake Counties. The larger area extended directly north of the current cities of Napa and Sonoma and to the north of Middletown and Cloverdale. This area included most of the Napa River watershed, the upper portions of Pope Creek, the southern headwaters of Putah Creek, Elk Creek, and a stretch of the Russian River. The smaller area was north along Cole Creek and a length of the south shore of Clear Lake.

The Wappo followed the tribelet pattern in which a semi-permanent village located near a continuous source of water acted as the center of the group. A large village would include perhaps 40 houses oval in shape and constructed of grass thatch over a framework of bent poles of varying sizes. One or two sweathouses would be near the center of the settlement with the doors oriented to the south. Stones, sticks, and shells were used to form most of the tools used by the Wappo. Several important obsidian sources are located within or near their territory including the well-known Borax Lake, Napa Valley, and Mount Konocti sources.

The founding of the mission of San Francisco Solano brought the area under Mexican rule. Many Indians were brought into the mission as converts, including several recorded Wappo tribelets (Mayacama near Calistoga with 103 converts, Loknomi near Middletown with 112). With the granting of ranchos came a curtailing of traditional hunting and gathering. Many Wappo became settled on the ranchos and took up agricultural work. Napa Valley settler George Yount formed a loose alliance with the Kaimus Wappo, and used them to gain a foothold in the area over the other tribelets. However, a combination of the epidemics of the 1830s and encroachment by Euro-Americans throughout the mid-19th century spelled an end to the Wappo. By 1910 only 73 Wappo could be located, and by 1970, only 50 Wappo were noted.

Southern Patwin

The term *Patwin* refers to the people belonging to the many small contiguous independent political entities in this area that shared linguistic and cultural similarities. Distinction is made between the River Patwin, who resided in large villages near the Sacramento River, and the Hill Patwin, whose villages were situated in the small valleys along the lower hills of the Vaca Mountains and the Coast Ranges, with concentrations in Long, Indian, Bear, Capay, Cortina, and Napa Valleys. The Patwin group occupied the lower western half of the Sacramento Valley west of the Sacramento River from the small town of Princeton west to Stonyford in the foothills and south to San Pablo and Suisun Bays. Patwin territory extended approximately 90 miles north to south and 40 miles east to west. The Southern Patwins lived between Putah Creek and what are now Suisun City and Vacaville.

The Patwin settled in the small valleys where large populations were reported. Patwin villages were composed of earth-covered or semi-subterranean structures, which were either elliptical or circular in shape. Five structure types could be found in most villages: family dwelling, dance house, menstrual house, sudatory (sweat) house, and granary. The dance house would be located on the

northern or southern edge of the village, the sudatory house would be located on the east or west of the dance house, and the menstrual house would be located on the opposite side of the village from the dance house.

History

Settlement

The Bay Area was discovered by members of the Portola expedition in 1769, which had traveled up the coast overland. A few years later, the viceroy of Mexico, Antonio Bucareli, sent a Spanish naval vessel, the *San Carlos*, to explore and survey the area. In 1775, this ship was the first recorded entry into the San Francisco Bay.

Generations of Native Americans inhabited the Bay Area long before Spanish explorers and missionaries started traveling through the region in the late 1700s. Spanish military and civilian settlers established military garrisons (presidios), Franciscan missions, and civil settlements (pueblos) throughout the Bay Area. The mission and presidio at San Francisco were established in 1776 and the missions in San Rafael and Sonoma were established in 1817 and 1823, respectively, partly in response to the Russian settlement in the area north of the San Francisco Bay. In 1834, when Mexico achieved independence from Spain, the Mexican government secularized the missions and divided the land holdings into individual land grants. The region experienced an influx of overland trappers around this time leading up to the Gold Rush. After the discovery of gold, the city of San Francisco became known as a gambling hub, and opportunities grew to purchase personal estates within the area. In 1848, the San Francisco school census showed a population of 812. The buildings at this time numbered 200; there were two hotels, boarding houses, saloons, and 10-pin alleys. In the last half of 1849, immigrants arrived in San Francisco at the rate of 1,000 per week by sea alone.

County Establishment

Contra Costa County, located in the East Bay, was one of the first counties established after California was admitted to the Union in 1850. The city of Martinez, which is in the northern portion of Contra Costa County, was designated the county seat in 1851. South of Contra Costa County lies Alameda County, which was created in 1853 from southern portions of Contra Costa County and northern portions of Santa Clara County. The city of Oakland has been the Alameda County seat since 1873. Solano County was one of the original counties in California; the county seat is Fairfield.

San Mateo County covers the San Francisco Peninsula and was formed from parts of San Francisco County and Santa Cruz County in 1856; the county seat is Redwood City. South and east of San Mateo County lies Santa Clara County, which was one of the original 27 counties formed during statehood. San Jose, located in Santa Clara County, was originally the first capital of the State of California and the first California Legislature convened there on December 15, 1849. The location of the capital was moved several more times before officially being established in Sacramento.

Marin County was formed in 1850, and the county seat is San Rafael. Sonoma County is located north of Marin County and was formed in 1850. The county seat is Santa Rosa and was established in 1868. Sonoma was the first town to be planned and settled before statehood under Mexican rule. The District of Sonoma originally included all of the land from the Sacramento River to the Pacific Ocean; at the first session of the legislature, the boundaries changed, and the present boundary lines were eventually formed in 1856.

Agriculture and Irrigation

Following the Gold Rush, many miners returned to the Bay Area to settle on fertile lands and start producing crops. Initially, wheat was the major crop. Orchards were planted on the valley hills, producing peaches, cherries, pears, figs, apricots, and walnuts. As the city of San Francisco grew, it became a major market for area farm products. Dr. John T. Strentzel (father-in-law of John Muir) pioneered the planting of fruit and nut orchards and vineyards. As early as 1869, Strentzel devised a method of shipping pears and other fruits in containers packed with carbonized bran, which allowed fruits to retain freshness while being transported long distances. Eventually, farmers were no longer dependent on local markets to sell their produce. Starting in the 1870s, fishing also became profitable, particularly in the Carquinez Strait area.

The railroad played a significant role in the development of the Bay Area region by providing an efficient and reliable method of shipping freight and farm products throughout the state. Agricultural success, in particular, was fostered by access to distant markets that the railroad made possible. The Central Pacific Railroad pushed through the Bay Area in the 1870s and led to the formal establishment of several railroad towns, which in turn attracted more settlers to the region. During the Gold Rush, the price of cattle in the state rose drastically and ranching became an important part of the region's economy. Many migrants who initially came to California in search of gold found they had better luck making a living in cattle ranching. In addition, technological advances in agricultural machinery such as combines and threshers allowed farmers to increase harvests with less effort. By 1874, the United States Geological Survey commenced the partitioning of the nation into 640-acre sections, and subsequently opened the public domain for private ownership. A fence law was adopted that same year forcing ranchers to enclose their lands and keep livestock from roaming free. Cattle-raising rancheros dominated the landscape at the start of the Gold Rush and gradually gave way to smaller ranches, many of which still exist today. As settlement accelerated, farmland was often converted to residential and commercial use. By the 1950s, commercial farming in much of the Bay Area had practically ceased. Fishing continued to provide a viable opportunity for many families until Bay waters were closed to commercial fishing in 1957.

As gold became more difficult to find and miners turned to farming, farmers used aquifers to irrigate their crops. Local water systems were built in the early part of the 20th century to bring water to cities. Beginning in 1858, the privately owned Spring-Valley Water Company provided all of San Francisco's water. The water system began to fail because of increases in population and the 1906 earthquake and fire, which prompted the use of other methods to provide municipal water for the region. The Raker Act was passed in 1914 and subsequently allowed the creation of a dam and reservoir in Yosemite National Park's Hetch Hetchy Valley, with a gravity-flow aqueduct to the Bay Area. The early 1960s was the first time that wholesale customers first signed long-term contracts (mostly 20 years) with the San Francisco Public Utilities Commission and chose to rely on the utilities commission instead of the State Water Project for their long-term water future.

3.5.2 Environmental Impacts

3.5.2.1 Methods for Analysis

Impacts on cultural resources were assessed qualitatively based on professional judgment in light of the activities, methods, and techniques currently implemented by the Pacific Gas and Electric Company (PG&E). Because PG&E has conducted operations and maintenance (O&M) activities in the study area for more than 30 years, O&M impacts identified in this section represent baseline

environmental conditions that would not change following the approval of the Incidental Take Permit (ITP).

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures

Cultural Resource Specialists

PG&E employs cultural resource specialists (CRSs), all of whom meet the Secretary of the Interior's Professional Qualification Standards for archaeology or architectural history. The CRS team has extensive experience identifying, evaluating, and treating a wide variety of historic and precontact resources using NRHP and CRHR criteria. The CRS team works directly with internal project managers, land planners, construction crews, and engineers in the operation, maintenance, and construction of PG&E infrastructure. CRSs also work directly with O&M staff from electric and gas operations and energy supply throughout the service territory.

CRS staff ensures regulatory compliance and protection of cultural resources. CRSs are also active stewards of the cultural resources that exist within PG&E's properties and rights-of-way (ROWs). CRS staff screens, reviews, and carries out studies that can have differing levels of scope and oversight depending on the type of activity, the extent of ground disturbance, the location of utility facilities, and the proximity to known or suspected cultural or archaeological resources. CRS staff is the primary staff responsible for developing and maintaining close working relationships with Native American communities throughout PG&E's service territory.

PG&E also maintains a team of external experts in the fields of archaeology, architectural history, ethnography, geology, and history.

Methods and Process for Screening

PG&E complies with all applicable cultural resource laws and regulations, and has developed standards for providing stewardship of cultural resources. For example, all project-managed ground-disturbing activities are screened for potential impacts on cultural resources. If potential impacts are identified, measures are developed and implemented to avoid or minimize impacts on cultural resources. Project screening includes consulting PG&E's confidential geospatial cultural resources database and linked document library, published literature (archaeology, ethnography, and history), historic topographic and plat maps, recent listings for the NRHP and CRHR, and publicly available documents such as environmental impact reports (EIRs) and environmental impact statements. O&M activities with larger ground disturbance that have a greater potential to affect cultural resources are given greater scrutiny and typically require additional study or analysis. Such consideration may include the following analyses.

- Field studies.
- More in-depth research (e.g., records searches through the California Historical Resources Information System).
- Queries using confidential cultural resources geospatial database as part of both automated and manual environmental screening and reviews.
- Application of advanced analytical tools, such as buried site sensitivity modeling.
- Consultation with the Native American Heritage Commission (NAHC).

- Outreach to affected communities.

Development of Protection Measures

Where a significant intact resource is known and could be affected, PG&E develops and implements measures to either avoid or minimize impacts. PG&E routinely implements the following site protection measures.

- Establishing work exclusion zones.
- Finding alternate work locations or access routes.
- Prohibiting vehicles, staging, or construction within site boundaries.
- Erecting temporary construction fencing or hanging flagging to facilitate resource avoidance.
- Replacing facilities in the same location to minimize ground disturbance.
- Assigning an archaeological and/or Native American construction monitor for activities within known or suspected archaeological sites.
- Developing and presenting field training to the crews.
- Outreach to affected communities.
- Performing archaeological recovery and interpretation when impacts cannot be avoided.

Training

CRS staff trains PG&E employees and contractors using two approaches—a general cultural resources awareness training, which certain employees receive annually, and project-specific cultural resource training. Systematic education of employees and contractors advance the following objectives.

- To provide an understanding of the ethnographic and archaeological setting of PG&E's facilities, properties, and ROWs.
- To aid in the identification of cultural resources that could be uncovered during ground-disturbing activities.
- To identify best practices for working near cultural resources.
- To identify steps to take in the event of an inadvertent discovery of cultural resources or human remains.

Training related to specific projects is detailed below under *Construction Compliance*.

Construction Compliance

The methods, results, and recommendations generated from the screening and development of protection measures are typically presented in a PG&E Cultural Resources Constraints Report (CRCR) or standard Archaeological Survey Report. Prior to construction, environmental and natural resource protection measures, including those for cultural resource protection, are detailed in a project's Environmental Release to Construction (ERTC) memorandum, indicating that environmental review is complete and that all protection measures are required to be implemented as prescribed.

Construction crews are educated about cultural resources that may be present in the project area. Such training is tailored to address the unique circumstances of a given project and, at a minimum, cover the following provisions.

- Summary of the requirements in the ERTC or other applicable documents.
- Verification that the job foreman is in possession of a CRCR, ERTC, or other applicable document, such as a project-specific Cultural Resources Awareness and Response brochure prepared by PG&E that provides the discovery protocol, including the phone number for the responsible CRS.
- Review of the discovery protocols.
- Summary of the types of precontact or historic artifacts and features that may be encountered in the field or at the job site.
- Description of the contexts within which such material may be found. For example, it may be appropriate to note the potential depth of suspected deposits, or expectation for changes in soil color and texture.
- Delineation of all work exclusion zones.

In addition, the CRS staff or its contractor will work closely with the crews in the field to confirm the location and protection of exclusion zones and to coordinate any archaeological or Native American construction monitoring that may be required.

General cultural resources best management practices required for all PG&E efforts consist of minimizing ground disturbance, keeping vehicles on existing roads, leaving artifacts where they are found, reporting potential cultural resources and any accidental damage to resources to the CRS, removing only materials brought onsite, and promoting individual accountability for the avoidance and protection of resources.

If cultural material, such as chipped or ground stone, historic debris, or building foundations, is discovered during ground-disturbing activities (other than emergency activities that cannot feasibly be interrupted), all activities will cease within 100 feet of the find until a qualified cultural resources professional can assess the significance of the find and, if necessary, develop appropriate treatment measures in consultation with PG&E, other appropriate agencies, and tribal representatives. Treatment may include measures such as limiting work, avoiding the site, capping the site, or conducting data recovery excavation.

In the rare event that human remains are discovered, PG&E complies with the requirements of Section 5097.98 of the California Public Resources Code, which stipulates halting further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until the county coroner has been contacted to determine that no investigation of the cause of death is required. If the coroner determines that the remains are Native American, the following steps are implemented.

1. The coroner will contact the NAHC.
2. The NAHC will identify the person or persons it believes to be the most likely descendant (MLD) of the deceased Native American.
3. The MLD will make recommendations to the landowner or the person responsible for the excavation work of the means of treating or disposing of, with appropriate dignity, the human

remains and any associated grave goods, unless the NAHC was unable to identify a descendant or the descendant failed to make a recommendation within 24 hours after being notified by the commission.

When emergency repairs are needed, PG&E is required to conduct them as rapidly as possible to ensure continuity of service and public safety. As a result, it is typically infeasible to incorporate cultural resources studies, avoidance measures, or treatment into the emergency repairs process. However, if PG&E emergency O&M work discovers or disturbs cultural resources, PG&E follows up with appropriate treatment measures to address impacts and avoid additional damage in the future. These measures may involve conducting recovery excavations, capping the site to avoid further disturbance of artifacts, or other procedures. If a find is determined to be significant, the qualified cultural resource professional will determine the appropriate parties to contact, and will meet with those parties to determine the appropriate course of action. Significant cultural resource materials recovered are subject to scientific analysis and professional museum curation, and are documented in a report prepared by the qualified cultural resource professional according to current professional standards.

HCP-Specific Avoidance and Minimization Measures

Two avoidance and minimization measures (AMMs) from PG&E's *Bay Area Operations and Maintenance Habitat Conservation Plan* (Bay Area O&M HCP) apply to cultural resources.

- Field Protocol (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 to the extent feasible. Minimize the development of new access and ROW roads, including clearing and blading for temporary vehicle access in areas of natural vegetation.

Applicant Proposed Measures

PG&E will implement the following applicant proposed measures (APMs) to reduce impacts and assess potential project-related construction and operational impacts on cultural resources.

APM CR-1: Inventory, evaluate, and protect cultural resources

As part of the screening process described in Chapter 2, *Project Description*, PG&E will continue to review historical and archaeological resources that were previously recorded, as well as structures that meet the 50-year threshold throughout the 30-year duration of ITP. If any resources have the potential to be eligible for listing on the CRHR or NRHP, PG&E will determine whether project activities will affect the resources and, if the activities would cause a substantial adverse change in the resource, a qualified cultural specialist will coordinate with PG&E, the landowner, and California Department of Fish and Wildlife (CDFW) on the appropriate steps for evaluation, protection, documentation and/or preservation of the resource.

APM CR-2: Provide worker training

The following procedures will be implemented prior to commencement of any project-related construction activities:

All PG&E, contractor, and subcontractor project personnel will receive training regarding:

- Appropriate work practices necessary to effectively implement the APMs and to comply with the applicable environmental laws and regulations
- The potential for exposing subsurface cultural resources and paleontological resources
- How to recognize possible buried cultural and paleontological resources
- Site-specific physical conditions to improve hazard prevention and, if applicable, a review of the stormwater pollution prevention plan, which will also address spill response.

This training will include a presentation of:

- Procedures to be followed upon discovery or suspected discovery of historic or archaeological materials, including Native American remains and their treatment
- Procedures to be followed upon discovery or suspected discovery of paleontological resources
- Procedures to be followed for spill and other hazard prevention

Actions that may be taken in the case of violation of applicable laws

APM CR-3: Inadvertent discovery of previously unidentified cultural resources.

The following procedure will be employed if a previously undocumented cultural resource is encountered during construction:

- All work within 100 feet (30 meters) of the find will be halted or redirected by the construction foreman and protective barriers or flagging will be installed along with signage identifying the area as an “environmentally sensitive area.” Entry into the area will be limited to PG&E-approved/qualified CRSs, PG&E, and other authorized personnel.
- PG&E and the CPUC will be notified immediately.
- A qualified archaeologist will document the resource and coordinate with PG&E, the landowner, and the CPUC on the appropriate steps for evaluation and preservation of the find. The level of effort will be based on the size and nature of the resource, as determined by the archeologist and approved by the CPUC.
- No work will occur within the environmentally sensitive area until clearance has been granted by the archaeologist or PG&E and the CPUC. Environmentally sensitive area flagging and signage will only be removed when authorized by PG&E or the archaeologist and the CPUC.

APM CR-4: Discovery of human remains.

The following procedures will be implemented in the event of the discovery of human remains, in compliance with California law, including, but not limited to, the following provisions: CEQA Guidelines Section 15064.5(e); Public Resources Code Sections 5097.94, 5097.98, and 5097.99; and California Health and Safety Code Section 7050.5:

Work in the immediate area of the find will be halted and the PG&E archaeologist, County Coroner, and CPUC will be notified immediately. Work will remain suspended until the Coroner can assess the remains. In the event the remains are determined to be precontact in origin, the Coroner will notify the NAHC, which will then identify an MLD. The MLD will consult with

PG&E's archaeologist within 48 hours of notification to determine further treatment of the remains.

APM CR-5: Undiscovered potential tribal cultural resources.

The following procedure will be employed (after stopping work and following the procedure for determining eligibility in APM CUL-2) if a resource is encountered and determined by the project's qualified archaeologist to be potentially eligible for the CRHR or a local register of historic resources and is associated with a California Native American Tribe(s) with a traditional and cultural affiliation with the geographic area of the proposed project:

- The project's qualified archaeologist will notify the CPUC for appropriate action. PG&E will assist the CPUC if needed to identify the lead contact person for the California Native American Tribe(s) potentially associated with the cultural resource and with a traditional and cultural affiliation with the geographic area of the proposed project. The CPUC will contact the lead contact person to set up a meeting with PG&E and the CPUC.
- The project's qualified archaeologist will participate with the CPUC in discussions with the California Native American Tribe(s) to determine whether the resource is a TCR as defined by Public Resources Code Section 21074, and the tribe(s)' preferred method of mitigation, if the resource is determined to be a TCR.

If no agreement can be reached for mitigation after discussions with the California Native American Tribe(s) or it is determined that the tribe(s)' preferred mitigation is not feasible, PG&E will consult with the CPUC and implement one of the example mitigation measures listed in Public Resources Code Section 21084.3(b), or other feasible mitigation.

Significance Criteria

In accordance with Appendix G of the State CEQA Guidelines, the potential significance of impacts on cultural resources from the proposed project and implementation of covered activities was evaluated for each of the following criteria:

- Substantial adverse change in the significance of a historical resource as defined in Public Resources Code Section 15064.5.
- Substantial adverse change in the significance of an archaeological resource pursuant to Public Resources Code Section 15064.5.
- Disturbance of any human remains, including those interred outside of dedicated cemeteries.
- Substantial adverse change in the significance of a TCR, defined in Public Resources Code Section 21074 and that is listed or eligible for listing in the CRHR, in a qualified local register of historical resources, or that has been determined by the lead agency to be significant in accordance with Public Resources Code Section 5024.1(c).

3.5.2.2 Impact Discussion

Impact CUL-1: Cause a substantial adverse change in the significance of a historical (Less-than-Significant Impact)

O&M activities generally have a low risk for affecting historical resources. O&M activities would take place primarily within existing ROWs and immediately adjacent areas that typically do not have

built historical resources present. Minor new construction activities, such as limited expansion of electrical substations and extension of natural gas pipelines and electric transmission, and distribution lines, have a higher potential to disturb or damage historical resources.

For all covered activities, PG&E would continue to comply with applicable laws for protecting historical resources and would continue to implement environmental practices under its Cultural Resources Program. In addition, applicable AMMs identified in the PG&E's Bay Area O&M HCP, specifically FP-02 and FP-03 that minimize ground disturbance, would also help protect historical resources and reduce the potential for disturbance or damage. With implementation of these practices, legal requirements and AMMs, impacts on historical resources would be less than significant. To further reduce potential impacts, PG&E would also implement APM CR-1, which requires the continued review of historical resources that may meet the 50-year threshold for listing in the NRHP and CRHR.

Impact CUL-2: Cause a substantial adverse change in the significance of an archaeological resource (Less-than-Significant Impact)

Many of the O&M activities would require excavation, which could result in the disturbance or damage of a previously unrecorded archaeological resource present on or below the surface at work sites. O&M activities would take place primarily within existing ROWs and immediately adjacent areas, which have already experienced some degree of ground disturbance. Because many O&M activities would require minimal ground disturbance, they are unlikely to affect archaeological resources on the surface and have a low potential to disturb or damage buried archaeological resources. Minor new construction activities, such as limited expansion of electrical substations and extension of natural gas pipelines and electric transmission, and distribution lines, would require varying levels of excavation and ground disturbance. These activities have a higher potential to disturb or damage archaeological resources, particularly in previously undisturbed or less disturbed areas.

For all covered activities, PG&E would continue to comply with applicable laws for protecting archaeological resources and would continue to implement environmental practices under its Cultural Resources Program. In addition, applicable AMMs from PG&E's Bay Area O&M HCP, specifically FP-02 and FP-03 that minimize ground disturbance, would also help protect archaeological resources and reduce the potential for disturbance or damage. With these practices and HCP AMMs, impacts on archaeological resources would be less than significant. To further reduce less-than-significant impacts, PG&E would implement APM CR-1, which requires the continued review of archaeological resources that may meet the 50-year threshold for listing in the NRHP and CRHR. PG&E would also implement APM CR-2 requiring worker cultural resources awareness training prior to ground disturbance, and APM CR-3 for inadvertent discovery of previously unidentified cultural resources.

Impact CUL-3: Disturb any human remains, including those interred outside of dedicated cemeteries (Less-than-Significant Impact)

O&M activities would take place primarily within existing ROWs and immediately adjacent areas, which have already experienced some degree of ground disturbance. Because most O&M activities would require minimal ground disturbance, they have a low potential to disturb or damage buried human remains. Minor new construction activities would require varying levels of excavation and

ground disturbance. These activities have a higher potential than O&M activities to disturb or damage buried human remains, particularly in previously undisturbed or less disturbed areas.

For all covered activities, PG&E would continue to comply with applicable laws for protecting human remains and would continue to implement environmental practices under its Cultural Resources Program. In the event that any human remains or any associated funerary objects are encountered during construction, all work would cease within the vicinity of the discovery and the appropriate county coroner would be contacted immediately in accordance with California Health and Safety Code Section 7050.5 and California Public Resources Code Section 5097.98. If the human remains are determined to be Native American, the coroner would notify the NAHC by telephone within 24 hours. The NAHC would then appoint and notify the MLD. The MLD would work with a qualified cultural resource professional and the landowner to decide the proper treatment of the human remains and any associated funerary objects. In addition, AMMs from PG&E's Bay Area O&M HCP, specifically FP-02 and FP-03 that minimize ground disturbance, would also help protect human remains and reduce the potential for disturbance or damage. With these measures in place, impacts on human remains would be less than significant.

Impact CUL-4: Cause a substantial adverse change in the significance of a tribal cultural resource (as defined in Public Resources Code Section 5020.1(k)) (Less-than-Significant Impact)

Many of the O&M activities would require excavation, which could result in the disturbance or damage of a TCR present on or below the surface at work sites. O&M activities would take place primarily within existing ROWs and immediately adjacent areas, which have already experienced some degree of ground disturbance. Because most O&M activities would require minimal ground disturbance, they are unlikely to affect TCRs on the surface and have a low potential to disturb or damage buried TCRs. Minor new construction activities would require varying levels of excavation and ground disturbance. These activities have a higher potential to disturb or damage TCRs, particularly in previously undisturbed or less disturbed areas.

For all covered activities, PG&E would continue to comply with applicable laws for protecting TCRs and would continue to implement environmental practices under its Cultural Resources Program. In addition, applicable AMMs from PG&E's Bay Area O&M HCP, specifically FP-02 and FP-03 that minimize ground disturbance, would also help protect tribal cultural resources and reduce the potential for disturbance or damage.

AB 52 requires that the CEQA lead agency, in this case CDFW, make a reasonable, good faith effort to consult with tribes that are traditionally and culturally affiliated with a project area to determine if TCRs would be affected by the project, discuss the significance of such impacts, discuss alternatives that could avoid such impacts, and, if necessary and to the extent feasible, reach mutual agreement with the tribe over impacts and mitigation measures. ACDFW has sent letters to those tribes that have previously informed CDFW of their desire to consult under AB 52, inviting those tribes to consult on this EIR. [CDFW add consultation results] With these standard measures in place, impacts on TCRs would be less than significant.

3.5.3 References Cited

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3.6 Energy

3.6.1 Existing Conditions

3.6.1.1 Regulatory Setting

Federal

American Recovery Reinvestment Act of 2009

As part of a larger stimulus package, the Recovery Act authorized federal funding to the U.S. Department of Energy to forward specific energy priorities, including modernizing the nation's electric transmission grid.

State

Renewables Portfolio Standard Program

Established in 2002, California's Renewables Portfolio Standard (RPS) aims to ensure that a minimum amount of renewable energy is included in the portfolio of electricity resources serving a state or county. In September 2018, Senate Bill (SB) 100 was signed into law, which directed the California Public Utilities Commission (CPUC), California State Energy Resources Conservation and Development Commission (CEC), and California Air Resources Board to plan for 100% of total retail sales of electricity in California to come from eligible renewable energy resources and zero-carbon resources by December 31, 2045. The law notes that new and modified electric transmission facilities may be necessary to facilitate the state achieving its renewables portfolio standard targets.

Additionally, SBs 1078 (2002), 107 (2006) and 2 (2011), California's RPS, obligates investor-owned utilities, energy service providers, and Community Choice Aggregators to procure additional retail sales per year from eligible renewable sources with the long-range target of procuring 33% of retail sales from renewable resources by 2020. The CPUC and CEC are jointly responsible for implementing the program. The RPS was extended by SB 350 in 2015.

Senate Bill 350—De León (Clean Energy and Pollution Reduction Act)

The key provisions of SB 350, the Clean Energy and Pollution Reduction Act of 2015, require the following by 2030: (1) an RPS of 50%, and (2) a doubling of energy efficiency (electrical and natural gas) by 2030, including improvements to the efficiency of existing buildings. These mandates will be implemented by future actions of CPUC and CEC.

Renewable Energy Transmission Initiative

The Renewable Energy Transmission Initiative 2.0 (RETI 2.0) is a statewide, non-regulatory planning effort convened by the California Natural Resources Agency, with participation from the CEC, CPUC, California Independent System Operator, and the U.S. Bureau of Land Management California Office. The RETI 2.0 initiative was created to explore the renewable generation potential available to California utilities to help meet state-wide greenhouse gas (GHG) reduction and

renewable energy goals and to identify the potential transmission implications of accessing and integrating these resources.

California 2008 Energy Action Plan Update

Originally developed in 2003 and updated in 2005 and 2008, the California Energy Action Plan identifies specific action areas to ensure that California's energy resources are adequate, affordable, technologically advanced, and environmentally sound. The plan's first-priority actions to address California's increasing energy demands are energy efficiency and demand response (i.e., reduction of customer energy usage during peak periods to address system reliability and support the best use of energy infrastructure). Additional priorities include the use of renewable sources of power and distributed generation. The plan also notes that investment in conventional transmission infrastructure is crucial to helping the state meet its renewable energy goals.

Local

Because CPUC has exclusive jurisdiction over project siting, design, and construction, the project is not subject to local discretionary regulations. For informational purposes and to assist with the California Environmental Quality Act (CEQA) review process, this section includes a discussion of local standards that concern energy resources in the study area.

General Plans

California law requires local jurisdictions (including counties and cities) to develop comprehensive, long-term general plans to guide their land use decision making and physical development (Government Code Section 65300). Of the seven required elements, or chapters, in a general plan, several relate directly or indirectly to the energy issues faced by a community as it manages its growth. For instance, the circulation element is not simply a transportation plan, but also addresses needs related to the circulation of energy infrastructure. The housing element must inventory and analyze the opportunities for energy conservation in residential development, such as energy saving features, energy saving materials, and energy efficient systems and design for residential development. General plans may also contain additional elements on topics of concern to the local community; common themes that bear on energy resources include air quality, GHG emissions, and climate change. Some communities also adopt ordinances or municipal code provisions in support of specific energy goals.

3.6.1.2 Environmental Setting

The San Francisco Bay Area (Bay Area) is served by the Pacific Gas and Electric Company (PG&E) for electricity and natural gas, as well as other private companies. In the Bay Area, PG&E currently owns and operates 4,430 miles of electric transmission lines and 207 substations, which convey electricity to approximately 23,015 miles of distribution lines. PG&E's natural gas system consists of a transmission system and a distribution system. The transmission system in the Bay Area includes 16 primary gas transmission lines, totaling approximately 1,820 miles of pipeline. Refer to Section 2.6, *System Overview*, in Chapter 2, *Project Description*, for additional information.

Energy Conservation

PG&E sponsors several energy conservation programs that include education, solar energy incentives, electric cars, florescent lighting business program, and a weatherization program for low

income families. These services are intended to reduce energy consumption in homes through the replacement of inefficient appliances and minor housing repairs, making the homes more energy efficient. Consumers also receive educational materials that provide energy-saving tips and information.

3.6.2 Environmental Impacts

3.6.2.1 Methods for Analysis

Official local and state websites were reviewed for regulatory background information and information on existing energy providers and resources in Bay Area counties.

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures

PG&E implements best management practices as standard practice to avoid or minimize potential impacts on energy. As such, the following measures will be implemented when undertaking the covered activities associated with the Incidental Take Permit:

- Minimize unnecessary vehicle idling time. The ability to limit vehicle idling time will depend on the sequence of activities and when and where vehicles are needed or staged. Certain vehicles, such as large diesel-powered vehicles, have extended warm-up times following start-up that limit their availability for use following start-up. Where such diesel-powered vehicles are required for repetitive tasks, these vehicles may require more idling time. The crews will apply a “common sense” approach to vehicle use, so that idling is reduced as far as possible below the maximum of 5 consecutive minutes allowed by California law; if a vehicle is not required for use immediately or continuously, its engine will be shut off.
- Maintain equipment in proper working conditions in accordance with PG&E standards.

Significance Criteria

In accordance with Appendix G of the CEQA Guidelines, the proposed project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation.
- Conflict with or obstruct a state or local energy plan for renewable energy or energy efficiency.

3.6.2.2 Impact Discussion

Impact EN-1: Wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation (Less than Significant)

The project would not result in potentially significant impacts due to wasteful, inefficient, or unnecessary consumption of energy resources. Operations and maintenance (O&M) and related activities would have a positive impact on energy resources by providing for the safe and efficient operation of PG&E's gas and electrical systems, as mandated for public safety and reliable energy.

Construction of O&M and related activities would require consumption of fuel to run construction vehicles, equipment, and helicopters. Off-road construction equipment would operate intermittently

depending on the type of work for each project. Typical O&M activities take 4 hours to 2 days to complete, although some larger activities take up to 3 months of work. Minor new construction activities may take 3 days to 3 months for gas pipelines, 5 days to 3 months for transmission lines, and 5 to 10 days for distribution lines. Workers' personal vehicles would consume gasoline, and heavy haul trucks would consume diesel fuel. Helicopter use during project construction, when required, would consume jet fuel.

PG&E's engineering and construction management staff develop efficient construction plans and sequences that minimize vehicle trips and avoid wasteful, inefficient, or unnecessary consumption of energy. Implementation of best management practices to minimize vehicle idling time would further reduce energy consumption (refer to *PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures*, in Section 3.3, *Air Quality*, for additional information). Therefore, impacts would be less than significant.

Impact EN-2: Conflict with or obstruction of a state or local plan for renewable energy or energy efficiency (No Impact)

O&M and related activities would help support state and local plans for developing renewable energy and energy efficiency. Minor new construction activities would strengthen the existing infrastructure to more efficiently service gas and electric customers in the study area. The proposed work would also help support California's transition to 100% renewable energy as required by SB 100 and would have a beneficial impact on the availability of renewable energy in the study area. The O&M activities would also promote energy efficiency by replacing older conductors and support structures and older pipelines and enhancing transmission system reliability. There would be no adverse impact.

3.7 Geology, Soils, and Paleontological Resources

3.7.1 Existing Conditions

3.7.1.1 Regulatory Setting

Federal

Title 49, Part 192 of the Code of Federal Regulations

Title 49, Part 192 of the Code of Federal Regulations (CFR) outlines the minimum federal safety standards for the transportation of natural gas and other gas by pipeline, including pipeline facilities and the transportation of gas within the limits of the outer continental shelf. Subparts A through P summarize the minimum requirements for the selection and qualification of pipe components, corrosion control regulations, pipeline testing, pipeline integrity management, and additional pipeline design specifications. Section 192.917(b) requires pipeline operators to incorporate topographic data, soil conditions, and earthquake fault data into evaluations regarding outside force threats. Specific data requirements are described in Appendix A of American Society of Mechanical Engineers document B31.8S: *Managing System Integrity of Gas Pipelines* (American Society of Mechanical Engineers 2016).

Clean Water Act Section 402

The National Pollutant Discharge Elimination System (NPDES) program was established in 1972 to control discharges of pollutants from defined point sources (33 United States Code [USC] Section 1342). On September 2, 2009, the State Water Resources Control Board (SWRCB) adopted Order No. 2009-0009-DWQ (as amended by 2010-0014-DWQ and 2012-0006-DWQ) (Construction General Permit), which reissued Water Quality Order 99-08-DWQ and incorporated Water Quality Order 2003-0007 (Small Linear Utility General Permit) for projects disturbing 1 acre or more of land, or that are part of a common plan of development or sale that disturbs more than 1 acre of land where the rainfall erosivity waiver does not apply. The new permit became effective on July 1, 2010, whereby all existing dischargers and new dischargers are required to obtain coverage under the new permit by submitting Permit Registration Documents.

On January 26, 2018, SWRCB issued a Notice of Applicability to the Pacific Gas and Electric Company (PG&E) that the Statewide General Order for Discharges from Natural Gas Utility Construction, Operation, and Maintenance Activities (Statewide Natural Gas Utility Permit) would serve as the NPDES permit for point source discharges to waters of the United States, pursuant to Section 402 of the Clean Water Act (CWA). Because the authority to implement Section 402 of the CWA has been delegated to the state, additional information regarding permitting under Section 402 of the CWA is provided in the *State* section.

Paleontological Resource Preservation Act

The Paleontological Resource Preservation Act (Public Law 111-11, Title VI, Subtitle D; 16 USC Sections 470aaa–470aaa-11) establishes requirements to manage and protect paleontological resources on federal lands. The law also prohibits the collection of paleontological resources from

federal land without a permit, except in the case of noncommercial collecting that complies with other regulations for that federal land.

National Natural Landmarks Program

The National Natural Landmarks (NNL) Program was established in 1962 under authority of the Historic Sites Act of 1935. Following are the goals of the NNL Program.

- To encourage the preservation of sites that illustrate the nation's geological and ecological character.
- To enhance the scientific and educational value of the sites preserved.
- To strengthen public appreciation of natural history and foster increased concern for the conservation of the nation's natural heritage.

Under the NNL Program, sites that represent the nation's "best" examples of various types of biological communities or geologic features (meaning that they are in good condition and effectively illustrate the specific character of a certain type of resource) are listed on the National Registry of Natural Landmarks (NRNL). At present, the NRNL contains 599 sites, ranging in size from 7 acres to almost 1 million acres (National Park Service 2018). Examples of sites with geological value include Mount Diablo State Park in Contra Costa County, Año Nuevo State Reserve in San Mateo County, and the San Andreas fault.

The NNL Program is administered by the National Park Service (NPS). However, most sites listed on the NRNL are not transferred to federal ownership and most do not become units in the National Parks system; most continue to be managed by their current owners following listing. At present, about half of the nation's NNLs are managed by public agencies, nearly one-third are privately owned and managed, and the remainder are managed through collaboration between agencies and private entities (64 *Federal Register* 25708).

NPS is responsible for maintaining relationships with NNL landowners and monitoring the condition of all NNLs. Based on its monitoring, NPS prepares an annual report for transmission via the Secretary of the Interior to Congress, identifying NNLs at risk of damage or degradation.

State

Alquist-Priolo Earthquake Fault Zoning Act

California's Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (Public Resources Code Section 2621 et seq.) is intended to reduce risks to life and property from surface fault rupture during earthquakes. The Alquist-Priolo Act prohibits the location of most types of structures intended for human occupancy across the traces of active faults and strictly regulates construction in the corridors along active faults (earthquake fault zones). It also defines criteria for identifying active faults, giving legal weight to terms such as *active*, and establishes a process for reviewing building proposals in and adjacent to earthquake fault zones.

Under the Alquist-Priolo Act, faults are zoned, and construction along or across them is strictly regulated if they are "sufficiently active" and "well defined." A fault is considered sufficiently active if one or more of its segments or strands shows evidence of surface displacement during Holocene time (defined for purposes of the act as referring to approximately the last 11,000 years). A fault is considered well defined if its trace can be identified clearly by a trained geologist at the ground

surface, or in the shallow subsurface using standard professional techniques, criteria, and judgment (Bryant and Hart 2007).

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 addresses earthquake hazards other than fault rupture, including liquefaction and seismically induced landslides. Seismic hazard zones are mapped by the State Geologist to assist local governments in land use planning. The act states that “it is necessary to identify and map seismic hazard zones in order for cities and counties to adequately prepare the safety element of their general plans and to encourage land use management policies and regulations to reduce and mitigate those hazards to protect public health and safety.”

California Building Standards Code

The California Building Standards Code provides the state’s standards for structural design and construction (California Code of Regulations, Title 24). Although gas pipeline and electric utility facilities are governed by California Public Utilities Commission (CPUC) regulations, such as CPUC General Orders 95 and 112-F, the California Building Code (CBC) provides minimum standards for certain non-utility-specific construction such as access roads, walls, and buildings. The state earthquake protection law (California Health and Safety Code Section 19100 et seq.) requires that structures be designed to resist stresses produced by lateral forces caused by wind and earthquakes and is contained in Chapter 16 of the CBC. Chapter 18 of the CBC regulates the excavation of foundations and retaining walls, and specifies required geological reports. Appendix J of the 2016 CBC regulates grading activities, including drainage and erosion control and construction on unstable soils, such as expansive soils and areas subject to liquefaction.

Clean Water Act Section 402

As discussed in the *Federal* section, the NPDES program was established to control discharges of pollutants from defined point sources (33 USC Section 1342). In California, NPDES permitting authority is delegated to and administered by the nine Regional Water Quality Control Boards (RWQCBs). The Construction General Permit (Order No. 2009-0009-DWQ [as amended by 2010-0014-DWQ and 2012-0006-DWQ]), requires the implementation of a stormwater pollution prevention plan (SWPPP), which must be prepared before construction begins and kept onsite (or readily available) throughout the construction process. In accordance with the Construction General Permit, a SWPPP must include the following provisions.

- Identification of pollutant sources and non-stormwater discharges associated with construction activity.
- Specifications for best management practices (BMPs) that will be implemented during project construction to minimize the potential for accidental releases and runoff from the construction areas, including temporary construction yards, pull sites, and other temporary work areas.
- Calculations and design details, as well as BMP controls for site runoff.
- BMPs used to eliminate or reduce pollutants after construction is complete.
- A Water Quality Certification from a Qualified SWPPP Developer.

On January 26, 2018, SWRCB issued a Notice of Applicability to PG&E that the Statewide Natural Gas Utility Permit would serve as the NPDES permit for point source discharges to waters of the United States pursuant to Section 402 of the CWA. The Statewide Natural Gas Utility Permit provides

regulatory coverage for planned, emergency, and unplanned discharges to waters of the United States, non-federal surface waters, and land resulting from hydrostatic testing of new and existing natural gas facilities, site dewatering, and other discharges resulting from construction and operations and maintenance (O&M) of natural gas facilities.

To comply with the Statewide Natural Gas Utility Permit, PG&E is taking the following actions.

- Establish and implement appropriate BMPs.
- Ensure that all planned discharges comply with the terms and requirements of the Statewide Natural Gas Utility Permit, including all applicable effluent limitations.
- Take all necessary steps to review and update the effectiveness and adequacy of the control measures and BMPs.
- Keep BMP manuals updated and available on the applicable project site for all system operators.
- Conduct monitoring and reporting in compliance with the provisions and requirements in the Monitoring and Reporting Program described in the Statewide Natural Gas Utility Permit.
- Maintain self-monitoring reports, including compliant and non-compliant discharge monitoring information and have information available upon request by the SWRCB and RWQCB.
- Submit an annual report to the applicable RWQCB(s) and all reporting information required by the Monitoring and Reporting Program.
- Notify the applicable RWQCB(s) per the notification requirements in the Monitoring and Reporting Program.

Public Resources Code

Public Resources Code Chapter 1.7, Sections 5097.5–5097.9 define any unauthorized disturbance or removal of a fossil site or remains on public land as a misdemeanor and specify that state agencies may undertake surveys, excavations, or other operations as necessary on state lands to preserve or record paleontological resources.

Local

Because the CPUC has exclusive jurisdiction over project siting, design, and construction, the project is not subject to local land use and zoning regulations or discretionary permits. The following discussion of local regulations is provided for informational purposes and to assist with CEQA review.

General Plans

California law requires counties and cities to develop comprehensive, long-term general plans to guide their land use decision making and physical development. Of the seven required “elements,” or chapters, in a general plan, the safety and conservation elements most closely relate directly or indirectly to geology and soils. For instance, the safety element must establish policies to minimize any potential geologic or soil instability hazards. The soils section of a conservation element may also identify areas subject to slides and erosion and include policies focusing on erosion prevention. As part of a Local Coastal Program, update, or amendment, local governments should evaluate and plan for sea level rise. Sea level rise potentially increases the risk of coastal hazards as identified in Public Resources Code Section 30253, including geologic hazards. General plans may also contain

additional elements on topics of concern to the local community. Most cities and counties also adopt ordinances or municipal code provisions in support of general plan goals.

General plans also often contain provisions for protecting paleontological resources, often in conjunction with cultural resources.

3.7.1.2 Environmental Setting

Physiography

The nine counties in the San Francisco Bay Area (Bay Area) are located primarily in the Coast Ranges geomorphic province. The easternmost portion of the study area is in the Great Valley geomorphic province (California Geological Survey 2002).

The Coast Ranges are northwest-trending mountain ranges and valleys that are located along the Pacific Coast and span almost the entire length of the state. The Coast Ranges are the largest of the state's geomorphic provinces, rising abruptly from the shore in Humboldt County and extending 400 miles south to the Santa Ynez River in Santa Barbara County. The northern and southern ranges are separated by a depression, or "gap," containing San Francisco Bay (California Geological Survey 2002). San Francisco Bay also separates the mountains into western and eastern portions of the Coast Ranges and is the only major sea level pass through the Coast Range; the gap in the western coast range is known as the Golden Gate, and the gap in the eastern coast range is the Carquinez Strait. These gaps were originally cut by rivers that are part of the drainage system for Sierra Nevada runoff and they allow low-elevation air to pass into and out of the Central Valley.

The highest elevation of the Coast Ranges in the Bay Area is approximately 4,350 feet above mean sea level.

The Russian River flows through the northern portion of the Bay Area, and the Napa and Petaluma Rivers empty into San Pablo Bay. Alameda Creek drains the Livermore Valley via Niles Canyon, a narrow gorge across the Diablo Range, and empties into the southern San Francisco Bay. The San Joaquin River and Sacramento River drain into the Central Valley to the Sacramento-San Joaquin Delta (Delta) in the eastern portion of the Bay Area, which empties into San Francisco Bay and ultimately the Pacific Ocean (Natural Resources Conservation Service 2006).

Geologic Setting

The Coast Ranges geomorphic province is characterized by northwest-trending mountain ranges formed over the past 10 million years or less by active uplift related to the complex tectonics of the San Andreas fault/plate boundary system (Norris and Webb 1990). The majority of the Bay Area is coastal valleys that are partly filled with unconsolidated and semi-consolidated marine sedimentary rocks and older, more consolidated eolian, lacustrine, and alluvial terrace deposits. The elongated shape and northwest-southeast orientation of the valleys are strongly controlled by right-lateral strike-slip movement along a regional set of faults (Natural Resources Conservation Service 2006), most notably the San Andreas fault.

As summarized by Elder (2013) in his synthesis of the framework geology of the Bay Area, the principal bedrock formation of the Coast Ranges is the Franciscan Formation. The rocks of the Franciscan Formation are accreted terranes that range in age from 200 to 50 million years. These terranes are an amalgamation of rock that accumulated episodically at the edge of the subduction

zone as they were scraped from the subducting oceanic plate and thrust eastward under the Coast Ranges. This stacking of wedges created a sequence in which younger wedges were pushed below older wedges, such that the wedges to the east are older than the underlying western wedges (Elder 2013).

A shift in the tectonic structure of the region created the San Andreas fault and a series of volcanic rock that ranges in age from 15 million years old on the San Francisco peninsula to 3 million years old north of San Francisco Bay, including the widely distributed Sonoma Volcanics and volcanics of the Berkeley Hills. These volcanics have broken down to create rich soils that provide a fertile growing medium for wine grapes (Elder 2013).

Continued tectonic forces created rotational blocks, such as the San Francisco Bay block, the Montara block of the Santa Cruz Mountains, and the East Bay Hills block of the Diablo Range, which formed 7 to 4 million years ago (Elder 2013).

The San Francisco Bay block is bounded by the San Andreas, Hayward, and Calaveras faults and is slowly subsiding. Currently, the total rate of movement along the San Andreas fault is approximately 39 millimeters per year across the system in central California, and strain built up on the segments is released during major earthquakes approximately every 200 years on specific segments and several times each century for the entire region. The uplift created by this tectonic activity produces the area's rugged terrain (Elder 2013).

The Delta region is underlain by interbedded marine, estuarine, and fine-grained nonmarine sediments transported to the Delta by the Sacramento and San Joaquin Rivers as they flow into San Pablo Bay (Natural Resources Conservation Service 2006).

The eastern side of the Coast Ranges is flanked by a sequence of Cretaceous through Quaternary clastic sedimentary strata. Most of the boundary between the Coast Ranges and the Sierran basements lay beneath thousands of meters of late Mesozoic and Cenozoic sedimentary rocks in the San Joaquin and southern Sacramento valleys. The next major boundary is the San Andreas fault, followed by the Salinian block, which is composed of granitic and continental crust (Norris and Webb 1990).

The Great Valley, located along the eastern edge of the Bay Area, is floored by a thick sequence of sedimentary deposits that range in age from Jurassic through Quaternary. Under the eastern and central portions of the valley, the base of the sequence likely rests on Mesozoic crystalline rock allied to the plutons of the Sierra Nevada. To the west, basement rocks are believed to be Franciscan metasediments or mélangé. Mesozoic sedimentary rocks now persist in the subsurface record marine deposition. They are overlain by Tertiary strata reflecting marine, estuarine, and terrestrial conditions, which are in turn overlain by Quaternary fluvial and alluvial strata recording uplift and erosion of the Sierra Nevada and Coast Ranges to approximately their present shape (Norris and Webb 1990).

Soils

The Natural Resources Conservation Service characterizes soils at the regional level according to the major land resource area (MLRA) classification system. An MLRA is a planning unit identified or defined on the basis of similar elevation and topography, climate, water resources, soils, natural vegetation communities, and land uses. An MLRA is typically made up of several geographically associated land resource units. A land resource unit, the basic unit used in the state's land resource

mapping, is a geographic area characterized by a particular pattern of soils, climate, water resources, and land uses.

The Bay Area contains six MLRAs (Table 3.7-1). The dominant MLRAs are the Central California Coastal Valleys and Central California Coast Range. Coastal areas in the northwest and southwest portions of the Bay Area are classified as the Coastal Redwood Belt. The California Delta and Sacramento and San Joaquin Valleys are in the eastern portion of the Bay Area. A portion of the Siskiyou-Trinity Area is between the Coastal Redwood Belt and Central California Coastal Valleys in the northwest portion of the Bay Area.

Table 3.7-1. Soil Characteristics by Major Land Resource Area

Major Land Resource Area	Geographic Extent	General Characteristics	Erosion Hazard	Runoff	Shrink-Swell Hazard
4B—Coastal Redwood Belt	Coastal areas of Sonoma, San Mateo, and Santa Clara Counties	Deep or very deep, well drained, and loamy or clayey on mountain slopes and hills in addition to coastal terraces	Severe	Moderate to rapid	Moderate to high
5—Siskiyou-Trinity Area	Central portion of Sonoma County	Moderately deep or deep, well drained, and loamy on mountain slopes and hills	Severe	Moderate to rapid	Moderate
14—Central California Coastal Valleys	Central part of Bay Area	Very deep, somewhat excessively drained to somewhat poorly drained, and loamy or clayey	Moderate	Moderate to rapid	Moderate
15—Central California Coast Range	Coast Ranges in western and eastern parts of Bay Area	Very shallow to deep, somewhat excessively drained or well drained, and loamy or clayey	Moderate	Moderate to rapid	Moderate to high
16—California Delta	Delta portion of Solano and Contra Costa Counties	Very deep, poorly drained or very poorly drained, and clayey	None to slight	Very slow	Low
17—Sacramento and San Joaquin Valleys	Eastern portion of Solano, Contra Costa, and Alameda Counties	Very deep, well drained or moderately well drained, and loamy or clayey	None to slight	Very slow	Ranges from low to high, depending on soil texture

Source: Natural Resources Conservation Service 2006; U.S. Fish and Wildlife Service 2016.

Geologic Hazards

Primary Seismic Hazards—Surface Fault Rupture and Ground Shaking

Faults in the Bay Area that are recognized as active by the state and zoned pursuant to the Alquist-Priolo Act include, from north to south, the San Andreas, Maacama, Rodgers Creek, Hayward, Calaveras, Concord, West Napa, Greenville, Sargent, and San Gregorio faults. All of these faults pose some risk of surface rupture related to seismic activity (Figure 3.7-1).

In addition to possible surface rupture, the Bay Area is likely to experience strong ground shaking as a result of earthquakes on any of the region's principal active faults. Recent studies estimate a 62% probability of at least one earthquake with a magnitude of 6.7 or greater occurring on one of the faults of the greater Bay Area in the next 30 years, and a 10% probability of a magnitude 7.0 or greater event during the same timeframe (Cao et al. 2003). Table 3.7-2 summarizes current information on earthquake recurrence intervals and the maximum credible earthquake for key structures in and near the study area.

The intensity of ground shaking at any given location is a function of earthquake magnitude, distance from the earthquake epicenter, and the nature of the substrate. Based on a probabilistic seismic hazard map that depicts the peak horizontal ground acceleration values exceeded at a 10% probability in 50 years, the peak horizontal ground acceleration values for the study area range from 0.2g up to 0.9g (where 1g is equal to 1 gravity or an acceleration of 9.8 meters per second per second). Those values indicate that the ground shaking hazard in the Bay Area ranges from moderate to high, with lower risks in the eastern portion and higher risks in the central and western portions, closer to potential seismic sources (Figure 3.7-2).

According to Association of Bay Area Governments' Shaking Hazard Map, the entire Bay Area is within either the strong, very strong or violent Modified Mercalli Intensity shaking severity level zones. This is based on likely shaking intensity in the Bay Area in any 50-year period from all possible faults (Association of Bay Area Governments 2013).

Table 3.7-2. Maximum Credible Earthquake and Recurrence Interval for Active Faults

Fault	Magnitude of Maximum Credible Earthquake ^a	Approximate Recurrence Interval ^b
Greenville	6.6	NA
Hayward	Northern segment: 6.4 Southern segment: 6.7	Northern segment: 270 to 710 years Southern segment: 150 to 250 years
Calaveras	Northern segment: 6.8 Central segment: 6.2 Southern segment: 5.8	Northern segment: 125 to 850 years
Maacama	Southern segment: 6.9	NA
San Andreas	North Coast Section: 7.4 Peninsula Section: 7.1	North Coast Segment: 200 to 400 years Peninsula Section: 225 years
Rodgers Creek	7.0	230 years
Concord	6.2	NA
West Napa	6.5	NA
Sargent	6.8	NA

Fault	Magnitude of Maximum Credible Earthquake ^a	Approximate Recurrence Interval ^b
San Gregorio	7.2	400 to 1,000 years

NA = Not available

^a Source: Cao et al. 2003.

^b Source: U.S. Geological Survey 2006.

Secondary Seismic Hazards—Liquefaction and Ground Failure

Secondary seismic hazards refer to liquefaction and related types of ground failure, as well as seismically induced landslide. Seismic Hazard Maps have been issued by the state for parts of Alameda, San Francisco, San Mateo, and Santa Clara Counties (California Geological Survey 2009). Liquefaction is likely to be a substantial concern in parts of the Bay Area (Figure 3.7-1) where soils and sediments are sandy and groundwater is shallow.

Land in the Delta, San Pablo Bay, and the San Francisco Bay region are highly susceptible to liquefaction (Figure 3.7-1). Lateral spreading has historically occurred in the western and central portions of the Bay Area, and both liquefaction and differential settling are significant hazards (Association of Bay Area Governments 2001).

Landslide and Other Slope Stability Hazards

The Bay Area has gently sloping to steep, low mountains where the potential for slope failure varies depending on the localized conditions. Urban areas tend to be on gentler slopes with less topographic relief and are less likely to be subject to landslides or have slope stability hazards. The steep slopes of the Coast Ranges have moderate to high potential for landslides. The central and east portions of the study area have greater landslide risks compared with the coastal areas and low-lying areas around the Delta (Wentworth et al. 2006). Landslides are a particular concern in the Coast Range foothills, where rugged topography underlain by Franciscan rocks is commonly prone to landslide and debris flows.

Paleontological Resources

Paleontological Sensitivity

Paleontological sensitivity is a qualitative assessment based on the paleontological potential of the stratigraphic units present, the local geology and geomorphology, and other factors relevant to fossil preservation and potential yield. According to the Society of Vertebrate Paleontology (2010), standard guidelines for sensitivity are (1) the potential for a geological unit to yield abundant or significant vertebrate fossils or to yield a few significant fossils, large or small, vertebrate, invertebrate, or paleobotanical remains, and (2) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecological, or stratigraphic data (Table 3.7-3).

Table 3.7-3. Paleontological Sensitivity Ratings

Potential	Definition
High	Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Paleontological potential consists of both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or

Potential	Definition
	trace fossils and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data.
Undetermined	Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources.
Low	Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections, or based on general scientific consensus, will only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule.
None	Some rock units, such as high-grade metamorphic rocks (e.g., gneisses and schists) and plutonic igneous rocks (e.g., granites and diorites), have no potential to contain significant paleontological resources. Rock units with no potential require neither protection nor mitigation measures relative to paleontological resources.

Source: Society of Vertebrate Paleontology 2010.

Unlike archaeological sites, which are narrowly defined, paleontological sites are defined by the entire extent (both areal and stratigraphic) of a geologic unit or formation. In other words, once a unit is identified as containing vertebrate fossils or other rare fossils, the entire unit is a paleontological site (Society of Vertebrate Paleontology 2010:2). For this reason, the paleontological sensitivity of geologic units is described and analyzed broadly, rather than being limited to county boundaries.

The University of California Museum of Paleontology database contains records of vertebrate fossils found in all nine counties in the study area (University of California Museum of Paleontology 2018a). These records are summarized in Table 3.7-4, both for all fossils types (i.e., plants, microfossils, invertebrates, vertebrates) and vertebrates only.

Table 3.7-4. Paleontological Records by County

County	University of California Museum of Paleontology Records		Example Vertebrate Fossils
	All Records ^a	Vertebrate Records	
Alameda	2,648	1,584	Horses, mammoth, mastodon, ground sloth, whale, fish, bison, birds, camel, wolves, rodents, amphibians
Contra Costa	18,864	15,977	Rodents, bison, horses, ground sloth, mammoth, mastodon, rabbit, rhinoceros, canids, fish, mustelid, beaver-like, pronghorn-like
Marin	902	146	Mastodon, mammoths, horses, birds, fish
Napa	61	3	Horse
San Francisco	2,239	13	Ground sloth, mammoths, mastodon, camelid, horses
San Mateo	1,683	233	Bison, mammoth, camel, ground sloth, horses, birds, walrus, seal-like pinniped, seals, fish

County	University of California Museum of Paleontology Records		Example Vertebrate Fossils
	All Records ^a	Vertebrate Records	
Santa Clara	319	43	Bison, horses, hippo-like herbivore, mammoth
Solano	620	78	Horses, mammoth, mastodon, deer, cotton rat
Sonoma	1,698	192	Mastodon, horses, ground sloth, whale, dolphin-like, reptile, fish

Source: University of California Museum of Paleontology 2018a and 2018b.

^a Plants, microfossils, invertebrates, and vertebrates.

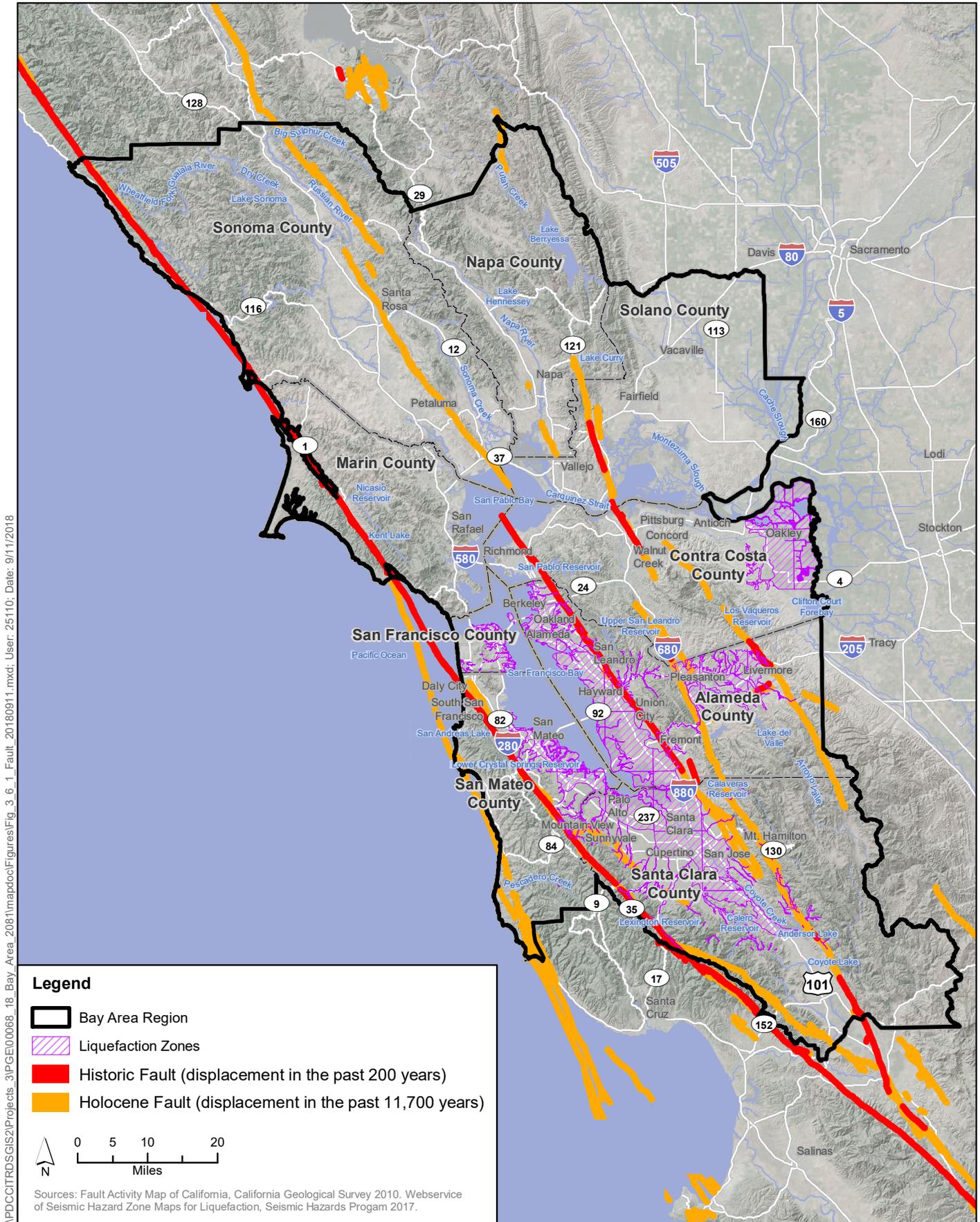
It is not possible to make a determination of the sensitivity for paleontological resources of each geologic unit in the study area because of the size the study area and the many geologic units present. However, records for some of the widespread and/or fossiliferous geologic formations in the study area are summarized in Table 3.7-5. The geologic units represent a wide range of geologic time and environments, such as grazing animals of the Pleistocene and marine mammals of the Pliocene.

Table 3.7-5. Example of Geologic Units in the Study Area with High Sensitivity for Paleontological Resources

Geologic Unit	Age	Example Fossils ^a	University of California Museum of Paleontology Vertebrate Records ^a
Montezuma Formation	Pleistocene	Rodents, camel, mammoth, tapir, ground sloth, horses, otter, birds, reptiles	2,765
Merced Formation	Pleistocene to Miocene	Deer, birds, fish, mastodon, ground sloth, seal, otter	172
Sonoma Volcanics	Pliocene	Horse and unidentified mammals	33
Purisima	Pliocene to Miocene	Whales, beaver, fish (many species), birds (many species), reptiles	1,353
Pinole Tuff	Miocene	Horses, pronghorn, rhinoceros, turtle, rabbit	951
Briones Formation	Miocene	Fish, birds, hippo-like herbivore	50
Orinda Formation	Miocene	Horses, camels, ground sloth, rabbit, rhinoceros, fish	139
San Pablo Formation	Miocene	Horses (many species), early elephant, rodents, ringtail, beaver	1,234
Sobrante Formation	Miocene	Fish	298
Monterey Formation	Miocene	Whales, mastodon, dugong, fish, birds	52
Moreno Formation	Late Cretaceous	Mosasaur, plesiosaur, sea turtle, fish	90
Franciscan Formation	Late Jurassic	Plesiosaur, ichthyosaur	2

Source: University of California Museum of Paleontology 2018c.

^a Fossil records for extent of geologic unit, not limited to the study area.



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Figure 3.7-1
Active Faults and Areas Susceptible to Liquefaction

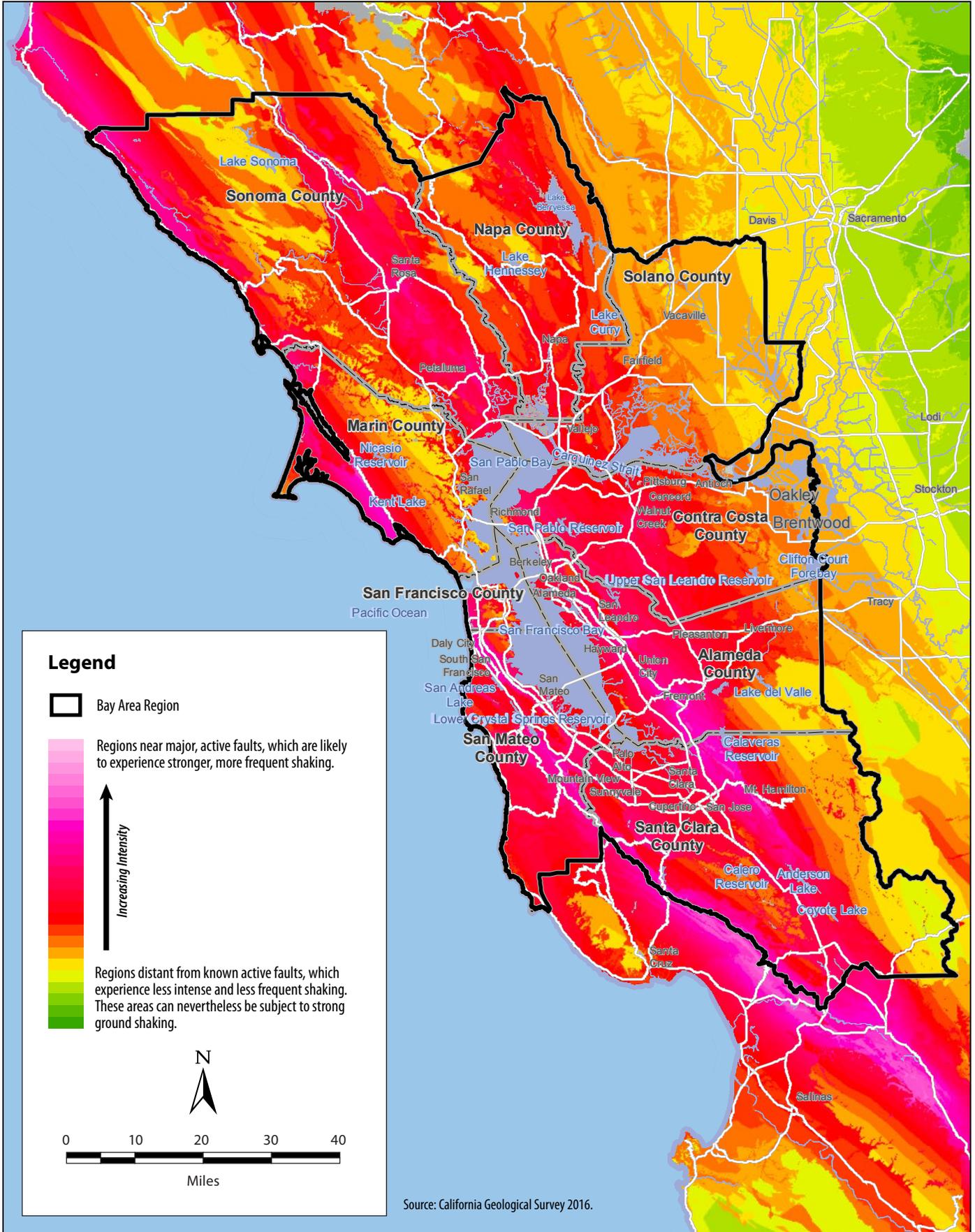


Figure 3.7-2
Earthquake Shaking Potential in the Study Area



Graphics ... 000668.18 (9/10/18) AB

National Natural Landmarks

Of the three NNLs that occur in the study area, the Dixon Vernal Pools/Jepson Prairie Preserve, the Audubon Canyon Ranch, and the Mount Diablo State Park, one is considered a unique geologic feature: the Mount Diablo State Park in Contra Costa County.

According to NPS (2018):

Mt. Diablo State Park contains the best examples of diapiric (igneous intrusion) geologic processes in the South Pacific Border biophysiological province. It is one of the few places in the region where geologic strata of Jurassic, Cretaceous, and Tertiary age can be seen in an aggregate thickness of 42,000 feet. The site also possesses a great diversity of native plant species and associations.

3.7.2 Environmental Impacts

3.7.2.1 Methods for Analysis

Impacts related to geology, soils, associated hazards, and paleontological resources were analyzed qualitatively, based on a review of soils and geologic information for the study area and on professional judgment. The analysis focuses on the potential for increased risk of personal injury, loss of life, and damage to property, including new or upgraded facilities, as a result of existing geologic or soil conditions in the study area. Because PG&E has conducted O&M activities in the study area for more than 30 years, O&M impacts described in this section represent baseline environmental conditions that would not change following approval of the Incidental Take Permit (ITP).

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures PG&E implements BMPs as standard practice to avoid or minimize potential impacts on geology, soils, associated hazards, and paleontological resources. As such, the following measures will be implemented when undertaking the covered activities associated with the ITP:

- Preparation of Stormwater Pollution Prevention Plans and Drainage Plans and Restoration of Surface Draining. A detailed description of these practices can be found in Section 3.10, *Hydrology and Water Quality*.
- Adherence to relevant CPUC, Institute of Electrical and Electronics Engineers (IEEE) 693, and building code earthwork standards to minimize damage from slope failure and minimize safety risk.

PG&E's *Bay Area Operations and Maintenance Habitat Conservation Plan* (Bay Area O&M HCP) contains the following avoidance and minimization measures (AMMs) related to geology and soils and applicable to the ITP. PG&E would apply these AMMs while implementing covered activities.

- Field Protocol (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 right-of-way (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-11: Utilize standard erosion and sediment control BMPs (pursuant to the most current version of *PG&E'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 waterbodies, stormwater inlets, and other standing bodies of water. Cover stockpiled soil prior to precipitation events.
- FP-14: If the covered activity disturbs 0.1 acre or more of habitat for a covered species in grasslands, the field crew will revegetate the area with a commercial "weed free" seed mix.

In addition, PG&E proposes the following applicant proposed measures (APMs) to minimize impacts to paleontological resources.

APM GEO-1: Protect unanticipated paleontological resource discoveries

If potential paleontological resources are discovered during construction activities, work will stop within 100 feet and the project paleontologist will be contacted immediately. If the discovery is determined to be significant, PG&E will implement measures to protect and document the paleontological resource, as directed by the paleontologist in consultation with the landowner, PG&E, and California Department of Fish and Wildlife. Efforts will be made to retain and protect such resources in place. If recovery of those resources is required to prevent their destruction, the paleontologist will develop a recovery strategy at a level appropriate to the discovery and in accordance with industry practice. The paleontologist will supervise the recovery effort, which may include the following components as appropriate to reduce impacts to a less-than-significant level: establishing recovery standards, preparing specimens for identification and preservation, documentation and reporting, and securing a curation agreement from the approved agency.

Work may not resume within 100 feet of the find until approval by the paleontologist.

APM GEO-2: Provide worker environmental awareness training

PG&E will continue to provide environmental awareness training on paleontological resources protection. This training may be administered by the program paleontologist as a stand-alone training or included as part of the overall environmental awareness training as required by the project and will at minimum include: types of paleontological resources that could occur at the project site; types of soils or lithologies in which the paleontological resources could be preserved; procedures that should be followed in the event paleontological resources are discovered; and penalties for disturbing paleontological resources.

Significance Criteria

In accordance with Appendix G of the State CEQA Guidelines, the potential significance of impacts related to geology, soils, and paleontological resources from the proposed project and implementation of covered activities was evaluated for each of the following criteria:

- Exposure of people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: (1) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault; (2) strong seismic ground shaking; (3) seismic-related ground failure, including liquefaction; or (4) landslides.

- Substantial soil erosion or the loss of topsoil.
- Placement of project-related facilities on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse.
- Placement of project-related facilities on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.
- Placement of project facilities on soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater.
- Substantial damage to, or destruction of, a unique paleontological resource or site or unique geologic feature.

3.7.2.2 Impacts and Mitigation Measures

Impact GEO-1: Exposure of people or structures to potential substantial adverse effects involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, including liquefaction, or landslides (Less-than-Significant Impact)

(a)(i) Expose People or Structures to Rupture of Known Fault—Less-than-Significant Impact

(a)(ii) Expose People or Structures to Strong Seismic Ground Shaking—Less-than-Significant Impact.

Portions of the study area could be subject to surface fault rupture or strong ground shaking in the event of an earthquake. PG&E's O&M activities, acquisition of conservation easements, and minor new construction activities would not exacerbate the existing risks associated with surface fault rupture. The activities associated with these elements of the project involve maintenance of existing facilities and shallow excavation, trenching, and construction for gas pressure limiting stations; new customer or business natural gas lines (up to 2 miles per project); new distribution and transmission lines (up to 2 miles per project); and tower lines, underground lines, and minor substation expansions. These activities would not alter the seismic setting or underlying geologic conditions and would therefore not increase the risk of surface fault rupture. Therefore, impacts on people or structures due to fault rupture would be less than significant.

For discussion of the risk of rupture related to hazardous materials and the associated control and clean-up activities, see Impacts HAZ-1 and HAZ-2 and the associated APMs in Section 3.9, Hazards and Hazardous Materials.

(a)(iii) Expose People or Structures to Seismic-Related Ground Failure/Liquefaction—Less-than-Significant Impact.

Parts of the study area are at varying degrees of risk related to liquefaction and other types of seismically induced ground failure and the corresponding potential to harm people or structures. Similar to the discussion described for Impact GEO-1(a)(i), the maintenance and construction activities associated with the project are not known to increase the risk to people or structures from seismic ground failure or liquefaction because these activities would not alter the seismic setting or

underlying geologic conditions. Therefore, impacts on people or structures due to liquefaction and other types of seismically induced ground failure would be less than significant.

Impact GEO-2: Potential to result in substantial soil erosion or the loss of topsoil (Less-than-Significant Impact)

Covered activities may involve vegetation removal, excavation, grading, fill placement, and other ground disturbance that could accelerate soil erosion and result in the loss of topsoil. The potential for accelerated soil erosion is particularly high where native soils are exposed (i.e., low vegetative cover) and in areas that have soils with moderate to high erosion potential, such as on steep terrain. New or expanded facilities are more likely to be located in previously undisturbed areas and would be more likely to result in accelerated erosion and the loss of topsoil. Maintenance or upgrades to existing facilities would primarily disturb soils in previously disturbed areas, such as along existing ROWs and around existing facilities where the soils have become compacted from use. Vehicle and equipment access for covered activities could disturb soils along existing roads and in undisturbed areas between facilities where roads have not been established. Activities in previously disturbed areas would have minimal effects on soil, but activities in undisturbed areas could accelerate erosion and result in a loss of topsoil. However, the overall extent of temporary and permanent ground disturbance from these activities in natural vegetation would be minimal across the nine Bay Area counties. During construction, PG&E would comply with the requirements of the Statewide Natural Gas Utility Permit including implementing BMPs to minimize the potential for runoff from the construction areas, including temporary construction yards, pull sites, and other temporary work areas. In addition, applicable AMMs from PG&E's Bay Area O&M HCP require PG&E to minimize disturbance areas, implement standard erosion and sediment control BMPs, and revegetate disturbances of at least 0.1 acre. As described in Chapter 2, *Project Description*, PG&E preserves topsoil during grading, trenching, and excavation by first removing and storing the topsoil before beginning the deeper earthwork.

With implementation of PG&E's BMPs and AMMs from the Bay Area O&M HCP, specifically FP-02, FP-03, FP-11, and FP-14, this impact would be less than significant.

For a discussion of PG&E processes to address erosion, see *PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures* in Section 3.10.2.1, *Methods for Analysis*, and Impact WQ-3 in Section 3.10.

Impact GEO-3: Placement of project-related facilities on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse (Less-than-Significant Impact)

PG&E covered activities could destabilize slopes or cause other forms of ground failure, mainly as a result of trenching or excavation. Because the primary concerns associated with slope failure are structural and safety issues, this analysis focuses primarily on PG&E's minor new construction activities.

Much of the study area is situated on flat or gently sloping topography, where the risk of slope failure is moderate to high. In areas where slopes are steep or substantial landslide hazard exists, such as the topography underlain by Franciscan units in the eastern Coast Ranges, adherence to relevant CPUC, IEEE 693 standards, and CBC earthwork standards would significantly reduce the risk of slope failure.

Based on site-specific conditions and recommendations, PG&E would take the following precautions, as appropriate, to prevent slope failure: place development constraints on building sites; require slope recontouring or other stabilization methods prior to construction; ensure adequate slope drainage; avoid identified landslides and unstable areas; and other site-specific approaches as deemed necessary. These measures would reduce the risk of slope failure and the associated damage that could result from slope failure.

Although the potential safety risks and damage associated with landslides and slope failure may not be entirely avoided, PG&E's compliance with applicable CPUC, IEEE, and CBC standards would ensure that risks are less than significant.

Impact GEO-4: Placement of project-related facilities on expansive soil, creating substantial risks to life or property (Less-than-Significant Impact)

Portions of the study area are situated on soils with moderate to high expansion potential. PG&E's O&M activities, acquisition of conservation easements, and minor new construction activities would not exacerbate the existing risks associated with expansive soils because these activities would not alter the underlying soil conditions. Therefore, this impact would be less than significant.

Impact GEO-5: Placement of facilities on soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater (No Impact)

Covered activities would not require the installation or use of septic leach field systems or other alternative wastewater disposal systems. Therefore, there would be no impact.

Impact GEO-6: Directly or indirectly destroy a significant paleontological resource or site or unique geologic feature (Less-than-Significant Impact with Mitigation)

Paleontological Resources

As discussed in Section 3.7.1.2, *Environmental Setting*, many geologic units in the study area have a high potential to contain important paleontological resources. O&M activities, which are ongoing and generally are implemented in previously disturbed ROWs, are not likely to disturb or damage paleontological resources. Damage is most likely to result where ground disturbance is greater and the work site has not experienced substantial prior disturbance. Thus, the greatest concern focuses on minor new construction activities that are likely to be implemented on previously undisturbed or largely undisturbed parcels. In most cases, minor new construction activities would require preparation of a site-specific geotechnical investigation and more investigation in previously undisturbed areas.

For all covered activities, PG&E would continue to comply with applicable laws for protecting paleontological resources and would continue to implement environmental practices under its Cultural Resources Program. In addition, AMMs from PG&E's Bay Area O&M HCP that minimize ground disturbance, specifically FP-02 and FP-03, would also help protect paleontological resources and reduce the potential for disturbance or damage. To reduce potential impacts on paleontological resources, APMs GEO-1 and GEO-2 would be implemented for all projects involving ground disturbance. With implementation of APMs GEO-1 and GEO-2 impacts on paleontological resources would be less than significant.

National Natural Landmarks

Mt. Diablo State Park is considered a unique geologic feature, which could be affected by construction activities. However, ongoing O&M activities would not change the uniqueness of the area and any effects of O&M activities would be minor and part of baseline environmental conditions. In addition, given the area's designation as a state park, it is highly unlikely that any minor new construction activities would be permitted that would diminish the quality of this geologic feature. If conservation lands were acquired near the state park, this conservation would further improve the setting of the park. Therefore, covered activities would have a less-than-significant impact on the unique geologic feature.

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3.8 Greenhouse Gas Emissions

3.8.1 Existing Conditions

3.8.1.1 Regulatory Setting

Federal

There is currently no federal overarching law specifically related to climate change or the reduction of greenhouse gas (GHG) emissions. Under the Obama Administration, the U.S. Environmental Protection Agency (EPA) had been developing regulations under the Clean Air Act (CAA) pursuant to EPA's authority under the CAA.¹ There have also been settlement agreements between EPA, several states, and nongovernmental organizations to address GHG emissions from electric generating units and refineries, as well as the EPA's issuance of an "Endangerment Finding" and a "Cause or Contribute Finding." EPA has also adopted the *Mandatory Reporting Rule and Clean Power Plan* (Clean Power Plan). Under the Clean Power Plan, EPA issued regulations to control carbon dioxide (CO₂) emissions from new and existing coal-fired power plants. However, on February 9, 2016, the U.S. Supreme Court issued a stay of these regulations pending litigation. Former EPA Administrator Scott Pruitt in 2017 signed a measure to repeal the Clean Power Plan, and the Supreme Court in October 2018 rejected legal challenges to the repeal.

State

In the absence of federal regulations, control of GHGs is generally regulated at the state level and is typically approached by setting emission reduction targets for existing sources of GHGs, setting policies to promote renewable energy and increase energy efficiency, and developing statewide action plans. Summaries of key policies, legal cases, regulations, and legislation at the state level that are relevant to the proposed project and covered activities are provided below.

Executive Order S-3-05

Executive Order (EO) S-3-05 (2005) asserted that California is vulnerable to the effects of climate change. To combat this concern, the order established the following GHG emissions reduction targets.

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80% below 1990 levels.

EOs are legally binding on state agencies such as the California Public Utilities Commission (CPUC). Accordingly, EO S-3-05 guides state agencies' efforts to control and regulate GHG emissions, although it has no direct, binding effect on local government or private actions. The secretary of the California Environmental Protection Agency is required to report to the governor and state legislature biannually regarding the impacts of global warming on California, mitigation and

¹ In *Coalition for Responsible Regulation, Inc., et al. v. EPA*, the United States Court of Appeals upheld EPA's authority to regulate GHG emissions under the CAA.

adaptation plans, and progress made toward reducing GHG emissions to meet the targets established in this EO.

Assembly Bill 32—California Global Warming Solutions Act

Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006, codified the state's GHG emissions target by requiring that the state's global warming emissions be reduced to 1990 levels by 2020. Since being adopted, the California Air Resources Board (CARB), the California Energy Commission (CEC), the CPUC, and the Building Standards Commission have been developing regulations that will help meet the goals of AB 32. The *AB 32 Scoping Plan* identifies specific measures to reduce GHG emissions to 1990 levels by 2020, and requires CARB and other state agencies to develop and enforce regulations and other initiatives for reducing GHGs (California Air Resources Board 2014a). Specifically, the *AB 32 Scoping Plan* articulates a key role for local governments, recommending they establish GHG reduction goals for both their municipal operations and the community that are consistent with those of the state.

Senate Bills 1078, 107, and 2—Renewables Portfolio Standard

Senate Bills (SBs) 1078 (2002), 107 (2006) and 2 (2011), California's Renewables Portfolio Standard (RPS), obligates investor-owned utilities, energy service providers, and Community Choice Aggregators to procure additional retail sales per year from eligible renewable sources with the target of procuring 33% of retail sales from renewable resources by 2020. The CPUC and CEC are jointly responsible for implementing the program. The RPS was extended by SB 350 in 2015, as discussed below.

Senate Bill 350—De León (Clean Energy and Pollution Reduction Act)

The key provisions of SB 350, the Clean Energy and Pollution Reduction Act of 2015, require the following by 2030: (1) an RPS of 50% and (2) a doubling of energy efficiency (electrical and natural gas) by 2030, including improvements to the efficiency of existing buildings. These mandates will be implemented by future actions of the CPUC and CEC.

Senate Bill 32

SB 32 (2016) requires CARB to ensure that statewide GHG emissions are reduced to at least 40% below the 1990 level by 2030, consistent with the target set forth in EO B-30-15. CARB adopted *California's 2017 Climate Change Scoping Plan* (Scoping Plan) in November 2017 to meet the GHG reduction requirement set forth in SB 32. It proposes continuing the major programs of *AB 32 Scoping Plan*, including: cap-and-trade regulation; low carbon fuel standard; more efficient cars, trucks, and freight movement; RPS; and reducing methane emissions from agricultural and other wastes. The 2017 Scoping Plan also addresses the GHG emissions from natural and working lands in California.

Guidelines to the California Environmental Quality Act (Senate Bill 97)

SB 97 of 2007 required amendment of the CEQA Guidelines to incorporate analysis of, and mitigation for, GHG emissions from projects subject to CEQA. The amendments added Section 15064.4 to the CEQA Guidelines, specifically addressing the potential significance of GHG emissions.

Section 15064.4 calls for a “good faith effort” to “describe, calculate or estimate” GHG emissions and indicates that the analysis of the significance of any GHG impacts should include consideration of the extent to which the project would do any of the following.

- Increase or reduce GHG emissions.
- Exceed a locally applicable threshold of significance.
- Comply with “regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions.”

The CEQA Guidelines also state that a project may be found to have a less-than-significant impact related to GHG emissions if the project complies with an adopted plan that includes specific measures to sufficiently reduce GHG emissions (14 California Code of Regulations Section 15064(h)(3)). Importantly, however, the CEQA Guidelines do not require or recommend a specific analytical methodology or provide quantitative criteria for determining the significance of GHG emissions.

Regulation for Reducing Sulfur Hexafluoride Emissions from Gas-Insulated Switchgear

The purpose of this regulation (17 California Code of Regulations Section 95350 et seq.) is to achieve GHG emission reductions by reducing sulfur hexafluoride (SF₆) emissions from gas-insulated switchgear. Owners of such switchgear must not exceed maximum allowable annual emissions rates, which are reduced each year until 2020, after which annual emissions must not exceed 1.0%. As defined by the regulation, the annual emissions rate means the gas-insulated switchgear owner’s total annual SF₆ emissions from all active gas-insulated switchgear equipment divided by the average annual SF₆ nameplate capacity of all active gas-insulated switchgear equipment. Owners must regularly inventory gas-insulated switchgear equipment, measure quantities of SF₆, and maintain records for at least 3 years. Additionally, by June 1 of each year, owners also must submit an annual report to CARB’s executive officer for emissions that occurred during the previous calendar year (California Air Resources Board 2014b).

Regional and Local

Regional Regulations

The study area consists of nine San Francisco Bay Area counties: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma. Some of the local jurisdictions located within the study area have adopted Climate Action Plans that could conceivably assist with CEQA review; however, most of those plans do not include construction-related GHG reduction goals or associated measures.

The nine counties are located in three air quality management districts: the Bay Area Air Quality Management District (BAAQMD), Northern Sonoma County Air Pollution Control District (NSCAPCD), and Yolo-Solano Air Quality Management District (YSAQMD). Only BAAQMD has published CEQA Air Quality guidelines that include guidance related to GHG emissions. Neither NSCAPCD nor YSAQMD have specific GHG guidance or thresholds.

Relevant information from the BAAQMD’s CEQA guidelines is summarized below.

Bay Area Air Quality Management District

BAAQMD's (2017) CEQA Guidelines outline advisory thresholds for stationary source and land use development projects. The mass emissions threshold for stationary source projects is 10,000 metric tons per year of carbon dioxide equivalent (CO₂e). The advisory threshold for land use development projects is 1,100 metric tons per year of CO₂e.

The guidelines do not identify a GHG emission threshold for construction-related emissions. However, BAAQMD recommends that GHG emissions from construction be quantified and disclosed, and that a determination regarding the significance of these GHG emissions be made with respect to whether a project is consistent with the AB 32 GHG emission reduction goals. The BAAQMD further recommends that best management practices (BMPs) be incorporated to reduce GHG emissions during construction, as feasible and applicable. BMPs may include using alternative-fuel (e.g., biodiesel, electric) construction vehicles or equipment for at least 15% of the fleet, using at least 10% local building materials, and recycling or reusing at least 50% of construction waste or demolition materials.

Local Regulations

Because the CPUC has exclusive jurisdiction over project siting, design, and construction, the project is not subject to local land use and zoning regulations or discretionary permits. The following discussion of general plans is provided for information purposes and to assist with CEQA review.

General Plans

California law requires counties and cities to develop comprehensive, long-term general plans to guide their land use decision making and physical development. All of the seven required elements, or chapters, in a general plan, with the exception of noise, have some relation to GHG emissions. For instance, the circulation element must establish policies to reduce vehicle miles traveled and GHGs. The development patterns in the land use element influence GHG emissions. The housing element is a critical tool in implementing policies and programs that reduce GHG emissions and promote sustainable development. General plans may also contain additional elements on topics of concern to the local community, which could have an effect on GHG emissions. Climate Action Plans, which should be consistent with general plans and may be adopted as part of the general plan, typically include GHG reduction and climate change adaptation measures.

3.8.1.2 Environmental Setting

The specific chemical properties of GHGs enable them to become well mixed within the atmosphere and transported over long distances. Consequently, unlike other resource areas that are primarily concerned with localized project impacts (e.g., within 1,000 feet of a project site), the global nature of climate change requires a broader analytic approach. The following subsections provide background information on global climate change and principal GHGs associated with Pacific Gas and Electric Company (PG&E) operations and maintenance (O&M) activities and minor new construction.

The Greenhouse Effect

Climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind patterns, lasting for an extended period of time (decades or longer). A GHG is any gas that absorbs infrared radiation in the atmosphere; in other words, GHGs trap heat in the

atmosphere. The *greenhouse effect* is the trapping and build-up of heat in the atmosphere (troposphere) near the Earth's surface. The greenhouse effect traps heat in the troposphere through a threefold process: short-wave radiation emitted by the sun is absorbed by the Earth, the Earth emits a portion of this energy in the form of long-wave radiation, and GHGs in the upper atmosphere absorb this long-wave radiation and emit it into space and toward the Earth. The greenhouse effect is a natural process that contributes to regulating the Earth's temperature. Without it, the average temperature of the Earth would be about 0°F instead of its present 57°F. If the atmospheric concentrations of GHGs rise, the average temperature of the lower atmosphere will gradually increase. Global climate change concerns are focused on whether human activities are leading to an enhancement of the greenhouse effect.

Some of the potential effects of global warming in California may include decrease in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. Globally, climate change has the potential to affect numerous environmental resources through potential, though uncertain, impacts related to future air temperatures and precipitation patterns. The projected effects of global warming on weather and climate are likely to vary regionally, but are expected to include the following direct effects (Intergovernmental Panel on Climate Change 2007).

- Higher maximum temperatures and more hot days over nearly all land areas.
- Higher minimum temperatures, fewer cold days and frost days over nearly all land areas.
- Reduced diurnal temperature range over most land areas.
- Increase of heat index over land areas.
- More intense precipitation events.

There are also many secondary effects that are projected to result from climate change, including global rise in sea level, impacts on agriculture, changes in disease vectors, and changes in habitat and biodiversity. Although the possible outcomes and the feedback mechanisms involved are not fully understood and much research remains to be done, the potential for environmental, social, and economic consequences over the long term is anticipated to be substantial.

Anthropogenic (human-made) GHG emissions in the United States are derived mostly from the combustion of fossil fuels for transportation and power production. Energy-related CO₂ emissions resulting from fossil fuel exploration and use account for close to 90% of the human-generated GHG emissions in the United States, primarily in the form of CO₂ emissions from burning fossil fuels (U.S. Environmental Protection Agency 2018).

Greenhouse Gases and Global Warming Potential

The principle anthropogenic GHGs contributing to global warming are CO₂, methane (CH₄), nitrous oxide (N₂O), and fluorinated compounds, including SF₆, hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). Water vapor, the most abundant GHG, is not included in this list because its natural concentrations and fluctuations far outweigh its anthropogenic sources.

The primary GHGs of concern associated with covered activities are CO₂, CH₄, N₂O, and SF₆. Principal characteristics of these pollutants are discussed below.

Carbon dioxide enters the atmosphere through fossil fuels (oil, natural gas, and coal) combustion, solid waste decomposition, plant and animal respiration, and chemical reactions (e.g., manufacture

of cement). CO₂ is also removed from the atmosphere (or *sequestered*) when it is absorbed by plants as part of the biological carbon cycle.

Methane is emitted during the production and transport of coal, natural gas, and oil. CH₄ emissions also result from livestock and other agricultural practices and from the decay of organic waste in municipal solid waste landfills.

Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.

Sulfur hexafluoride is an inorganic, colorless, odorless, nonflammable, potent GHG, and an excellent electrical insulator.

Methods have been set forth to describe emissions of GHGs in terms of a single gas to simplify reporting and analysis. The most commonly accepted method to compare GHG emissions is the global warming potential methodology defined in the Intergovernmental Panel on Climate Change (IPCC) reference documents. The IPCC defines the global warming potential of various GHG emissions on a normalized scale that recasts all GHG emissions in terms of CO₂e, which compares the gas in question with that of the same mass of CO₂ (by definition, CO₂ has a global warming potential of 1).

3.8.2 Environmental Impacts

3.8.2.1 Methods for Analysis

O&M and minor new construction activities would generate traffic and associated GHG emissions from vehicles on roads and highways in the study area. Activities that require physical changes or heavy-duty equipment would also generate GHG emissions through the use of heavy-duty diesel-powered equipment. In addition, it is possible that substation expansion projects or projects involving the replacement of circuit breakers that utilize SF₆ could result in GHG emissions in the form of SF₆ leakage. Although the majority of the O&M and minor new construction activities would take place within or immediately adjacent to existing PG&E rights-of-way, the precise sizes and locations of individual activities are not known at this time. Thus, it is not possible to identify the specific amount of GHG emissions that would result from O&M and minor new construction activities, or in which counties or air basins they would be generated. Accordingly, GHG impacts resulting from the O&M and minor new construction activities are assessed qualitatively based on the expected types, frequency, and intensity of construction and O&M activities, relative to existing conditions. Where applicable, previously published analyses of similar PG&E projects are used to inform the impact analysis and discussion.

The analysis discusses the potential for ongoing and future individual O&M and minor new construction activities in the study area to generate GHG emissions that exceed local air district thresholds or to violate GHG-related air district requirements. This analysis focuses on identifying a strategy to ensure that an appropriate level of GHG protections are provided for ongoing and future O&M and minor new construction activities. The analysis considers PG&E's existing environmental programs and practices, as described below. Because PG&E has conducted O&M activities in the study area for more than 30 years, the O&M impacts described in this section represent baseline environmental conditions that would not change following approval of the Incidental Take Permit (ITP).

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures

PG&E complies with all applicable federal and state air quality regulations. The company's air quality program and BMPs also help with the reduction of GHG emissions from PG&E activities. Refer to Section 3.3.2, *Environmental Impacts*, for a summary of the company's air quality program and practices.

PG&E is also committed to decreasing its CO₂ GHG emissions and has already instituted several operational changes in an effort to decrease the organization's carbon footprint. In addition to complying with mandatory GHG inventory reporting requirements by CARB and EPA, PG&E voluntarily reports a more comprehensive emissions inventory to The Climate Registry, a nonprofit organization that assists organizations in reporting emissions in order to manage and reduce them. PG&E has committed to a 55% renewable energy target by the year 2031, and also has been working to reduce GHG emissions from its vehicle fleet by deploying alternative-fuel vehicles, including hybrid-electric bucket trucks and compressed natural gas vehicles. PG&E is continuing to invest in new vehicles and technologies that further reduce GHG emissions from its vehicle fleet. Some of these efforts include the deployment of bucket trucks equipped with electric power takeoff, which allows crews to operate the trucks without idling the engines and installing electric vehicle chargers at PG&E facilities to promote the use of electric vehicles by employees.

In addition, the following applicant proposed measure (APM) specifically applies to the reduction of GHG emissions.

APM GHG-1: Avoid and Minimize Potential Sulfur Hexafluoride (SF₆) Emissions

For substation expansions or modifications that includes new breakers insulated with SF₆, PG&E will continue to include the project substation equipment in PG&E's system-wide SF₆ emission reduction program, which includes inventorying and monitoring system-wide SF₆ leakage rates and employing X-ray technology to inspect internal circuit breaker components to eliminate dismantling of breakers and reduce accidental releases. New project breakers will have a manufacturer's guaranteed SF₆ leakage rate of 0.5% per year or less and will be maintained in accordance with PG&E's maintenance guidelines.

Significance Criteria

In accordance with Appendix G of the State CEQA Guidelines, the potential significance of impacts related to GHG emissions from the proposed project and implementation of covered activities was evaluated for each of the following criteria:

- Generation of GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

As discussed previously, the study area spans three air quality districts (BAAQMD, NSCAPCD, and YSAQMD). Neither YSAQMD nor NSCAPCD have specific GHG emissions thresholds. BAAQMD has emissions thresholds for operational GHG emissions, and recommends BMPs to reduce GHG emissions from construction activities.

Although the specific locations and parameters of the O&M and minor new construction activities are not known at this time, the majority of the future actions would be related to short-term ongoing O&M and minor construction activities, and would not generally result in the development of a new stationary source or land use development. As such, no specific operational GHG threshold from the BAAQMD would directly apply to the O&M and minor new construction activities. Nevertheless, these thresholds can be used to assist with CEQA review.

3.8.2.2 Impact Discussion

Impact GHG-1: Generation of greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment (Less-than-Significant Impact)

Covered activities could result in the generation of GHG emissions from continuing on-road vehicle movement, use of mobile and stationary equipment, painting and asphalt paving, and replacing fuel-based circuit breakers with SF₆ breakers. Emissions would vary substantially depending on the level of activity, duration of the activity, specific operations, types of equipment, and number of personnel working on a given project.

Operational activities typically include inspecting, monitoring, testing, and operating valves, enclosures, switches, and other components, and are part of the existing baseline. These activities involve utility personnel working at existing facilities for discrete and designated periods of time. In general, most operational activities would be minor and temporary, involving few vehicle trips and would not change from existing operational activities.

Maintenance activities include repairing and replacing equipment, structures, and access roads. This work also includes emergency repair and replacement and vegetation management, including tree pruning and removal. These activities are also part of the baseline conditions and would not be affected by issuance of the ITP (including emissions from natural gas pipeline purging). GHG emissions associated with maintenance activities result from vehicle trips and use of heavy-duty equipment when required for facility repair or replacement. Most maintenance activities are likely to be small in scale and fairly short in duration. Activities likely requiring the most intensive equipment and vehicle use would be pipeline replacement and reconductoring. GHG emissions from pipeline replacement and reconductoring would likely originate from the use of mobile and stationary construction equipment, as well as employee and haul truck vehicles. Tree removal activities may also have an effect on existing stored carbon and annual carbon sequestration, but this effect is expected to be minimal and no different from baseline conditions.

No new permanent emission-generating facilities would be installed as part of O&M activities, and any replacement of existing facilities would be in kind, except for potential replacement of fuel-based circuit breakers with SF₆ circuit breakers. Leakage of SF₆ circuit breakers may generate additional GHGs, but these emissions would be controlled through compliance with PG&E's APM GHG-1 that limits SF₆ leak rates to 0.5% per year or less. Additionally, new SF₆ breakers would be less subject to leaks than older SF₆ breakers. Accordingly, there would be negligible changes in criteria pollutant or GHG emissions from PG&E O&M activities compared with existing conditions. Rather, relative to existing conditions, emissions are expected to decline over the 30-year life of the ITP as PG&E replaces its vehicles and equipment with more fuel-efficient models.

Minor new construction activities include expanding electric substations, constructing gas pressure limiting stations, and installing infrastructure to extend service to locally approved new residential

or commercial customers. GHG emissions would be generated by the use of mobile and stationary construction equipment, as well as employee and haul truck vehicle exhaust.

Minor new construction activities would generate short-term GHG emissions. However, activities would be relatively small in scale. Minor construction projects with the greatest likelihood to generate emissions would be new customer pipeline installation, new distribution and transmission line construction or relocation, electric tower line construction, and minor substation expansion projects.

Based on previous similar projects, emissions from these types of construction activities are not likely to exceed 1,100 metric tons CO_{2e} per year, which is the BAAQMD's advisory threshold for land use development projects. All construction activities would also be subject to PG&E's air quality program, which would reduce GHG emissions through implementation of BMPs. This approach is consistent with BAAQMD guidance for reducing GHG emissions from construction activities. Accordingly, because emissions from minor new construction activities are not expected to exceed applicable thresholds or violate air district requirements, this impact would be less than significant. APM GHG-1, limiting SF₆ leak rates, will further reduce less-than-significant impacts.

Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases (Less-than-Significant Impact)

The *AB 32 Scoping Plan* approved by CARB on December 12, 2008, provides a framework for actions to reduce California's GHG emissions and requires CARB and other state agencies to adopt regulations and other initiatives to reduce GHGs. The *AB 32 Scoping Plan* identifies several state regulatory measures aimed at the identification and reduction of GHG emissions, and recommends strategies for implementation at the statewide level to meet the goals of AB 32. It establishes an overall framework for the measures that would be adopted to reduce California's GHG emissions.

Covered activities would improve the infrastructure used in distribution of California's energy supply, and would not adversely affect California's ability to supply renewable energy, PG&E's ability to meet its RPS obligations, or the ability of the counties in the study area to achieve any GHG reduction goals they may have. O&M covered activities would be comparable to ongoing PG&E activities, and associated emissions would not increase as a result of the project. Rather, emissions are expected to decrease relative to existing conditions. Any emissions from minor new construction activities would be short term and minor because of compliance with PG&E's air quality program and the limited scope of covered activities. Should any new substation expansion or other minor new construction activities result in the addition of electric substation equipment that utilize SF₆, PG&E would comply with CARB's SF₆ regulations to inventory, report, and minimize SF₆ leaks through the use of new technology. For these reasons, covered activities would be consistent with the goals of the *AB 32 Scoping Plan*.

SB 32 (which includes the goal of reducing GHG emissions to 40% below 1990 levels by 2030) and EO S-3-05 (which includes the goal of reducing GHG emissions to 80% below 1990 levels by 2050) establish the state's long-term GHG reduction framework. *California's 2017 Climate Change Scoping Plan* (California Air Resources Board 2017) extends many of the *AB 32 Scoping Plan* policies, and covered activities would not conflict with any of these strategies. The infrastructure upgrades proposed as part of the project would contribute to long-term improvements to the state's electric and natural gas systems, enhancing climate resiliency and flexibility for adaptive management. Ultimately, the covered activities would not conflict with any applicable GHG management plan, policy, or regulation. Therefore, this impact would be less than significant.

3.8.3 References Cited

3.8.3.1 Printed References

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3.9 Hazards and Hazardous Materials

3.9.1 Existing Conditions

3.9.1.1 Regulatory Setting

Federal

Clean Water Act—Section 401

The Clean Water Act (CWA) (33 United States Code [USC] Section 1251 et seq.) is intended to promote restoration and maintenance of the chemical, physical, and biological integrity of waters of the United States. Under CWA Section 401, states have the authority to review any federal permit or license that will result in a discharge to wetlands and other waters under state jurisdiction to ensure that the actions will be consistent with the state's water quality requirements.

Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) was enacted by Congress in 1976 (15 USC Section 2601 et seq.) and gave the U.S. Environmental Protection Agency (EPA) the authority to protect the public from unreasonable risk of injury to health or the environment by regulating the manufacture, sale, and use of chemicals currently produced or imported into the United States. The TSCA, however, does not address wastes produced as byproducts of manufacturing. The types of chemicals regulated by the act fall into two categories: existing and new. *New chemicals* are defined as “any chemical substance which is not included in the chemical substance list compiled and published under TSCA section 8(b).” This list included all of the chemical substances manufactured or imported into the U.S. prior to December 1979, such as polychlorinated biphenyls, which were historically used in electrical equipment. *Existing chemicals* include any chemical listed under section 8(b). The distinction between existing and new chemicals is necessary because the act regulates each category of chemicals in different ways. EPA repeatedly screens both new and existing chemicals and can require reporting or testing of those that may pose an environmental or human-health hazard. EPA can ban the manufacture and import of those chemicals that pose an unreasonable risk.

Resource Conservation and Recovery Act

Under the Resource Conservation and Recovery Act of 1976 (RCRA; 42 USC Section 6901 et seq.), individual states may implement their own hazardous waste programs in lieu of RCRA as long as the state program is at least as stringent as the federal RCRA requirements. The federal government approved California's RCRA program, called the Hazardous Waste Control Law (HWCL), in 1992. The act established a program administered by EPA for the regulation of the generation, transportation, treatment, storage, and disposal of hazardous waste. EPA implements this law through Title 42, Subtitle C, Section 6921 et seq. of the USC and its implementing regulations (40 Code of Federal Regulations [CFR] Part 260 et seq.).

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; 42 USC Chapter 103) and associated Superfund Amendments provide EPA with the authority to identify hazardous sites, to require site remediation, and to recover the costs of site remediation from polluters. CERCLA also enabled the revision of the National Oil and Hazardous Substances Pollution Contingency Plan, also known as the National Contingency Plan. The plan provides the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, or contaminants.

Solid Waste Disposal Act

The Solid Waste Disposal Act (SWDA) was the first major federal law directed at waste disposal. It recognizes the potentially negative health and environmental consequences associated with certain waste disposal practices. The SWDA provides waste management technology, and charges municipalities with responsibility for disposal of solid waste.

Occupational Safety and Health Administration Law and Regulations

The federal Occupational Safety and Health Administration's (OSHA) mission is to ensure the safety and health of American workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in workplace safety and health. The OSHA staff establishes and enforces protective standards and reaches out to employers and employees through technical assistance and consultation projects. OSHA standards are listed in Title 29 CFR Part 1910.

U.S. Department of Transportation

The U.S. Department of Transportation's (USDOT) Office of Pipeline Safety was created under the Natural Gas Pipeline Safety Act of 1968 and continues to be the lead federal regulator for pipeline safety. The Natural Gas Pipeline Safety Act of 1968, as amended through March 2006 (Title 49, Subtitle VIII, Chapter 601 of the USC), specifies the minimum safety standards for constructing, designing, installing, initially inspecting, and initially testing a new natural gas pipeline facility. The standards include the characteristics of the material used in constructing a facility, design factors for specific locations, and public safety factors, particularly its ability to prevent and contain a natural gas spill. The design standards for specific locations reflect site-specific geological, topographical, seismic, and soil conditions.

Title 49 CFR Parts 190 through 192 contain federal pipeline safety regulations that relate specifically to natural gas. Title 49, Part 192 of the CFR prescribes federal safety standards for transportation of natural gas by pipeline. Regulations vary with class locations, which are based on the number of dwelling units, high-occupancy buildings, or open areas within 660 feet of approximately 1 continuous mile of the pipeline centerline. Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation.

The Pipeline Safety Improvement Act of 2002 strengthened pipeline safety laws. The act requires gas transmission operators to develop and follow a written integrity management program to address risks on each covered transmission pipeline segment within high-consequence areas.

Congress amended Title 49 of the CFR with Pipeline Safety, Regulatory Uncertainty, and Job Creation Act in 2011. The act is intended to enhance the safety, environmental protection, and reliability associated with the transportation of energy products by pipeline.

USDOT Hazardous Materials Regulations (49 CFR Parts 100–185) cover all aspects of hazardous materials packaging, handling, and transportation. The Hazardous Materials Transportation Act contains requirements for hazardous material shipments and packaging, as well as guidelines for marking, manifesting, labeling, packaging, placarding, and spill reporting. Specific regulations dealing with hazardous materials are covered in the CFR in the following locations.

- Title 49, Section 173.50 et seq.
- Title 49, Section 173.56 (Hazardous Material Regulations, Shippers—General Requirements for Shipping and Packaging).
- Title 49, Part 397 (Transportation of Hazardous Materials; Driving and Parking Rules).

Federal Aviation Administration Regulations

All airports and navigable airspace not administered by the Department of Defense are under the jurisdiction of the Federal Aviation Administration (FAA). Title 14, Part 77 of the CFR establishes the standards and required notification for objects affecting navigable airspace. In general, construction projects exceeding 200 feet in height, or those extending at a ratio greater than 100 to 1 (horizontal to vertical) from a public or military airport runway more than 3,200 feet long, out to a horizontal distance of 20,000 feet, are considered potential obstructions and require FAA notification. In addition, construction projects extending at a ratio greater than 50 to 1 (horizontal to vertical) from a military or public airport runway measuring 3,200 feet or less, out to a horizontal distance of 10,000 feet, are considered potential obstructions and require FAA notification. Title 14, Part 133 of the CFR also requires an operating plan to be developed in coordination with and approved by the local FAA Flight Standards District Office that has jurisdiction over when helicopter use would be required.

State

California Public Utilities Commission

Maintenance and repair of the pipeline system in the study area is required by California Public Utilities Commission (CPUC) General Order (G.O.) 112-F, which governs the design, construction, testing, operation, and maintenance of gas gathering and transmission and distribution piping systems in the state of California. G.O. 112-F includes requirements for leak testing, inspections of pipelines and associated appurtenances, and incident reporting. Specifications for electrical equipment associated with natural gas pipelines are also discussed within G.O. 112-F. Under G.O. 95, the CPUC regulates all aspects of design, construction, operation, and maintenance of electrical power lines subject to CPUC jurisdiction. These rules are supplements to the federal regulations and do not supersede federal pipeline safety regulations.

The Natural Gas Pipeline Safety Act of 2011, within the Public Utilities Act, designates the CPUC as the state authority responsible for regulating and enforcing intrastate gas pipeline transportation and pipeline facilities pursuant to federal law, including the development, submission, and administration of a state pipeline safety program certification for natural gas pipelines. The Natural Gas Pipeline Safety Act of 2011 requires each gas corporation to prepare and submit to the CPUC a

proposed comprehensive pressure testing implementation plan for all intrastate transmission lines to either pressure test those lines or to replace all segments of intrastate transmission lines that were not pressure tested or that lack sufficient details related to performance of pressure testing. The comprehensive pressure testing implementation plan is required to include a timeline for completion that is as soon as practicable, and includes interim safety enhancement measures, including increased patrols and leak surveys, pressure reductions, prioritization of pressure testing for critical pipelines that must run at or near maximum allowable operating pressure values that result in hoop stress levels at or above 30% of specified minimum yield stress, and any other measure that the CPUC determines will enhance public safety during the implementation period.

Regarding fire safety, the CPUC issued new fire safety regulations in December 2017. The regulations apply to the High Fire-Threat District that consists of three areas (California Public Utilities Commission 2017).

- Tier 1 High Hazard Zones on the U.S. Forest Service-California Department of Forestry and Fire Protection (CAL FIRE) joint map of Tree Mortality High Hazard Zones.
- Tier 2 of the CPUC Fire-Threat Map where there is an elevated risk for utility-associated wildfires.
- Tier 3 of the CPUC Fire-Threat Map where there is an extreme risk for utility-associated wildfires.

The fire-safety regulations require electric utilities to implement the following measures.

- Prioritize correction of safety hazards based, in part, on whether the safety hazard is located in the High Fire-Threat District.
- Correct non-immediate fire risks in Tier 2 of the High Fire-Threat District within 12 months, and in Tier 3 within 6 months.
- Maintain increased clearances between vegetation and power lines throughout the High Fire-Threat District.
- Maintain more stringent wire-to-wire clearances for new and reconstructed facilities in Tier 3.
- Conduct annual patrol inspections of their overhead distribution facilities in rural areas of Tier 2 and Tier 3.
- Prepare a fire-prevention plan annually if they have overhead facilities in the High Fire-Threat District.

Hazardous Waste Control Law

The HWCL (California Health and Safety Code Chapter 6.5, Section 25100 et seq.) authorizes the California Environmental Protection Agency and the Department of Toxic Substances Control (DTSC), a department within the agency, to regulate the generation, transportation, treatment, storage, and disposal of hazardous wastes. DTSC can also delegate enforcement responsibilities to local jurisdictions that enter into agreements with DTSC for the generation, transport, and disposal of hazardous materials under the authority of HWCL.

Hazardous Substance Account Act

The Hazardous Substance Account Act (HSAA) (California Health and Safety Code Chapter 6.8, Section 25300 et seq.) is California's equivalent to CERCLA. It addresses hazardous waste sites and

apportions liability for them. The HSAA also provides that owners are responsible for the cleanup of such sites and the removal of toxic substances, where possible.

The two state agencies with primary responsibility for enforcing federal and state regulations related to hazardous material transport, and responding to hazardous materials transportation emergencies, are the California Highway Patrol and California Department of Transportation, respectively.

Occupational Health and Safety

The California Occupational Safety and Health Act of 1970 provides measures that address the safety of construction and industrial workers; Title 8 of the California Code of Regulations identifies the majority of these measures. The California Division of Occupational Safety and Health (Cal/OSHA) assumes primary responsibility for developing and enforcing workplace safety regulations within the state. Cal/OSHA standards are more stringent than federal OSHA regulations and take precedence.

California Office of Emergency Services

The California Office of Emergency Services is the state office responsible for establishing emergency response and spill notification plans related to hazardous materials accidents.

Porter-Cologne Water Quality Control Act

As discussed in more detail in Section 3.10, *Hydrology and Water Quality*, the Porter-Cologne Water Quality Control Act (Porter-Cologne Act; California Water Code, Division 7) is the provision of the California Water Code that regulates water quality in California and authorizes the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCBs) to implement and enforce the regulations. The RWQCBs regulate discharges under the Porter-Cologne Act primarily through the issuance of waste discharge requirements. Anyone discharging or proposing to discharge materials that could affect water quality must file a report of waste discharge. The SWRCB and the RWQCBs can make their own investigations or may require dischargers to carry out water quality investigations and report on water quality issues. The Porter-Cologne Act provides several means of enforcement, including cease and desist orders, cleanup and abatement orders, administrative civil liability orders, civil court actions, and criminal prosecution. The study area is under the jurisdiction of the Central Valley, Central Coast, North Coast, and San Francisco Bay RWQCBs.

Unified Hazardous Waste and Hazardous Materials Management Regulatory Program

The Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program) (California Code of Regulations Title 27) was mandated by the State of California in 1993. The Unified Program was created to consolidate, coordinate, and make consistent the administrative requirements, permits, inspections, and enforcement activities for the following six environmental programs.

- Hazardous Waste Generators and Hazardous Waste On-site Treatment Programs.
- Underground Storage Tank Program.
- Aboveground Petroleum Storage Act Program.
- Hazardous Materials Release Response Plans and Inventories.

- California Accidental Release Prevention Program.
- Uniform Fire Code Hazardous Materials Management Plans and Hazardous Materials Inventory Statements.

At the local level, this is accomplished by identifying a Certified Unified Program Agency (CUPA) that coordinates all of these activities to streamline the process for local businesses. CUPAs have statutory authority to require permits, inspect facilities, issue violations, and perform enforcement actions—including the authority to photograph any hazardous material or hazardous waste, container, container label, vehicle, waste treatment process, waste disposal site, or condition constituting a violation of law found during an inspection (California Health and Safety Code, Chapter 6.95, Section 25511(a) and Chapter 6.5, Section 25185(a)(5)).

Hazardous Materials Management Plans must comply with Health and Safety Code, Chapter 6.95, Sections 25500 through 25545, and the California Fire Code (Section 5001.5.1) and include: (1) access to each storage and use area; (2) location of emergency equipment; (3) location where liaison will meet emergency responders; (4) facility evacuation meeting point locations; (5) the general purpose of other areas within the building; (6) location of all aboveground and underground tanks and their appurtenances including, but not limited to, sumps, vaults, below-grade treatment systems and piping; (7) the hazard classes in each area; (8) locations of all control areas and Group H occupancies; and (9) emergency exits.

Public Resources Code

Public Resources Code Sections 4290–4293 identify construction, operation, and maintenance requirements to minimize fire hazards for structures located in State Responsibility Areas (SRAs).

- Public Resources Code Section 4290 was adopted to establish minimum wildfire protection standards in conjunction with building, construction, and development of all residential, commercial, and industrial buildings in SRAs. Under Section 4290, all residential, commercial, and industrial building construction within SRAs must provide for basic emergency access and perimeter wildfire protection measures, as specified in the code. Local standards that exceed those of Section 4290 supersede Section 4290.
- Public Resources Code Section 4291 addresses requirements for maintaining defensible space around buildings in SRAs.
- Public Resources Code Section 4292 addresses power line hazard reduction. It identifies the requirements for firebreaks around “any pole or tower which supports a switch, fuse, transformer, lightning arrester, line junction, or dead end or corner pole” in wildland areas.
- Public Resources Code Section 4293 provides specific clearances for power lines in wildland areas.

California Department of Forestry and Fire Protection

Pursuant to Public Resources Code Sections 4201–4204 and Government Code Sections 51175–51189, CAL FIRE has created Fire Hazard Severity Zone (FHSZ) maps for the state that identify areas that are within state or local responsibility for preventing or suppressing fires. These maps identify areas of significant fire hazard based on fuels, terrain, weather, and other relevant factors. The FHSZs then define the application of various mitigation strategies to reduce risks associated with wildland fires. SRAs are areas of the state in which the financial responsibility of preventing and

suppressing fires has been determined to be primarily the responsibility of the state (Public Resources Code Section 4201). Local Responsibility Areas (LRAs) are areas in which the financial responsibility of preventing and suppressing fires is primarily the responsibility of local agencies, including cities and counties (Government Code Sections 51175–51189). SRAs were originally mapped by CAL FIRE in 1985 and LRAs in 1996.

Within SRAs, the Director of CAL FIRE has designated areas as moderate, high, and very high fire hazard severity zones (Public Resources Code Section 4202). Outside of SRAs, within LRAs, the Director of CAL FIRE was charged with recommending the locations of very high fire hazard severity zones (Government Code Section 51178.). These recommendations were to be reviewed and adopted in ordinances by local agencies (Government Code Section 51179), although not all local agencies have complied. All designations are mapped on the CAL FIRE website.

Local

Because the CPUC has exclusive jurisdiction over project siting, design, and construction, the project is not subject to local land use and zoning regulations or discretionary permits. The following discussion is provided for information purposes and to assist with California Environmental Quality Act (CEQA) analysis.

General Plans

California law requires counties and cities to develop comprehensive, long-term general plans to guide their land use decision making and physical development. Of the seven required elements, or chapters, in a general plan, the safety element is most applicable to hazards and hazardous materials. The safety element establishes policies and programs to protect the community from risks associated with seismic, geologic, flood, and wildfire hazards, as well as from other concerns such as drought. Some other general plan elements, including the conservation and open space element, may include policies regarding flood hazards, fire hazards, and other potentially hazardous conditions.

3.9.1.2 Environmental Setting

The San Francisco Bay Area (Bay Area) supports a diversity of land uses and numerous transportation corridors that contain various potential hazards that pose risks to human health and safety. Some of these hazards are natural, such as wildfire, steep slopes, and seismic hazards, while others are a result of human activities, such as hazardous material sites, pesticide use in agricultural areas, and urban areas in high fire hazard areas. Contaminants associated with the various uses in the study area include a variety of fuels and other petroleum distillates; pesticides, fertilizers, and other agricultural chemicals; lead; radioactivity; and volatile and semi-volatile organic chemicals. Construction activities can introduce hazardous materials into the environment and create hazards to people.

Hazardous Materials Sites

EPA and DTSC maintain lists of hazardous materials sites, and both agencies are responsible for monitoring cleanup efforts and ensuring the sites do not pose substantial hazards to the environment or people. Numerous hazardous materials sites have been recorded in the Bay Area, including several Superfund sites (California Department of Toxic Substances Control 2018; U.S. Environmental Protection Agency 2018); the sites are in various stages of being cleaned up. Table

3.9-1 presents a total of 182 sites in the study area that qualify for the inclusion in the state's database of hazardous materials sites or the federal national priority list (California Department of Toxic Substances Control 2018).

Table 3.9-1. Known Hazardous Waste and Substances Sites in the Study Area

County	Federal National Priority Sites	State Hazardous Materials Sites	Total
Alameda	3	50	53
Contra Costa	4	33	37
Marin	0	8	8
Napa	0	2	2
San Francisco	1	7	8
San Mateo	0	9	9
Santa Clara	21	24	45
Solano	2	9	11
Sonoma	2	3	5
Total	33	145	178

Source: California Department of Toxic Substances Control 2018.

Fire Hazards

The Bay Area contains a mixture of urban areas and open space; the area where development is adjacent to open space is referred to as the *wildland urban interface*. Wildfire can threaten communities and buildings in this interface. The state maps fire hazard severity and identifies wildfire threat areas. Of the 4.39 million acres of land in the Bay Area, 18.5% is in a wildfire threat area, and 57.1% in SRAs has been categorized as having high, very high, or extreme wildfire risk (Association of Bay Area Governments 2016). The extent of wildland urban interface and wildfire threat areas in the counties in the Bay Area is presented in Table 3.9-2.

Table 3.9-2. Wildland Urban Interface and Wildfire Threat Areas by County

County	Percent of Land in Wildland Urban Interface	Percent of Land in Wildfire Threat Area ^a
Alameda	43.2	12.2
Contra Costa	64.3	17.4
Marin	74.3	23.0
Napa	43.6	31.2
San Francisco	47.1	2.2
San Mateo	53.6	16.3
Santa Clara	41.4	10.0
Solano	33.0	14.2
Sonoma	46.1	44.8

Source: Association of Bay Area Governments 2016.

^a Wildfire threat areas consist of high, very high, and extreme threat areas; percent of land is based on total land area of each county.

According to geographic information system (GIS) mapping by ICF in 2018, approximately 2.5% of Pacific Gas and Electric Company's (PG&E) facilities are in a very high fire hazard severity zone, 5.7% are in the high fire hazard zone, and 6.9% are in the moderate fire hazard zone.

In January 2018, the CPUC adopted its High Fire-Threat District Map, which designates fire-threat areas requiring application of enhanced fire safety. The study area includes many areas mapped as Tier 2 (elevated) or Tier 3 (extreme) fire hazards zones (California Public Utilities Commission 2018). Refer to Section 3.19, *Wildfire*, for a detailed discussion on fire hazard mapping.

Emergency Response and Evacuation Plans

The Bay Area is highly vulnerable to both natural hazards and human-caused disasters, such as earthquakes, fires, industrial accidents, and terrorist incidents. Each county in the Bay Area and many cities have some sort of emergency response and evacuation plan. The Bay Area has a regional plan adopted in March 2008 called the San Francisco Bay Area Regional Emergency Coordination Plan (RECP). The plan provides an all-hazards framework for collaboration among responsible entities and coordination during emergencies in the Bay Area. The plan defines procedures for regional coordination, collaboration, decision making, and resource sharing among emergency response agencies in the Bay Area.

The San Francisco Bay Area Earthquake Readiness Response: Concept of Operations Plan (CONPLAN), describes the joint state and federal response to a catastrophic earthquake in the Bay Area. The CONPLAN contains: projected earthquake impacts, objectives, courses of action and decision points, response capabilities, and response actions. The CONPLAN was developed for a catastrophic earthquake along the San Andreas fault in Northern California, but the CONPLAN and the resources needed for the response are applicable to any catastrophic earthquake in the Bay Area.

Schools

There are 165 school districts in each of the nine counties of the study area.

- Alameda County—19 school districts.
- Contra Costa County—18 school districts.
- Marin County—19 school districts.
- Napa County—5 school districts.
- San Francisco County—1 school district.
- San Mateo County—23 school districts.
- Santa Clara—31 school districts.
- Solano County—7 school districts.
- Sonoma County—42 school districts.

According to GIS mapping prepared for the project by ICF in 2018, there are more than 3,000 school sites within 0.5 mile of PG&E facilities. However, many of these are historical sites that are no longer in use as schools.

Seaports and Airports

The Bay Area is served by five seaports, which provide the opportunity for intermodal transfers to trucks and railcars. The Port of Oakland, the largest of the five, is the third largest U.S. seaport on the West Coast (after the ports of Los Angeles and Long Beach). Other seaports are the Port of San Francisco, the Port of Richmond, the Port of Benicia, and the Port of Redwood City. These seaports are supported by freight railroad services operated by Union Pacific and Burlington Northern Santa Fe.

The Bay Area is also served by three major international airports: San Francisco International Airport, Oakland International Airport, and Norman Y. Mineta San Jose International Airport. Each of these airports provides mobility for people and freight nationally and internationally. The region is also served by one smaller airport with limited commercial service, Charles M. Schulz Sonoma County Airport, as well as numerous smaller general aviation airports. There are a total of 33 public use airports within 0.5 mile of PG&E facilities within the study area.

3.9.2 Environmental Impacts

3.9.2.1 Methods for Analysis

Impacts related to hazards and hazardous materials were qualitatively assessed based on professional judgment in light of activities, methods, and techniques currently implemented by PG&E as part of ongoing operations and maintenance (O&M) activities. Because PG&E has conducted O&M activities in the study area for more than 30 years, the O&M impacts described in this section represent baseline environmental conditions that would not change following approval of the Incidental Take Permit (ITP).

The dedication of lands for conservation would not result in interference with emergency plans on those lands because there would be limited physical barriers that would prevent access to conservation lands by emergency personnel. No impact would occur; therefore, this issue is not discussed further.

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures

PG&E complies with applicable state and federal laws, regulations, and requirements pertaining to hazardous materials and hazardous wastes. Relevant federal regulations include the TSCA, CWA, SWDA, RCRA, and CERCLA. These regulations establish legal requirements for hazardous materials storage, transportation and handling, and for agency oversight. As such, PG&E implements the following best management practices:

- Minimize the amount of hazardous materials at the site and store hazardous liquids, wastes, and all chemicals in watertight containers with appropriate secondary containment to prevent any spillage or leakage.
- Monitor, maintain, and prevent discharges from waste disposal containers to the storm drain system or surface waters

Keep spill cleanup kits onsite when fueling maintenance vehicles and accessible at all times, and train all personnel with regard to location, use, and contents of spill kits. PG&E has standard company requirements for reducing fire risks during work in any forest, brush, or grass-covered land,

currently set forth in Utility Standard: TD-1464S. Those requirements include measures such as tailboard training, restricting overland driving, carrying specified fire-fighting tools, ensuring water availability, parking in cleared areas, restricting smoking, review of the current fire index, and requiring a dedicated fire watch.

PG&E will also comply with all federal, state, and applicable local laws regarding fire hazards. These rules include the following construction, operation, and maintenance requirements for power lines:

- CPUC G.O. 95 regulates all aspects of design, construction, operation, and maintenance of electrical power lines and fire safety hazards for utilities subject to their jurisdiction.
- National Electric Reliability Corporation Reliability Standard FAC-003-4 establishes vegetation management standards for electric transmission lines.
- California Public Resource Code Sections 4292, 4293, and 4295.5 address fire hazard reduction for electric lines and establish minimum clearances.
- PG&E's 2020 Wildfire Mitigation Plan (submitted to the CPUC on February 7, 2020).

In addition, PG&E would apply the following avoidance and minimization measures (AMMs) from PG&E's *Bay Area Operations and Maintenance Habitat Conservation Plan* (Bay Area O&M HCP) while implementing covered activities.

- Field Protocol (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 right-of-way (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-07: Vehicle speeds on unpaved roads will be restricted to 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-09: During fire season in designated SRAs, equip all motorized equipment with federally approved or state-approved spark arrestors. Use a backpack pump filled with water and a shovel and fire-resistant mats and/or windscreens when welding. During fire "red flag" conditions as determined by CAL FIRE, curtail welding. Each fuel truck will carry a large fire extinguisher with a minimum rating of 40 B:C. Clear parking and storage areas of all flammable materials.
- Hazardous Waste: PG&E will immediately stop and, pursuant to pertinent state and federal statutes and regulations, arrange for repair and clean up by qualified individuals of any fuel or hazardous waste leaks or spills at the time of occurrence, or as soon as it is safe to do so. PG&E will exclude the storage and handling of hazardous materials from the Permit Area and will properly contain and dispose of any unused or leftover hazardous products offsite.
- Refuse Removal: Upon completion of covered activities, PG&E will remove from the Permit Area and properly dispose of all temporary fill and construction refuse, including broken equipment parts, wrapping material, cords, cables, wire, rope, strapping, twine, buckets, metal or plastic containers, and boxes.
- Wildfire Prevention: PG&E may blade, mow, or otherwise clear access pathways, staging areas, and work areas before allowing heavy equipment and vehicles to access the site if the site is in a

high or very high fire hazard severity zone or if the risk of fire danger is high based on 7-day predictions from National Oceanic and Atmospheric Administration forecasts. PG&E will clear dead vegetation from the immediate work footprint, and keep basic fire suppression supplies onsite at all times. Disking or tilling may be used for fire prevention in some instances.

PG&E would also implement the following applicant proposed measures (APMs) with regard to hazardous materials.

APM HAZ-1: Spill response

Emergency-spill response and clean up kits will be onsite where they are immediately available to respond to an accidental release of a hazardous fluid or material. If applicable, a stormwater pollution prevention plan will be implemented, which will also address spill response and other site-specific physical conditions to improve hazard prevention.

APM HAZ-2: Vehicle refueling

No vehicles or heavy equipment will be refueled within 100 feet of a wetland, stream, or other waterway, or within 250 feet of vernal pools, unless secondary containment is used. The fueling operator must always stay with the fueling operation. Tanks may not be topped off.

PG&E would also implement APM FIRE-1: Construction fire prevention practices, discussed in Section 3.19, and APM TRA-1: Implement transportation best management practices, discussed in Section 3.17, *Traffic*.

Significance Criteria

In accordance with Appendix G of the State CEQA Guidelines, the potential significance of impacts related to hazards and hazardous materials resulting from the proposed project and implementation of covered activities was evaluated for each of the following criteria:

- Creation of a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
- Creation of a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.
- Emission of hazardous emissions or involving handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school.
- Placement of project-related facilities on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and resulting creation of a significant hazard to the public or the environment.
- Placement of project-related facilities within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in a safety hazard for people residing or working in the project area.
- Placement of project-related facilities within the vicinity of a private airstrip, resulting in a safety hazard for people residing or working in the project area.
- Impairment of implementation of or physical interference with an adopted emergency response plan or emergency evacuation plan.

- Exposure of people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

3.9.2.2 Impact Discussion

Impacts HAZ-1 and HAZ-2: Creation of a significant hazard to the public or the environment through either the routine transport, use, or disposal of hazardous materials or reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment (Less-than-Significant Impact)

Many covered activities may require the use of hazardous substances such as fuels and lubricants for vehicles and equipment, paints, solvents, and epoxies. O&M activities are ongoing and would not change as a result of ITP approval. Minor new construction may require additional substances such as paving media (e.g., blacktop or gravel). Hazardous materials could be released in a variety of ways during O&M and minor new construction activities. For example, vehicles could leak or spill fuel, brake fluid, and lubricants. Spills could also occur during fueling or servicing activities, or during delivery of fuels and other substances to work sites. Spills would have the potential to contaminate soil and surface water or groundwater, potentially resulting in toxic effects on vegetation, wildlife, workers, and the general public. Substances such as solvents, paints, and epoxies could pose similar concerns if accidentally released or improperly handled or disposed. However, PG&E complies with applicable state and federal laws and regulations, and would implement AMMs from PG&E's Bay Area O&M HCP and summarized in Section 3.9.2.1, *Methods for Analysis*, during covered activities. The AMMs include stopping work and, pursuant to pertinent state and federal statutes and regulations, arranging for repair and cleanup by qualified individuals of any fuel or hazardous waste leaks or spills, not storing hazardous materials in the Permit Area, and containment and disposal of any unused or leftover hazardous products offsite.

When the storage of hazardous materials within or near work areas is required, the quantities of hazardous materials stored onsite are minimized and the materials are stored in closed containers located away from water features, storm drains, and areas of stormwater infiltration. In addition, hazardous liquids and wastes are stored in watertight containers with secondary containment to prevent any spillage or leakage. Given the quantity of potentially hazardous materials likely to be used at a given site, the impacts would not be significant.

For efforts such as minor new construction activities, PG&E would prepare a Hazardous Materials Management Plan (HMMP) as required pursuant to Chapter 6.95 of the California Health and Safety Code and the Fire Code. CAL FIRE does not approve HMMPs; they are enforced by the local CUPA after a site visit. The HMMP would provide a list of management practices and activities designed to minimize the effects of inadvertent releases of hazardous materials and to ensure the proper handling, storage, and disposal of hazardous and nonhazardous waste during covered activities. The types of measures and procedures that would be outlined in the HMMP include training requirements for O&M personnel, storage requirements for hazardous materials, spill prevention and control procedures, vehicle and equipment maintenance procedures, and notification procedures in the event of an accidental release.

Adherence to all applicable state and federal laws and implementation of applicable AMMs from PG&E's Bay Area O&M HCP (FP-02, FP-03, FP-07, FP-08, and FP-09) would ensure that impacts related to the potential for improper handling, storage, or use of hazardous substances and impacts

related to the potential for inadvertent spills or releases of hazardous substances would be less than significant. PG&E would also implement APMs HAZ-1 and HAZ-2, which would address spill response and vehicle refueling, to further reduce less-than-significant impacts.

Impact HAZ-3: Emission of hazardous emissions or handling of hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school (Less-than-Significant Impact)

See Impacts HAZ-1 and HAZ-2 above for a discussion on the transport, use, disposal, and upset and accident conditions involving the release of hazardous materials into the environment. PG&E's facilities are located throughout the study area and include infrastructure that directly serves schools and their surrounding communities. Thus, some O&M activities may take place within 0.25 mile of existing schools. Minor new construction activities, which would include installation of new structures in expanded substations or gas pressure limiting stations or to support service to new commercial or residential customers, may also take place within 0.25 mile of existing schools. However, PG&E complies with federal, state, and local hazardous material and pesticide handling regulations and AMMs from PG&E's Bay Area O&M HCP minimize storage or handling of hazardous materials in the Permit Area and require prompt cleanup of any hazardous waste leaks or spills.

For efforts such as minor new construction within 0.25 mile of schools, PG&E would prepare a HMMP. The HMMP would provide a list of management practices and activities designed to minimize the effects of inadvertent releases of hazardous materials and to ensure the proper handling, storage, and disposal of hazardous and nonhazardous waste during covered activities. The types of measures and procedures that would be outlined in the HMMP include training requirements for O&M personnel, storage requirements for hazardous materials, spill prevention and control procedures, vehicle and equipment maintenance procedures, and notification procedures in the event of an accidental release. Therefore, impacts related to use of hazardous materials in proximity to existing schools and planned school sites would be less than significant. Additionally, APMs HAZ-1 and HAZ-2, providing spill response procedures and vehicle refueling guidelines, would further reduce less-than-significant impacts.

Impact HAZ-4: Placement of project-related facilities on a site that is included on a list of hazardous materials sites, and resulting creation of a significant hazard to the public or the environment (Less-than-Significant Impact)

Because of the diversity and distribution of sites with known hazardous materials contamination in the study area, it is possible that ongoing O&M activities and minor new construction activities could take place on contaminated sites, although PG&E minimizes such activities to the extent possible through database searches. Larger maintenance or repair efforts could encounter subsurface contaminants. Subsurface contaminants associated with nearby hazardous sites could also potentially be encountered during O&M activities requiring ground disturbance outside of existing ROWs. However, PG&E staff reviews each potential work site for the presence of hazardous materials or contaminants through database searches. Additionally, O&M personnel are trained to identify and handle hazardous materials. AMMs from PG&E's Bay Area O&M HCP require O&M personnel to stop work immediately and implement cleanup measures in the event that hazardous materials are spilled, released, or encountered during ground-disturbing activities. Cleanup measures would be implemented in response to a hazardous materials release to protect terrestrial ecosystems, surface water quality, aquatic ecosystems, groundwater quality, and human health. FP-09 would require PG&E to immediately stop and arrange for repair and cleanup by qualified

individuals of any fuel or hazardous waste leaks or spills at the time of occurrence, or as soon as it is safe to do so, in accordance with pertinent state and federal statutes and regulations. PG&E will exclude the storage and handling of hazardous materials from the Permit Area and will properly contain and dispose of any unused or leftover hazardous products offsite.

For efforts such as minor new construction, PG&E would prepare a HMMP. The HMMP would provide a list of management practices and activities designed to minimize the effects of inadvertent releases of hazardous materials and to ensure the proper handling, storage, and disposal of hazardous and nonhazardous waste during covered activities. The types of measures and procedures that would be outlined in the HMMP include training requirements for O&M personnel, storage requirements for hazardous materials, spill prevention and control procedures, vehicle and equipment maintenance procedures, and notification procedures in the event of an accidental release.

With the implementation of PG&E's practices and AMMs from PG&E's Bay Area O&M HCP, and HMMPs for minor new construction, impacts on the public or the environment resulting from hazardous materials sites would be less than significant. APMs HAZ-1 and HAZ-2, providing spill response procedures and vehicle refueling guidelines, would further reduce less-than-significant impacts.

Impact HAZ-5: Placement of project-related facilities within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in a safety hazard for people residing or working in the project area (Less-than-Significant Impact)

The placement of PG&E facilities within an airport land use plan or within 2 miles of a public airport or public use airport could result in a safety hazard for people residing or working in the project area. Because PG&E's electric and natural gas facilities are located throughout the study area, some covered activities may take place within 2 miles of a public airport. There are 33 public use airports within 0.5 mile of PG&E facilities within the study area. These include small airports such as the Nut Tree Airport in Vacaville and large international airports such as San Francisco International Airport. No aspect of the covered activities would result in an airport-related safety hazard for people residing or working in the study area because PG&E would submit the required Notice of Proposed Construction and Alteration Application to the FAA for any towers or poles that exceed the Notice Criteria, and all other work would be at a lower level than tower/pole work and would have no potential to result in a safety hazard.

O&M covered activities requiring the replacement of pipeline facilities are primarily conducted underground and within existing PG&E ROWs. Natural gas O&M activities are ongoing and their nature would not change following approval of the ITP. Minor new construction activities relating to pipeline facilities are typically at one story in height and less than 3 acres in size. Boom trucks and cranes would be the tallest equipment used during covered activities related to pipelines. This equipment would be used to lift pipelines and pig launchers/receivers, as well as to install and dismantle hydrostatic testing equipment. The height of boom trucks and cranes would vary based on the extension of the boom or jib. However, it is not anticipated that boom trucks or cranes would extend beyond 50 feet when lifting pipeline materials. Therefore, boom trucks and cranes would not extend to heights that would violate obstruction standards or require notification under the regulations provided in Title 14, Part 77 of the CFR. In the event covered activities are required in

the vicinity of a public use airport, PG&E would confirm the applicability of FAA notification requirements prior to the use of equipment that would potentially constitute an obstruction.

With the implementation of the legally-required FAA notifications, impacts on the public or the environment resulting from project-related facilities within an airport land use plan or within 2 miles of a public airport or public use airport would be less than significant.

Impact HAZ-6: Placement of project-related facilities in the vicinity of a private airstrip, resulting in a safety hazard for people residing or working in the project area (Less-than-Significant Impact)

Because PG&E's electric and natural gas facilities are located throughout the study area, some covered activities may take place in the vicinity of a private airstrip. With the implementation of the legally-required FAA notifications, impacts on the public or the environment resulting from project-related facilities within the vicinity of a private airstrip would be less than significant.

Impact HAZ-7: Impairment of implementation of or physical interference with an adopted emergency response plan or emergency evacuation plan (Less-than-Significant Impact with Mitigation)

O&M activities are ongoing and would not change as a result of ITP approval. Emergency response and evacuation plans already account for these O&M activities. Minor new construction activities such as construction of new electrical/natural gas transmission lines or minor substation expansions could require temporary lane closures on roads in the study area. Temporary impediments during minor construction activities could impair implementation of emergency response or evacuation plans, which could be a significant impact.

The impact of temporary impediments during minor construction activities would be reduced to a less-than-significant level with implementation of APM TRA-1, APM HAZ-1, and APM HAZ-2. Specifically, APM TRA-1 requires PG&E to provide through access for emergency vehicles at all times, notify local fire and police departments to allow the design of alternative evacuation and emergency access routes, and make every effort to allow emergency service providers adequate lead time to ensure that emergency access and response times are maintained during PG&E work periods. With implementation of APM TRA-1, APM HAZ-1, and APM HAZ-2 this impact would be less than significant.

Impact HAZ-8: Exposure of people or structures to a significant risk involving wildland fires (Less-than-Significant Impact)

Refer to Section 3.19 for additional information and impact analysis regarding wildfire risk. PG&E facilities are located throughout the Bay Area, and many are located in wildfire threat areas and wildland urban interfaces, some of which are part of SRAs. As noted previously, approximately 2.5% of PG&E's facilities are in a very high fire hazard severity zone, 5.7% are in the high fire hazard zone, and 6.9% are in the moderate fire hazard zone. Additionally, the study area includes many areas mapped as Tier 2 (elevated) or Tier 3 (Extreme) fire hazard zones on the CPUC's High Fire-Threat District Map (California Public Utilities Commission 2018). Any O&M or minor new construction activity that involves potential interaction of a possible ignition source with fuel could create an increased risk of fire. One of the primary objectives of PG&E's O&M activities is to maintain existing facilities in a safe and reliable manner, in compliance with various regulatory requirements (e.g., Public Resources Code Sections 4290–4293). PG&E performs routine maintenance of its facilities to

keep them in proper working condition. and minimize public health or safety risks as well as damage to other buildings or structures. For example, as a part of O&M activities, PG&E manages vegetation along electrical lines to maintain specific clearance distance and reduce fuel load in high threat areas. These O&M activities are ongoing and would not change following approval of the ITP.

The use of construction equipment for covered activities in and around vegetated areas, particularly during the summer months, would increase the potential for wildfire ignition. Pursuant to the requirements of Public Resources Code Section 4442, PG&E requires that all personnel and contractors utilize equipment with internal combustion engines that are equipped with an operational spark arrester to avoid or minimize risk of fire. PG&E personnel are required to adhere to Utility Standard TD-1464S, which establishes requirements for PG&E personnel to follow when traveling to, performing work, or operating outdoors in any forest, brush, or grass-covered land (Pacific Gas and Electric Company 2019). Utility Standard TD-1464S also requires the work supervisor/local superintendent to identify evacuation routes. PG&E personnel are trained to use fire extinguishers and shovels, etc. in the event of a fire event. PG&E employees involved in preventing and mitigating fires must complete training SAFE-1503WBT annually between January 1 and April 1. When the Air Quality Index (AQI) for particulate matter less than or equal to 2.5 microns in diameter exceeds 150, PG&E must provide its employees with respirators for use on a voluntary basis and train them on respirator use. When the AQI exceeds 500, respirator use becomes mandatory and employees who wear a respirator must undergo medical clearance, fit testing, and training.

Several AMMs from PG&E's Bay Area O&M HCP reduce fire risks. FP-02 requires PG&E personnel to park vehicles and equipment on pavement, existing roads, or other disturbed or designated areas (barren, gravel, compacted dirt). FP-03 requires PG&E personnel to use existing access and ROW roads and to minimize the development of new access and ROW roads, including clearing and blading for temporary vehicle access in areas of natural vegetation. FP-09, requires equipping all motorized equipment with federally approved or state-approved spark arrestors during fire season in designated SRAs. The AMM also contains provisions for safe welding practices and requires fuel trucks to carry fire extinguishers. In addition, a general AMM from the HCP requires mowing access pathways, staging areas, and work areas before allowing heavy equipment and vehicles to access the site if the site is in a high or very high fire hazard severity zone or if the risk of fire danger is high based on 7-day predictions from National Oceanic and Atmospheric Administration forecasts.

With adherence to the Utility Standards, HCP AMMs and other precautions that PG&E takes described above, the risk of loss, injury, or death involving wildland fires would be less than significant. To further reduce fire risks, PG&E will implement APMs HAZ-1 and HAZ-2, providing spill response procedures and vehicle refueling guidelines.

3.9.3 References Cited

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3.10 Hydrology and Water Quality

3.10.1 Existing Conditions

3.10.1.1 Regulatory Setting

Federal

Clean Water Act

The Clean Water Act (CWA) (33 United States Code [USC] Section 1251 et seq.), formerly the Federal Water Pollution Control Act of 1972, was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of waters of the United States. The definition of waters of the United States includes the following.

- Waters currently or previously used for interstate or foreign commerce.
- All other waters that, if degraded, could affect interstate or foreign commerce.
- Territorial seas.
- All navigable waters¹.

The limits of non-tidal waters extend to the ordinary high water mark or to the limit of adjacent wetlands. The term *wetlands* is defined by Title 33, Section 328.3 7b of the Code of Federal Regulations as those areas “that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” In addition, waters of the United States include impoundments and tributaries of waters of the United States, as well as waters determined to have a significant nexus to waters of the United States.

Under the CWA, federal facilities have regulatory responsibilities that include preventing water pollution, obtaining discharge permits, meeting applicable water quality standards, developing risk management plans, and maintaining records. The CWA also requires states to set standards to protect, maintain, and restore water quality through the regulation of point sources and certain nonpoint source discharges to surface water.

Clean Water Act Sections 303 and 304—Water Quality Standards and Impaired Waters

Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the United States (33 USC Section 1313). Section 304(a) requires the U.S. Environmental Protection Agency (EPA) to publish water quality criteria that accurately reflect the latest scientific knowledge on the kind of effects and extent of effects that pollutants in water may have on health and welfare

¹ A waterbody qualifies as a navigable water of the United States if it is subject to the ebb and flow of the tide and/or it is presently used, has been used in the past, or may be susceptible for use (with or without reasonable improvements) to transport interstate or foreign commerce. Determinations have been made on whether waterbodies qualify as navigable waters for purposes of asserting jurisdiction under Sections 9 and 10 of the Rivers and Harbors Appropriation Act of 1899. However, a waterbody lacking a determination should not indicate that it is not navigable.

(33 USC Section 1314[a]). Where multiple uses exist, water quality standards must protect the most sensitive use. Water quality standards are typically numeric, although narrative criteria based on biomonitoring methods may be employed when numerical standards cannot be established or when they are needed to supplement numerical standards.

Section 303(c)(2)(b) of the CWA requires states to adopt numerical water quality standards for toxic pollutants for which the EPA has published water quality criteria and which could reasonably be expected to interfere with designated uses in a waterbody. Under Section 303(d) of the CWA, states, territories, and authorized tribes are required to develop a list of waterbodies where beneficial uses are impaired. The waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for water segments on the lists and develop action plans (i.e., total maximum daily load [TMDL] plans) to improve water quality

Clean Water Act Section 404—Dredge/Fill Permitting

Section 404 of the CWA prohibits the discharge of dredge or fill material into waters of the United States without a permit from the U.S. Army Corps of Engineers (USACE). Under the current USACE-administered Nationwide Permit (NWP) program, “activities required for the construction, maintenance, repair, and removal of utility lines and associated facilities” may be authorized under NWP 12 (Utility Line Activities) if the activity does not result in a loss of more than 0.5 acre of waters of the United States “for each single and complete project.” Permanent impacts on waters of the United States that exceed 0.5 acre may require an Individual Permit. The program area is under the jurisdiction of the San Francisco and Sacramento Districts of USACE.

Clean Water Act Section 401—Water Quality Certification

Under Section 401 (33 USC Section 1251 et seq.) of the CWA, any applicant for a federal license or permit to conduct any activity that may result in any discharge into navigable waters of the United States must obtain a Water Quality Certification pursuant to Section 401 of the CWA to certify that the proposed activity would comply with state water quality standards. Because the authority to issue Water Quality Certifications has been delegated to the state, additional information regarding Section 401 Water Quality Certifications is included in the *State* section.

Clean Water Act Section 402—National Pollutant Discharge Elimination System

The National Pollutant Discharge Elimination System (NPDES) program was established in 1972 to control discharges of pollutants from defined point sources (33 USC Section 1342). On September 2, 2009, the State Water Resources Control Board (SWRCB) adopted Order No. 2009-0009-DWQ (as amended by 2010-0014-DWQ and 2012-0006-DWQ) (Construction General Permit), which reissued Water Quality Order 99-08-DWQ and incorporated Water Quality Order 2003-0007 (Small Linear Utility General Permit) for projects disturbing 1 acre or more of land, or that are part of a common plan of development or sale that disturbs more than 1 acre of land where the rainfall erosivity waiver does not apply. The new permit became effective on July 1, 2010, whereby all existing dischargers and new dischargers are required to obtain coverage under the new permit by submitting Permit Registration Documents.

On January 26, 2018, SWRCB issued a Notice of Applicability to PG&E that the Statewide General Order for Discharges from Natural Gas Utility Construction, Operation, and Maintenance Activities

(Statewide Natural Gas Utility Permit) would serve as the NPDES permit for point source discharges to waters of the United States, pursuant to Section 402 of the CWA.² Because the authority to implement Section 402 of the CWA has been delegated to the state, additional information regarding permitting under Section 402 of the CWA is included in the ***Error! Reference source not found.*** section.

Rivers and Harbors Appropriation Act—Section 10

Section 10 of the Rivers and Harbors Appropriation Act of 1899 (33 USC Section 401 et seq.) makes it unlawful to obstruct or alter a navigable river or other navigable water of the United States. Construction, excavation, or deposition of materials in, over, or under such waters—or any work that would affect the course, location, condition, or capacity of those waters—requires a Section 10 permit and approval from USACE.

Coastal Zone Management Act

The Coastal Zone Management Act of 1972 encourages local government to preserve, protect, develop, and, where possible, restore or enhance valuable natural coastal resources such as wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs, as well as the fish and wildlife using those habitats. Study area lands that are located along the coast and inland areas near the coast are covered by the Coastal Zone Management Act. Although participation by local government is voluntary, the act makes federal financial assistance available to the local governments that are willing to develop and implement a comprehensive coastal management program.

National Flood Insurance Program

The Federal Emergency Management Agency (FEMA) is responsible for determining flood elevations and floodplain boundaries based on USACE studies. FEMA is also responsible for distributing the Flood Insurance Rate Maps (FIRMs) used in the National Flood Insurance Program (42 USC Chapter 50). A FIRM is an official FEMA-prepared map of a community. These maps identify the locations of special flood hazard areas, and the flood-risk premium zones (100-year floodplains) that are applicable to the community. Although FEMA allows nonresidential development in the floodplain, the agency has criteria to “constrict the development of land which is exposed to flood damage where appropriate” and “guide the development of proposed construction away from locations which are threatened by flood hazards.” In response to the increasing cost of disaster relief, Congress passed the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. FEMA administers the National Flood Insurance Program to provide subsidized flood insurance to communities that comply with FEMA regulations to limit development in floodplains. Federal regulations governing development in a floodplain are set forth in Title 44, Part 60 of the Code of Federal Regulations, enabling FEMA to require municipalities that participate in the National Flood Insurance Program to adopt certain flood hazard reduction standards for construction and development in 100-year floodplains.

² The Statewide Natural Gas Utility Permit also serves as waste discharge requirements, pursuant to the Porter-Cologne Water Quality Control Act, as described in the ***Error! Reference source not found.*** section.

State

Clean Water Act

The CWA requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain non-point source discharges to surface water. The following subsections describe the responsibilities of the state of California in the implementation of the CWA through the Regional Water Quality Control Boards (RWQCBs). The CWA is described previously in the *Error! Reference source not found.* section.

Clean Water Act Section 401

As discussed previously, the authority to issue Section 401 Water Quality Certifications has been delegated to the state. Under Section 401, any applicant for a federal license or permit to conduct any activity that may result in any discharge into navigable waters must provide the licensing or permitting agency with a Water Quality Certification that the discharge would comply with the applicable CWA provisions (33 USC Section 1341). If a federal permit is required under CWA Section 404, the applicant must also obtain a Water Quality Certification from the appropriate RWQCB.

Clean Water Act Section 402

As discussed in the *Error! Reference source not found.* section, the NPDES program was established to control discharges of pollutants from defined point sources (33 USC Section 1342). In California, NPDES permitting authority is delegated to and administered by the nine RWQCBs. The Construction General Permit (Order No. 2009-0009-DWQ [as amended by 2010-0014-DWQ and 2012-0006-DWQ]), requires the implementation of a stormwater pollution prevention plan (SWPPP), which must be prepared before construction begins and kept onsite (or readily available) throughout the construction process. In accordance with the Construction General Permit, a SWPPP must include the following.

- Identification of pollutant sources and non-stormwater discharges associated with construction activity.
- Specifications for best management practices (BMPs) that will be implemented during project construction to minimize the potential for accidental releases and runoff from the construction areas, including temporary construction yards, pull sites, and other temporary work areas.
- Calculations and design details, as well as BMP controls for site run-on.
- BMPs used to eliminate or reduce pollutants after construction is complete.
- A Water Quality Certification from a Qualified SWPPP Developer.

The Construction General Permit requires that the site sediment risk is calculated based on rainfall, soil erodibility, and slope. It also requires that the receiving water risk is calculated based on whether the disturbed areas discharge to a waterbody that is listed under CWA Section 303(d)-as impaired for sediment or that has an EPA-approved TMDL plan for sediment. The receiving water risk must also be calculated based on whether the disturbed areas discharge to a waterbody with a beneficial use of fish spawning, cold freshwater habitat, and fish migration. The result of this analysis determines the combined risk (i.e., 1, 2, or 3), which dictates the monitoring and reporting requirements. Linear underground or overhead projects can be broken into two or more segments for permitting purposes based on several factors, one of which is risk.

On January 26, 2018, SWRCB issued a Notice of Applicability to PG&E that the Statewide Natural Gas Utility Permit would serve as the NPDES permit for point source discharges to waters of the United States pursuant to Section 402 of the CWA.³ The Statewide Natural Gas Utility Permit provides regulatory coverage for planned, emergency, and unplanned discharges to waters of the United States, non-federal surface waters, and land resulting from the following activities.

- Hydrostatic testing of new and existing natural gas facilities.
- Site dewatering.
- Other discharges resulting from construction and operations and maintenance (O&M) of natural gas facilities.

NPDES General Municipal Stormwater Permit

Municipal stormwater discharges are also regulated under the NPDES General Permit for municipal separate storm sewer systems (MS4s). Phase I MS4 regulations cover municipalities with more than 100,000 residents, certain industrial processes, and construction activities that disturb an area of 5 acres or more. Phase II “small” MS4 regulations require stormwater management plans to be developed by municipalities with fewer than 100,000 residents and for construction activities that disturb 1 or more acres of land. SWRCB adopted a Statewide Phase II Small MS4 General Permit in 2013 to efficiently regulate discharges from numerous qualifying Small MS4s under a single permit. Small MS4s are categorized as either “traditional” or “nontraditional.” Traditional MS4s operate throughout a community. Nontraditional MS4s are similar to traditional MS4s but operate as a distinct facility. Most nontraditional MS4s in California are not designated as having to comply with the Statewide Phase II Small MS4 General Permit, although SWRCB reserves the right to allow the RWQCBs to regulate through due process any single nontraditional MS4 if it is deemed necessary. Marin, Napa, San Francisco, Santa Clara, Solano, and Sonoma Counties are considered to be Traditional Small MS4 permittees under SWRCB’s waste discharge requirements for stormwater discharges from Small MS4s (NPDES Order No. 2013-001-DWQ; General Permit No. CAS000004). Alameda, Contra Costa, and San Mateo Counties are currently subject to NPDES Permit No. CAS612008 issued by Order No. R2-2009-0074, and amended by Order No. R2-2011-0083. In many cases, stormwater drainage control measures and compliance with RWQCB Municipal Regional Stormwater Permit Order No. R2-2015-0049 Provision C.3 (Provision C.3) may already be required by local jurisdictions as standard conditions of approval for building permit applications.

California Fish and Game Code Sections 1600 through 1616

Sections 1601 through 1606 of the California Fish and Game Code require that a Notification of Lake or Streambed Alteration Agreement (LSAA) be submitted to the California Department of Fish and Wildlife (CDFW) for any proposed action that includes the following:

- Substantially divert or obstruct the natural flow of any river, stream, or lake.
- Substantially change or use any material from the bed, channel, or bank of any river, stream, or lake.
- Deposit or dispose of debris, waste, or other material containing crumbed, flaked, or ground pavement where it can pass into a river, stream, or lake.

³ The Statewide Natural Gas Utility Permit also serves as waste discharge requirements, pursuant to the Porter-Cologne Water Quality Control Act, as described in the ***Error! Reference source not found.*** section.

CDFW reviews the proposed action and, if necessary, submits a proposal to the applicant that includes measures to protect affected fish and wildlife resources of a river, lake, or stream. The final mutually agreed-upon proposal constitutes the LSAA.

California Fish and Game Code Section 5650

Section 5650 of the California Fish and Game Code makes it illegal to discharge any substance that may affect fish, plants, or bird life into waters of the state, unless authorized by the RWQCB waste discharge requirements or a federal permit for which a CWA Section 401 state certification is issued.

Porter-Cologne Water Quality Control Act (California Water Code, Division 7)

Under this state law, SWRCB has authority over state waters and water quality. *Waters of the state* are defined as “any surface water or groundwater, including saline waters, within the boundaries of the state” (Water Code Section 13050[e]). Examples are rivers, streams, lakes, bays, marshes, mudflats, unvegetated and seasonally ponded areas, drainage swales, sloughs, wet meadows, natural ponds, vernal pools, diked baylands, seasonal wetlands, and riparian woodlands. The RWQCBs have local and regional authority. The Central Coast, Central Valley, North Coast, and San Francisco Bay RWQCBs have authority in the study area. The RWQCBs prepare and periodically update basin plans (water quality control plans), which provide the technical basis for determining waste discharge requirements, taking enforcement actions, and evaluating clean water grant proposals. A basin plan must include (1) a statement of beneficial water uses that the RWQCB will protect, (2) the water quality objectives needed to protect the designated beneficial water uses, and (3) strategies to be implemented, with time schedules for achieving the water quality objectives. The San Francisco Bay, North Coast, Sacramento and San Joaquin River, and Central Coast Basin Plans apply to different portions of the study area.

Projects that will discharge waste to waters of the state must file a report of waste discharge with the appropriate RWQCB if the discharge could affect the quality of waters of the state (Water Code Section 13260). The RWQCB will issue waste discharge requirements or a waiver of the waste discharge requirements for the project. The requirements will implement any relevant water quality control plans that have been adopted, and must take into consideration the beneficial uses to be protected and the water quality objectives reasonably required for that purpose (Water Code Section 13263).

California Coastal Act

The California Coastal Act, enacted in 1976, governs decisions of the Coastal Commission in review and issuance of coastal development permits. The Coastal Commission, or a city or county with delegated authority through a Coastal Commission–certified Local Coastal Program, has jurisdiction over development in the coastal zone. The coastal zone varies from several hundred feet inland of the mean high tide line to 5 miles inland. Development includes a variety of activities within the coastal zone, including construction, reconstruction, demolition, or alteration of any structure, including any facility of a private, public, or municipal utility and including roads, pipelines, and power lines. Development also includes removal of major vegetation such as clearing of vegetation around facility rights-of-way (ROW).

Cobey-Alquist Floodplain Management Act

The Cobey-Alquist Floodplain Management Act (Water Code Sections 8400–8415) and Executive Order B-39-77 support the National Flood Insurance Program. The act encourages local governments to plan, adopt, and enforce land use regulations for floodplain management. The act also identifies requirements that jurisdictions must meet in order to receive state financial assistance for flood control.

McAteer-Petris Act/San Francisco Bay Conservation and Development Commission

The McAteer-Petris Act is a provision under California law that preserves San Francisco Bay from indiscriminate filling. The act established the San Francisco Bay Conservation and Development Commission (BCDC) as the agency charged with preparing a plan for the long-term use of the bay and regulating development in and around the bay while the plan was being prepared. The *San Francisco Bay Plan*, completed in January 1969, includes policies on 18 issues critical to the wise use of the bay, ranging from ports and public access to design considerations and weather. The act authorizes BCDC to incorporate the policies of the Bay Plan into state law. The Bay Plan has two features: policies to guide future uses of the bay and shoreline, and maps that apply these policies to the bay and shoreline. BCDC conducts the regulatory process in accordance with the Bay Plan policies and maps, which guide the protection and development of the bay and its tributary waterways, marshes, managed wetlands, salt ponds, and shoreline.

Local

Because the California Public Utilities Commission has exclusive jurisdiction over the design, siting, installation, operation, maintenance, and repair of utility facilities, the project is not subject to local discretionary regulations. The following discussion of local plans and policies is provided for information purposes and to assist with California Environmental Quality Act (CEQA) review.

General Plans and Ordinances

Government Code Section 65302, as amended (2007 California Statute 369) requires that on or after January 1, 2009, the updated safety elements of general plans must incorporate significantly enhanced geographic data, goals, and policies related to flood hazards. This enhanced assessment of flood hazards includes: flood mapping information from multiple agencies including FEMA, USACE, the California Office of Emergency Services, California Department of Water Resources, and any applicable regional dam, levee, or flood protection agencies; historical data on flooding; an inventory of existing and planned development (including transportation infrastructure) in flood zones; and new policies that comprehensively address existing and future flood risk in the planning area.

City and county municipal codes contain ordinances, policies, and permits administered by the respective city or county agency related to grading and construction that may directly or indirectly affect surface water quality.

3.10.1.2 Environmental Setting

Climate and Precipitation

The climate in the San Francisco Bay region is influenced by local topography and air circulation patterns. Along the western side of the Coast Ranges, the climate is influenced by the Pacific Ocean, with warm winters, cool summers, small daily and seasonal temperature ranges, and high relative

humidity. Maritime influences decrease farther away from the coast. Inland counties experience a more continental type of climate, with warmer summers, colder winters, greater daily and seasonal temperature ranges, and generally lower relative humidity. Seaward of the mountains, temperature is moderated by the ocean, and the range between daily high and low temperatures is usually less than 20 degrees Fahrenheit.

Precipitation in the study area is highly variable from year to year and is characterized by moderately wet winters and dry summers. Winter rains (December through March) account for about 75% of the average annual rainfall; about 90% of the annual total rainfall is received in the November to April period.

Precipitation in the Coast Ranges is typically higher than precipitation farther inland. Average precipitation is 45–55 inches per year along the coast and in the northern portion of the study area and 20–30 inches per year in the central portion of the study area. Farther inland, average precipitation generally ranges 15–25 inches per year.

Surface Hydrology

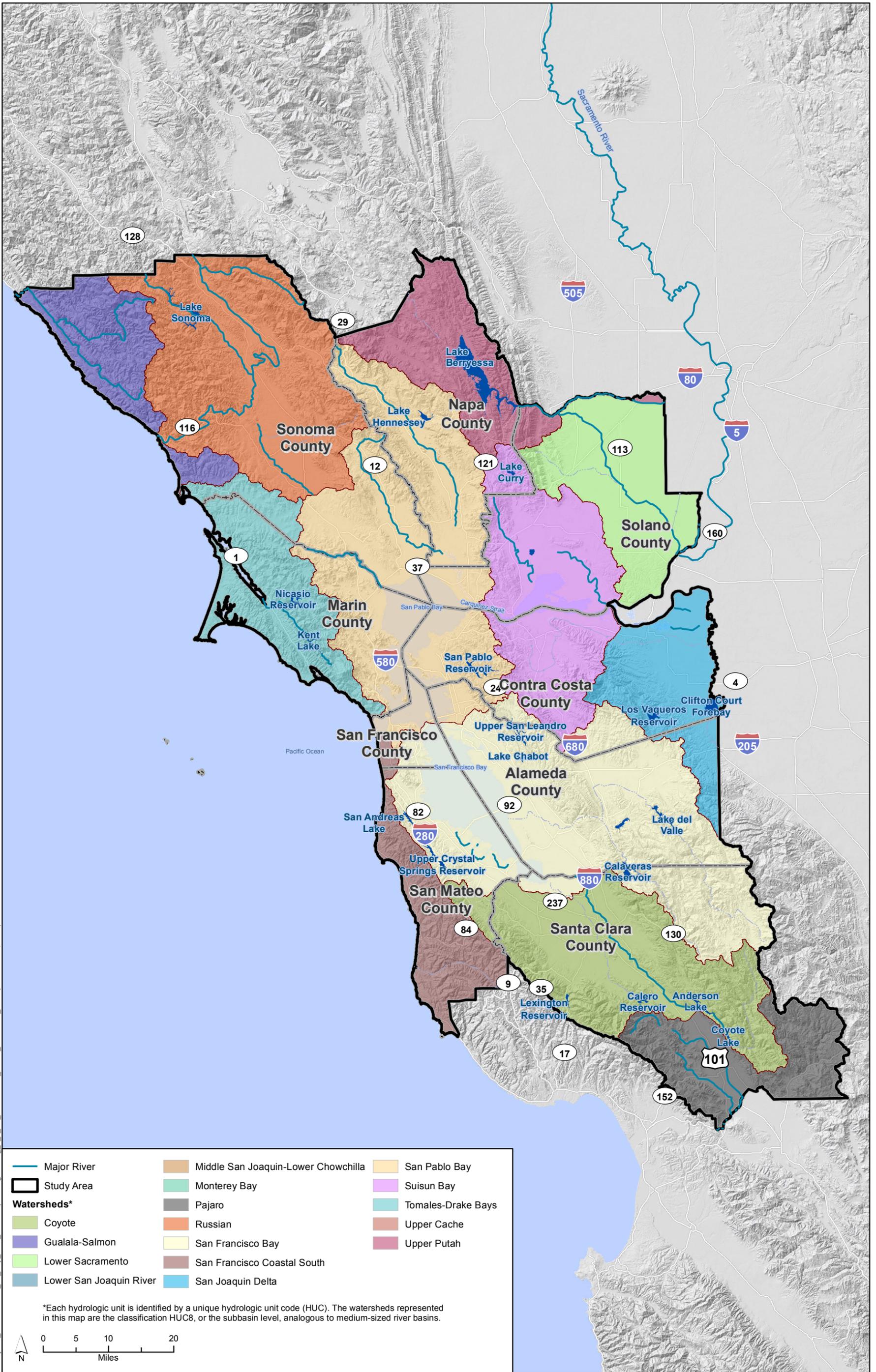
Regional Drainage

Surface waters drain 7,099 square miles of land in the San Francisco Bay Area (Bay Area). The majority of the Bay Area drains into the San Francisco Bay, which is the centerpiece of the metropolitan region and covers an area of about 2.88 million acres (4,500 square miles). The San Francisco Bay Basin encompasses portions of Marin, Napa, Solano, San Francisco, Contra Costa, San Mateo, Alameda, and Santa Clara Counties. Watersheds and major waterbodies within the study area are shown on Figure 3.10-1A.

The San Francisco Bay functions as the only drainage outlet for the waters of the Central Valley and naturally divides the northern and southern coastal mountain ranges. The San Francisco Bay Basin is bounded by the Coast Ranges' uplift to the north and south and the Pacific Ocean to the west. The Sacramento and San Joaquin Rivers enter the Basin on the east through the Sacramento–San Joaquin Delta (Delta), a complex system of natural and modified tributary channels, and contribute almost all the freshwater inflow to the Bay; the San Francisco Bay Estuary receives 90% of its fresh water from the Sacramento and San Joaquin Rivers and 10% from local drainage basins. The San Francisco Bay Estuary alone encompasses an area of roughly 1,600 square miles, including 700 miles of rivers and sloughs and 1,100 miles of levees.

The San Francisco Bay is commonly divided into four different subregions: Suisun Bay, North Bay/San Pablo Bay, Central Bay, and South Bay. Surface waters consist of freshwater rivers, streams, and lakes, estuarine waters, and coastal waters. Estuarine waters are composed of the Bay system from the Golden Gate to the regional boundary near Pittsburg and the lower portions of streams flowing into the Bay, such as the Napa and Petaluma Rivers in the north and Coyote and San Francisquito Creeks in the south. The first major waterbody at the convergence of the Sacramento and San Joaquin Rivers is Suisun Bay; the marsh at the northern edge of this bay, Suisun Marsh, is the largest brackish water wetland complex in the western United States.

Although the general pattern of natural drainage in the San Francisco Bay Basin is still intact, the hydrologic system has been substantially modified as a result of regional and local water supply efforts in support of agriculture and urban and suburban development. These include the State Water Project and federal Central Valley Project, which convey Delta supply water to users in



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Figure 3.10-1A
Watersheds and Major Waterbodies Within the Study Area



regions throughout central and southern California. Most of the low-lying lands in the western Delta have been reclaimed by protective dikes and converted to agricultural uses. As a result, the eastern portions of Solano and Contra Costa Counties have substantially subsided and are currently at or below sea level.

Portions of the Bay Area that surround the San Francisco Basin are located within the jurisdiction of the North Coast RWQCB, the San Francisco Bay RWQCB, the Central Valley RWQCB, or the Central Coast RWQCB. Surface waters located in the North Coast region (Sonoma County) drain into the Pacific Ocean north of San Francisco Bay, and include portions of the Gualala River Basin, portions of the Russian River Basin, Salmon Creek, and several minor coastal streams. The San Francisco Bay region (San Francisco, Marin, and San Mateo Counties) is characterized by its dominant feature, the San Francisco Bay Estuary, which conveys the waters of the Sacramento and San Joaquin Rivers to the Pacific Ocean. Other dominant surface water features include Tomales Bay in the north to Pescadero and Butano Creeks in the south. Surface waters located in the Central Valley region drain into the Delta, which drains into San Francisco Bay. A small portion of the Central Coast region (Santa Clara and San Mateo Counties) is located within the study area. Surface waters in this region include the Gazos Creek Basin along the coast, several minor coastal streams, and the Pacheco Creek Basin, which is located inland at the southeastern corner of the study area.

Watercourses

Surface waters in the Bay Area include freshwater rivers and streams, coastal waters, and estuarine waters. Many of the original drainages toward the San Francisco Bay have been channelized and put underground in areas through urbanization of the area, though a few still remain. Estuarine waters include the San Francisco Bay Delta from the Golden Gate to the Sacramento and San Joaquin Rivers, and the lower reaches of various streams that flow directly into the Bay, such as the Napa and Petaluma Rivers in the North Bay and the Coyote and San Francisquito Creeks in the South Bay. Major rivers and streams are also listed below by county.

- Alameda County: Alameda Creek, San Leandro Creek, San Lorenzo Creek.
- Contra Costa County: San Pablo Creek.
- Marin County: Corte Madera Creek, Lagunitas Creek, Gallinas Creek, Miller Creek, Novato Creek.
- Napa County: Huichica Creek, Napa River.
- San Francisco City and County: None.
- San Mateo County: Cordilleras Creek, San Mateo Creek, Sanchez Creek.
- Santa Clara County: Adobe Creek, Coyote Creek, Guadalupe River, Llagas Creek (drains to the Pacific Ocean via the Pajaro River), Los Gatos Creek, Permanente Creek, San Francisquito Creek, Stevens Creek.
- Solano County: Green Valley Creek, Napa River, Putah Creek, Suisun Creek.
- Sonoma County: Petaluma River, Russian River, Santa Rosa Creek, Sonoma Creek.

Surface Water Quality

Urbanization of the Bay Area has reduced the quality of surface water as a result of wastewater and industrial discharges, loss of wetlands, widespread stream modification for flood control projects and urban development, sedimentation from construction activities, and contamination from

pollutants. Modifications to the natural hydrology can affect water quality as a result of increased impervious surfaces, which leads to higher levels of pollutants in surface runoff and a reduction in wetlands and riparian areas, which help filter pollutants and improve water quality. Agricultural activities in rural areas can also degrade water quality from pollutants in agricultural discharges, onsite sewage systems, and land conversions. Sedimentation and habitat degradation have impaired water quality in coastal watersheds from excess fine sediments, lack of large woody debris, and lack of spawning gravels.

The RWQCBs have developed basin plans, or water quality control plans, which provide overall guidance for state agencies to regulate discharges and protect water quality in the basins. For the study area, four basin plans (San Francisco Bay Basin Plan, North Coast Basin Plan, Sacramento and San Joaquin River Basin Plan, and the Central Coastal Basin Plan) have been developed. Each basin plan identifies beneficial uses of surface waters and contains water quality objectives that are used to set effluent discharge limits in permits. Examples of beneficial uses are agricultural supply, cold and warm freshwater habitat, municipal and domestic supply, recreation, and wildlife habitat. Existing and potential beneficial uses have been identified for major waterbodies in the basin plans; the designated uses also apply to tributaries of the identified waterbodies. To protect the beneficial uses of surface waters, the basin plans also describe water quality objectives to monitor and control pollutant concentrations, physical and chemical conditions of the water, and the toxicity of the water to aquatic organisms. The study area contains numerous waterbodies that have a range of beneficial uses and applicable water quality objectives; information on individual waterbodies can be found in the applicable basin plan.

For waterbodies that do not meet the water quality standards identified in the basin plans, the State has a water quality control policy for developing California's CWA Section 303(d) list of impaired waterbodies. Each RWQCB develops its own listing recommendations for review by SWRCB. The policy ensures a consistent approach to developing recommendations. After the SWRCB finalizes the list, it is submitted to EPA Region 9 for approval. Waters are listed if they do not meet, or are not expected to meet by the next listing cycle, applicable water quality standards after the application of certain technology-based controls. Through the listing process, these waters are scheduled for development of TMDLs or other actions to ensure that appropriate actions are taken to meet water quality standards. The TMDLs establish pollutant limits to reduce the amount of pollutants entering the waterbody and enable the waterbody to meet water quality standards. The state reviews and updates the 303(d) list of impaired waterbodies as needed; the current CWA Section 303(d) list/305(b) is the 2014/2016 Integrated Report. SWRCB has listed several waterbodies in the Bay Area as impaired for various pollutants, such as sedimentation, mercury, temperature, turbidity, pesticides, and nutrients (Table 3.10-1).

Table 3.10-1. 303(d) Impairments for Surface Waters in the Study Area^a

County Name	Stream Name	Pollutant/ Stressor	Source	TMDL Completion Date
Alameda County	Alameda Creek	Diazinon	Urban runoff/storm sewers	5/21/2007 ^b
	San Leandro Creek, lower	Diazinon	Urban runoff/storm sewers	5/21/2007 ^b
		Trash	Source unknown	Estimated 2029
	San Lorenzo Creek	Diazinon	Source unknown	5/16/2007 ^b
	San Francisco Bay,	Chlordane	Source unknown	Estimated 2013

County Name	Stream Name	Pollutant/ Stressor	Source	TMDL Completion Date
	central	DDT	Source unknown	Estimated 2013
		Dieldrin	Source unknown	Estimated 2013
		Mercury	Atmospheric deposition, industrial point sources, municipal point sources, natural sources, nonpoint source, resource extraction	02/12/2008 ^b
		PCBs	Source unknown	03/29/2010 ^b
		Selenium	Source unknown	08/23/2016 ^b
		Dioxin compounds	Source unknown	Estimated 2019
		Furan compounds	Source unknown	Estimated 2019
		Invasive species	Source unknown	Estimated 2019
		Trash	Source unknown	Estimated 2021
	San Francisco Bay, lower	Chlordane	Source unknown	Estimated 2013
		DDT	Source unknown	Estimated 2013
		Dieldrin	Source unknown	Estimated 2013
		Trash	Source unknown	Estimated 2021
		Mercury	Source unknown	02/12/2008 ^b
		PCBs	Source unknown	03/29/2010 ^b
		Dioxin compounds	Source unknown	Estimated 2019
		Furan compounds	Source unknown	Estimated 2019
	Invasive species	Source unknown	Estimated 2019	
	San Francisco Bay, south	Chlordane	Source unknown	Estimated 2013
DDT		Source unknown	Estimated 2013	
Dieldrin		Source unknown	Estimated 2013	
Alameda County, continued	San Francisco Bay, south, continued	Selenium	Source unknown	Estimated 2021
		Mercury	Source unknown	02/12/2008 ^b
		PCBs	Source unknown	03/29/2010 ^b
		Dioxin compounds	Source unknown	Estimated 2019
		Furan compounds	Source unknown	Estimated 2019
		Invasive species	Source unknown	Estimated 2019
Contra Costa County	San Pablo Creek	Diazinon	Urban runoff/storm sewers	5/16/2007 ^b
		Trash	Source unknown	Estimated 2029
Marin County	Corte Madera Creek	Diazinon	Other	5/21/2007 ^b
	Lagunitas Creek	Nutrients	Source unknown	Estimated 2022

County Name	Stream Name	Pollutant/ Stressor	Source	TMDL Completion Date
		Pathogens	Source unknown	1/10/2007 ^b
		Sedimentation/Siltation	Source unknown	3/11/2006 ^b
	Gallinas Creek	Diazinon	Source unknown	5/16/2007 ^b
	Miller Creek	Diazinon	Source unknown	5/16/2007 ^b
	Novato Creek	Diazinon	Source unknown	5/16/2007 ^b
Napa County	Napa River, tidal	Nutrients	Agriculture, onsite waste systems (septic tanks)	Estimated 2018
		Pathogens	Agriculture, onsite waste systems (septic tanks)	11/01/2001 ^b
	Rindler Creek	Trash	Source unknown	Estimated 2029
San Mateo County	San Mateo Creek	Diazinon	Source unknown	5/16/2007 ^b
		Trash	Source unknown	Estimated 2019
Santa Clara County	Coyote Creek	Diazinon	Urban runoff/storm sewers	5/21/2007 ^b
		Trash	Illegal dumping, urban runoff/storm sewers	Estimated 2029
	Guadalupe River	Diazinon	Source unknown	5/16/2007 ^b
		Mercury	Source unknown	06/01/2010 ^a
	Llagas Creek, above Chesbro Reservoir	Temperature, water	Source unknown	Estimated 2023
pH		Source unknown	Estimated 2027	
Santa Clara County, continued	Llagas Creek, below Chesbro Reservoir	Chloride	Source unknown	Estimated 2027
		Chlorpyrifos	Agriculture	11/12/2013 ^b
		Specific conductivity	Source unknown	Estimated 2027
		<i>Escherichia coli</i> (<i>E. coli</i>)	Collection system failure, domestic animals/livestock, urban runoff/storm sewers	Estimated 2027
		Fecal coliform	Collection system failure, domestic animals/ livestock, urban runoff/storm sewers	8/3/2010 ^b
		Oxygen, dissolved	Agriculture, domestic animals/livestock, natural sources, urban runoff/storm sewers	Estimated 2028
		Nitrate	Agriculture	10/13/2006 ^b
		Sedimentation/siltation	Agriculture-grazing, habitat modification, hydromodification, irrigated crop production, land development, resource extraction, silviculture	5/3/2007 ^b

County Name	Stream Name	Pollutant/ Stressor	Source	TMDL Completion Date	
		Sodium	Nonpoint source, source unknown	Estimated 2027	
		Total dissolved solids	Source unknown	Estimated 2027	
		Turbidity	Source unknown	Estimated 2023	
		Los Gatos Creek	Diazinon	Source unknown	5/16/2007 ^b
		Permanente Creek	Diazinon	Urban runoff/storm sewers	5/16/2007 ^b
			Selenium	Source unknown	Estimated 2021
			Toxicity	Source unknown	Estimated 2021
			Trash	Source unknown	Estimated 2029
		San Francisquito Creek	Diazinon	Source unknown	5/16/2007 ^b
			Sedimentation/siltation	Source unknown	Estimated 2013
			Trash	Source unknown	Estimated 2029
		Stevens Creek	Diazinon	Source unknown	5/21/2007 ^b
			Temperature, water	Source unknown	Estimated 2021
			Toxicity	Source unknown	Estimated 2019
Trash			Source unknown	Estimated 2029	
Solano County	Green Valley Creek	Chloride	Source unknown	Estimated 2019	
		Benthic community effects	Hydromodification, illicit connection/illegal hook-ups, dry weather flows, urban runoff/storm sewers	Estimated 2025	
		Bifenthrin	Source unknown	Estimated 2025	
		Chlorpyrifos	Source unknown	Estimated 2025	
		Manganese	Source unknown	Estimated 2019	
		Pentachlorophenol (PCP)	Source unknown	Estimated 2019	
		Sulfates	Source unknown	Estimated 2019	
		Total Nitrogen as N	Source unknown	Estimated 2025	
	Napa River, Mare Island Strait	Chlordane	Source unknown	Estimated 2029	
		Dieldrin	Source unknown	Estimated 2029	
		Mercury	Source unknown	02/12/2008 ^b	
		PCBs	Source unknown	03/29/2010 ^b	
		Total DDT	Source unknown	Estimated 2029	
		Putah Creek (Solano Lake to Putah Creek Sinks; partly in Delta waterways, northwest portion)	Mercury	Resource extraction, source unknown	Estimated 2017
	Rindler Creek	Trash	Source unknown	Estimated 2029	

County Name	Stream Name	Pollutant/ Stressor	Source	TMDL Completion Date	
	Suisun Bay	Chlordane	Agriculture	Estimated 2029	
		DDT	Source unknown	Estimated 2013	
		Dieldrin	Source unknown	Estimated 2013	
		Dioxin compounds	Source unknown	Estimated 2019	
		Furan compounds	Source unknown	Estimated 2019	
		Invasive species	Source unknown	Estimated 2019	
		Mercury	Source unknown	2/12/2008 ^b	
		PCBs including dioxin-like	Source unknown	3/29/2010 ^b	
		Selenium	Source unknown	8/23/2016 ^b	
	Suisun Creek	Oxygen, dissolved	Source unknown	Estimated 2021	
		Temperature, water	Source unknown	Estimated 2021	
	Solano County, continued	Delta waterways (northwestern portion)	Chlorpyrifos	Source unknown	10/10/2007 ²
			DDT	Source unknown	Estimated 2011
Diazinon			Source unknown	10/10/2007 ^b	
Electrical conductivity			Source unknown	Estimated 2027	
Group A pesticides			Source unknown	Estimated 2027	
Invasive species			Source unknown	Estimated 2019	
Mercury			Agricultural return flows, atmospheric deposition, highway/road/bridge runoff, industrial point sources, municipal point sources, natural sources, resource extraction (see TMDL documentation), urban runoff/storm sewers	10/20/2011 ^b	
Toxicity			Source unknown	Estimated 2019	
Delta waterways (northern portion)		Chlordane	Source unknown	Estimated 2029	
		Chlorpyrifos	Source unknown	10/10/2007 ^b	
		DDT	Source unknown	Estimated 2011	
		Diazinon	Source unknown	10/10/2007 ^b	
		Dieldrin	Source unknown	Estimated 2011	
	Group A pesticides	Source unknown	Estimated 2011		
	Invasive species	Source unknown	Estimated 2019		

County Name	Stream Name	Pollutant/ Stressor	Source	TMDL Completion Date
		Mercury	Agricultural return flows, atmospheric deposition, highway/road/bridge runoff, industrial point sources, municipal point sources, natural sources, resource extraction (see TMDL documentation), urban runoff/storm sewers	10/20/2011 ^b
		PCBs	Source unknown	Estimated 2019
		Toxicity	Source unknown	Estimated 2027
Solano County, continued	Ledgewood Creek Ulati Creek (Solano County)	Diazinon	Source unknown	5/16/2007 ^b
		Chlorpyrifos	Agriculture	Estimated 2026
		Diazinon	Agriculture	Estimated 2026
		Diuron	Agriculture	Estimated 2019
		Toxicity	Source unknown	Estimated 2027
Sonoma County	Petaluma River	Diazinon	Source unknown	Estimated 2019
		Nutrients	Source unknown	Estimated 2020
		Pathogens	Source unknown	Estimated 2019
		Sedimentation/ siltation	Source unknown	Estimated 2019
		Trash	Source unknown	Estimated 2029
	San Pablo Bay	Chlordane	Source unknown	Estimated 2013
		DDT	Source unknown	Estimated 2013
		Dieldrin	Source unknown	Estimated 2013
		Dioxin compounds	Source unknown	Estimated 2019
		Furan compounds	Source unknown	Estimated 2019
		Invasive species	Source unknown	Estimated 2019
		Mercury	Source unknown	02/12/2008 ^b
		PCBs including dioxin-like	Source unknown	03/29/2010 ^b
	Selenium	Source unknown	01/01/2016 ^b	
	Russian River ^c HU, Lower Russian River HA, Guerneville HSA, Green Valley Creek watershed	Indicator bacteria	Nonpoint source, other	Estimated 2016
		Oxygen, dissolved	Source unknown	Estimated 2021
	Russian River ^c HU, Lower Russian River HA,	Aluminum	Source unknown	Estimated 2025
		Indicator bacteria	Source unknown	Estimated 2016

County Name	Stream Name	Pollutant/ Stressor	Source	TMDL Completion Date
	Guerneville HSA	Sedimentation/siltation	Flow alteration/regulation/modification, removal of riparian vegetation, streambank modification/destabilization	Estimated 2025
Sonoma County, continued	Russian River ^c HU, Middle Russian River HA, Geyserville HSA	Specific conductivity	Source unknown	Estimated 2025
		Temperature, water	Flow alteration/regulation/modification Removal of riparian vegetation	Estimated 2019
		Diazinon	Source unknown	Estimated 2025
		Indicator bacteria	Source unknown	Estimated 2016
		Sedimentation/siltation	Flow alteration/ regulation/modification, removal of riparian vegetation	Estimated 2025
		Temperature, water	Flow alteration/ regulation/modification, removal of riparian vegetation	Estimated 2019
	Russian River ^c HU, Upper Russian River HA, Ukiah has	Aluminum	Source Unknown	Estimated 2025
		Sedimentation/siltation	Flow alteration/ regulation/modification Removal of riparian vegetation Streambank modification/destabilization	Estimated 2025
		Temperature, water	Flow alteration/ regulation/modification, Removal of riparian vegetation	Estimated 2019
	Mendocino Coast HU, Gualala River HA, Gualala River	Aluminum	Source unknown	Estimated 2025
Sonoma County, continued	Mendocino Coast HU, Gualala River HA, Gualala River, continued	Sedimentation/siltation	Disturbed sites (land development) erosion/siltation, flow alteration/regulation/modification, harvesting, restoration, residue management, highway/road/bridge construction, land development, logging road construction/maintenance, nonpoint source removal of riparian vegetation, silviculture, specialty crop production	01/01/2004 ^b

County Name	Stream Name	Pollutant/ Stressor	Source	TMDL Completion Date
		Temperature, water	Flow alteration/regulation/modifica tion, removal of riparian vegetation	Estimated 2019
	Sonoma Creek, tidal	Nutrients	Agriculture, onsite wastewater systems (septic tanks)	Estimated 2018
		Pathogens	Onsite wastewater systems (septic tanks)	02/29/2008 ^b
	Sonoma Creek, non-tidal	Nutrients	Agriculture	Estimated 2018
		Pathogens	Agriculture	02/29/2008 ^b
		Sedimentation/si ltation	Source unknown	07/12/2010 ^b

Source: State Water Resources Control Board 2018.

^a Surface waters are limited to streams and rivers, as well as major bays only. Impairments found in reservoirs and lakes within the study area are not included.

^b Date TMDL approved by EPA

^c Sediment impacts in Russian River tributaries prompted listing the entire Russian River watershed sediment. The entire Russian River watershed, including the Laguna de Santa Rosa, is listed for sedimentation and temperature. Only Russian River Hydraulic Units with additional impairments are included in the table.

DDT = Dichlorodiphenyltrichloroethane

HA = Hydrologic Area

HSA = Hydrologic Subarea

HU = Hydrologic Unit

PCBs = Polychlorinated biphenyls

PCP = Pentachlorophenol

TMDL = total maximum daily load

Groundwater Hydrology

Numerous groundwater basins underlie the Bay Area, according to a groundwater assessment conducted by the California Department of Water Resources (2003). The study area includes the San Francisco Bay Basin, and portions of the Northern California Coastal Basin, the Sacramento River Basin, the San Joaquin River Basin, and the Central California Coast Basin. The San Francisco Bay Basin contains 28 identified groundwater basins that underlie approximately 1,400 square miles. The Northern California Coastal Basin contains 63 groundwater basins or subbasins that underlie approximately 1,600 square miles; 11 of these basins are in Sonoma and Marin Counties. The Sacramento River Basin contains 88 groundwater basins or subbasins that underlie approximately 7,900 square miles; three of these basins are in eastern Napa and Solano Counties. The San Joaquin River Basin contains three groundwater basins and nine subbasins that underlie approximately 5,830 square miles; one subbasin is in eastern Contra Costa and Alameda Counties. The Central California Coastal Basin contains 50 groundwater basins and 12 subbasins that underlie approximately 3,740 square miles. These groundwater basins supply water for agricultural and urban purposes throughout the Bay Area. Groundwater is also an important supplement to surface water supplies during drought conditions. In total, there are 43 groundwater basins within the study area shown in Figure 3.10-1B. Because of steep mountainous regions or areas with impermeable bedrock, approximately 66% of the study area is outside of a recognized groundwater basin.

Groundwater recharge typically occurs from runoff infiltrating permeable sediments of a valley floor, either at the basin margins or through streambeds where the water table is lower than the water level in the stream. In some of the basins that are hydraulically connected to other basins, water enters as lateral subsurface flow from an adjacent basin. The bulk of recharge occurs in the western portion of the Bay Area where precipitation rates are highest. Depth to groundwater varies across the Bay Area and depends on subsurface conditions, sources of groundwater recharge, and other factors. In the Santa Clara, Napa-Sonoma, and Petaluma Valleys, for example, groundwater wells extend 200–500 feet below the ground surface to supply groundwater for municipal and irrigation purposes. Shallow water tables may be encountered in small basins and near perennial or intermittent waterbodies.

Groundwater quality in the Bay Area is generally suitable for most urban and agricultural uses, with only local impairments. The primary constituents of concern are high total dissolved solids, nitrate, boron, and organic compounds. Numerous cases of groundwater contamination have resulted from leaking underground storage tanks, the release of fuel hydrocarbons, and spills or persistent leaks of organic solvents at industrial sites.

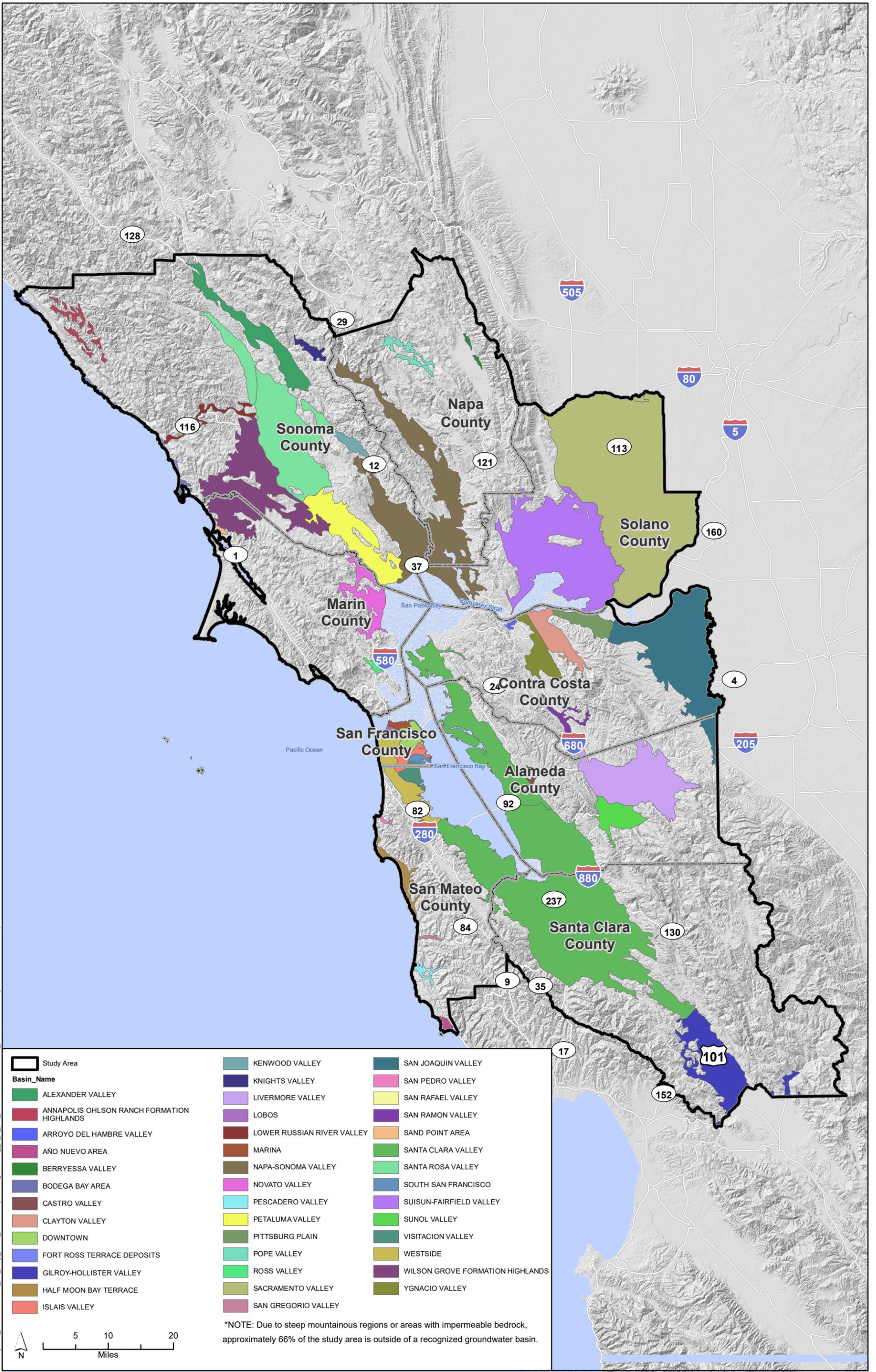
Flood Hazards

Flooding has been one of the most common disasters in the Bay Area since 1950. Most flooding is associated with severe storms and heavy rainfall and affects low-lying areas. Less than 15% of the land in the Bay Area falls within the 100- or 500-year flood zone. Marin, Napa, and Solano Counties have the highest percentages of urban land in the 100-year flood zone (10.9%, 10.7%, and 11.5%, respectively), and Santa Clara County has the highest percentage of urban land in the 500-year flood zone (38.1%). The study area is predominantly outside of a special flood hazard area (Figure 3.10-1C). However, portions of the study area are within a FEMA-designated 100-year floodplain and subject to flooding during a 100-year flood event (Federal Emergency Management Agency 2016, 2017, 2018).

Tsunami waves generated by earthquakes could flood coastal areas and inland areas with connectivity to San Francisco Bay. According to California Emergency Management Agency statewide tsunami inundation maps, all nine counties within the study area contain areas subject to tsunami run-up (California Emergency Management Agency et al. 2009). In addition, localized flooding may also occur during storm events. Flooding, regardless of the source, can damage infrastructure and buildings and cause power outages, loss of resources, evacuation delays, and other problems that can affect public health and safety.

The San Francisco Bay contains many flat low-lying marginal areas and highly developed valleys with surrounding steep terrain that is conducive to flooding, especially during intense storms. Because of the topography of alluvial plains, floodwaters escaping some stream channels may flow away from the flooding stream, crossing open areas or flowing through city streets until reaching an adjacent watercourse. This type of flooding compounds and exacerbates local flooding that occurs when storm drains and small channels become blocked or surcharged during storms. Flood protection agencies have constructed major flood protection infrastructure projects along the following waterways to reduce the impacts of flooding.

- Alameda Creek
- Corte Madera Creek
- Coyote Creek



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Figure 3.10-1B
Groundwater Basin within the Study Area

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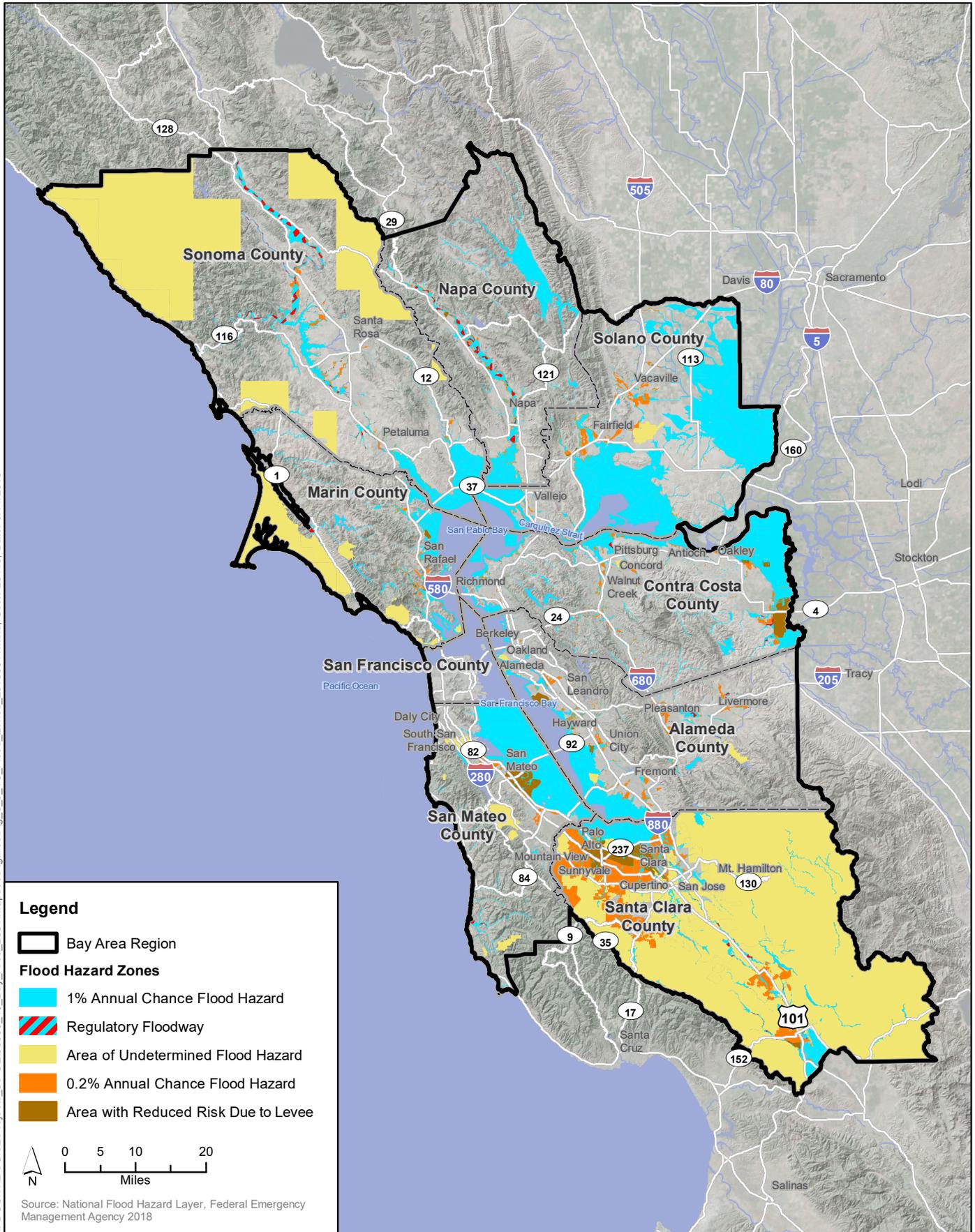


Figure 3.10-1C
FEMA Flood Zones within the Study Area



- Guadalupe River
- Napa River
- Novato Creek
- Petaluma River
- San Francisquito Creek

3.10.2 Environmental Impacts

3.10.2.1 Methods for Analysis

Impacts on surface water hydrology, groundwater hydrology and supply, surface and groundwater quality, and flood hazards were evaluated qualitatively, based on a review of the hydrology and water quality of the study area and professional judgment. The analysis focuses on the potential for O&M and minor new construction activities to modify drainage patterns, degrade water quality, or affect groundwater recharge or quality in the study area, with consideration of PG&E's environmental programs and practices. Because PG&E has conducted O&M activities in the study area for more than 30 years, the O&M impacts described in this section represent baseline environmental conditions that would not change following approval of the Incidental Take Permit (ITP).

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures

PG&E conducts all activities requiring the use or disposal of water in compliance with regulatory requirements. These include the federal CWA, California's Porter-Cologne Water Quality Control Act, requirements of SWRCB and RWQCBs; and any applicable county and city regulations and policies. The following sections describe specific methods of compliance.

PG&E also implements BMPs for water quality (as described later in the discussion of Impact WQ-1) as standard practice to avoid or minimize potential impacts on water quality. As such, the following measures will be implemented when undertaking the covered activities associated with the ITP permit.

Stormwater Pollution Prevention Plans

In compliance with CWA Section 402, PG&E prepares and implements a SWPPP whenever an O&M activity triggers the need (e.g., disturbs more than 1 acre) for an NPDES General Permit for Discharge of Storm Water Associated with Construction Activities (Construction General Permit Order 2009-0009-DWQ) from SWRCB. A copy of the SWPPP must be posted at the project site, and a notice of intent to discharge stormwater must be filed with the RWQCB with jurisdiction over the work site. A SWPPP includes the following information.

- A description of site characteristics, including runoff and drainage characteristics and soil erosion hazard.
- A description of proposed construction procedures and construction-site housekeeping practices, including prohibitions on discharging or washing any of the following materials into streets, shoulder areas, inlets, catch basins, gutters, natural or modified drainages, or

agricultural drainages: concrete; solvents and adhesives; thinners; paints; fuels; sawdust; dirt; gasoline; asphalt and concrete saw slurry; and chlorinated water.

- A description of measures that will be implemented for erosion and sediment control, including requirements to:
 - Conduct major construction activities involving excavation and spoils haulage during the dry season, to the extent possible.
 - Conduct all construction work in accordance with site specific construction plans that minimize the potential for increased sediment inputs to storm drains and surface waters.
 - Grade and stabilize spoils sites to minimize erosion and sediment input to surface waters and generation of airborne particulate matter (see Section 3.3, *Air Quality*).
 - Implement erosion control measures as appropriate to prevent sediment from entering storm drains and surface waters to the extent feasible, including the use of silt fencing or fiber rolls to trap sediments and erosion control blankets on exposed slopes.

In addition, for projects that disturb less than 1 acre of soil or which are otherwise exempt from requirements for an NPDES General Permit for Discharge of Storm Water Associated with Construction Activities, PG&E implements activity-specific erosion and sediment control plans. These plans contain measures similar to those in a SWPPP.

Drainage Plans and Restoration of Surface Drainage

PG&E's typical practice for O&M and minor new construction is to implement erosion control during ground-disturbing activities, and to return the site as close as possible to its pre-existing grade once work is completed. Facilities are generally designed to minimize drainage disruption, although in some cases, regulations and the company's Construction Stormwater Management Program, which includes activity-specific and site-specific erosion and sediment control plans, require that a site be graded to provide interior drainage or passive water treatment to prevent spills from contaminating surface waters.

For some of its new facilities, PG&E develops a drainage or runoff quality control plan. For example, if a ministerial grading permit is required from a local jurisdiction (county or city), the terms of the permit may require a drainage plan. The drainage plan goal is to achieve consistency with accepted engineering standards of care, and to ensure the following.

- Construction earthwork does not adversely modify existing surface drainage patterns.
- Where surface drainage must be altered to accommodate construction, measures are implemented to:
 - Maintain flow in natural, modified, and constructed channels.
 - Ensure that post-construction runoff and groundwater infiltration at the site are not substantially altered.

The plan may also provide for design measures and/or BMPs as appropriate to maintain the quality of runoff waters and waters that infiltrate into the subsurface. Such measures may include passive treatment such as grassy swales or other site-appropriate provisions.

Statewide Natural Gas Utility Permit

To comply with the Statewide Natural Gas Utility Permit, PG&E takes the following actions.

- Establish and implement appropriate BMPs.
- Ensure that all planned discharges comply with the terms and requirements of the Statewide Natural Gas Utility Permit, including all applicable effluent limitations.
- Take all necessary steps to review and update the effectiveness and adequacy of the control measures and BMPs.
- Keep BMP manuals updated and available on the applicable project site for all system operators.
- Conduct monitoring and reporting in compliance with the provisions and requirements in the Monitoring and Reporting Program described in the Statewide Natural Gas Utility Permit.
- Maintain self-monitoring reports, including compliant and non-compliant discharge monitoring information and have information available upon request by the SWRCB and RWQCB.
- Submit an annual report to the applicable RWQCB and all reporting information required by the Monitoring and Reporting Program.
- Notify the applicable RWQCB pursuant to the notification requirements in the Monitoring and Reporting Program.

Bay Area O&M HCP AMMs

PG&E's *Bay Area Operations and Maintenance Habitat Conservation Plan* (Bay Area O&M HCP) contains the following avoidance and minimization measures (AMMs) that specifically address hydrology and water quality. PG&E would apply these AMMs while conducting covered activities.

- Field Protocol (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-11: Utilize standard erosion and sediment control BMPs (pursuant to the most current version of PG&E'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 waterbodies, stormwater inlets, and other standing bodies of water. Cover stockpiled soil prior to precipitation events.
- 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, where feasible. If refueling must be conducted closer to wetlands, construct a secondary containment area subject to review by an environmental field specialist and/or biologist. Maintain spill prevention and cleanup equipment in refueling areas.
- FP-16: Maintain a buffer of 250 feet from the edge of vernal pools and 50 feet from the edge of wetlands, ponds, or riparian areas. If maintaining the buffer is not possible because, e.g., the areas are in or adjacent to facilities, the field crew will implement other measures as prescribed by the land planner, biologist, or HCP administrator to minimize impacts, such as by flagging

access, requiring foot access, restricting work until the dry season, or requiring a biological monitor during the activity.

- Hazardous Waste: PG&E will immediately stop and, pursuant to pertinent state and federal statutes and regulations, arrange for repair and clean up by qualified individuals of any fuel or hazardous waste leaks or spills at the time of occurrence, or as soon as it is safe to do so. PG&E will exclude the storage and handling of hazardous materials from the Permit Area and will properly contain and dispose of any unused or leftover hazardous products offsite.

Applicant Proposed Measures In addition to implementing the above measures as part of the proposed project, PG&E would implement the following applicant proposed measure (APM) to reduce project impacts:

APM HYDRO-1: Develop and Implement a frac-out plan for projects using horizontal directional drilling.

For all gas projects utilizing horizontal directional drilling (HDD), PG&E will store pertinent materials onsite to quickly contain potential frac-outs⁴, and these materials will be determined by conditions on the ground. At the entry or exit of the drill and for the duration of the drilling activity, PG&E will maintain a supply of sediment barriers (e.g., weed-free straw bales and silt fence), plastic sheeting, shovels and buckets, mud pumps and additional hose, mud storage tanks, and a vacuum truck. In addition, PG&E may store sandbags, floating booms or silt curtains, plywood, a small backhoe to dig a sump, and corrugated pipe.

In the event of a frac-out, the release will be assessed immediately and PG&E will take the following steps:

- Initiate immediate suspension of the drilling operation.
- Contain the frac-out with supplies and materials as appropriate.
- Verify that the drilling lubricant will not enter a water feature.
- Assess the containment structure and determine if additional supplies and materials are needed to prevent the spread of surfaced drilling lubricant.
- Determine if cleanup of the frac-out material is needed.

If a frac-out is identified in a jurisdictional water feature or other sensitive resource area, the following additional steps will be taken:

- PG&E will notify the appropriate agency authorities with jurisdiction (i.e., USACE, CDFW, and RWQCB).
- The drill angle will be increased to move below the frac-out and to reduce the amount of drilling lubricant reaching the surface. The current drill profile will be evaluated; and drill pressures and pump volume rates will be adjusted, as needed.
- If standing water is present, hand-placed containment, silt curtains, or other containment techniques for water releases will be deployed if necessary. To the extent feasible, surface releases of excess drilling lubricant will be held in a contained area and removed using small

⁴ Infrequently, the geologic strata above the bore may be weaker than anticipated or unconsolidated. As the drill head passes under these locations, the pressure of the drilling lubricant may result in a fracture of these strata, allowing drilling lubricant to rise to the surface.

collection sumps with portable pumps and hoses, and without undue disturbance to the banks and bed of the water feature.

- Frac-out cleanup will be conducted in a manner that avoids damage to existing and adjacent vegetation. Soils that come in contact with drilling lubricant will be removed to the extent feasible without causing excessive loss of topsoil or vegetation.

Once the frac-out is contained, drilling may resume upon approval from the appropriate agency officials and PG&E representatives. Frac-out material will be collected and stored in containers until it can be reused or disposed of in an approved disposal facility.

Significance Criteria

In accordance with Appendix G of the State CEQA Guidelines, the potential significance of impacts on hydrology and water quality from the proposed project and implementation of covered activities was evaluated for each of the following criteria:

- Violation of any water quality standards or waste discharge requirements.
- Substantial depletion of groundwater supplies or substantial interference with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted).
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite.
- Substantial alteration of the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantial increase in the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite.
- Creation of or contribution of runoff water that would exceed the capacity of existing or planned stormwater drainage systems or substantial additional sources of polluted runoff.
- Other substantial degradation of water quality.
- Placement of housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or FIRM or other flood hazard delineation map.
- Placement of structures that would impede or redirect flood flows within a 100-year flood hazard area.
- Exposure of people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Contribution to inundation by seiche, tsunami, or mudflow.

Given these criteria, in the *California Building Industry Association v. Bay Area Air Quality Management District* case that was decided in 2015, the California Supreme Court held that CEQA does not generally require lead agencies to consider how existing hazards or conditions might affect a project's users or residents, except where the project would exacerbate an existing environmental hazard (Bay Area Air Quality Management District 2016). Accordingly, hazards resulting from a project that places development in an existing or future flood hazard area are not considered impacts under CEQA unless the project would exacerbate the flood hazard. Thus, the analysis below

evaluates whether PG&E O&M activities and minor new construction would exacerbate existing or future flood hazards in the study area, resulting in a substantial risk of loss, injury, or death. An impact could be significant if O&M and minor new construction activities were to exacerbate future flood hazards by increasing the frequency or severity of flooding or cause flooding to occur in an area that would not be subject to flooding without the proposed activity.

3.10.2.2 Impact Discussion

Impact WQ-1: Violation of any water quality standards or waste discharge requirements (Less-than-Significant Impact)

Covered activities would involve various levels of ground disturbance, as described in Chapter 2, *Project Description*. Covered activities could also result in accidental leaks or spills associated with the operation or refueling of equipment, or other releases of non-stormwater from construction dewatering, horizontal directional drilling frac-outs, and hydrostatic test discharges. Thus, these activities could result in discharges of sediment or other pollutants.

Covered activities that include vegetation clearing, grading, erosion control, trenching, and excavating for installation or repair of gas or electric transmission and distribution facilities could result in short-term impacts on water quality. Sediments and any associated pollutants from an accidental discharge from materials or equipment may be introduced into drainage structures or other waterbodies. Such impacts resulting from O&M activities would be part of baseline environmental conditions and would not increase following approval of the ITP.

Most covered activities would disturb less than 1 acre of soil or would otherwise be exempt from a construction stormwater permit. However, PG&E would implement an erosion and sediment control plan for smaller activities as standard practice, as described under *PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures* in Section 3.10.2.1, *Methods for Analysis*. Stormwater discharges associated with activities that disturb more than 1 acre of soil would be regulated under the General Construction Permit; PG&E would prepare and implement a SWPPP for such activities, as described under *PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures*. Compliance with the Statewide Natural Gas Utility Permit would require implementation of BMPs to protect water quality. When covered activities must occur in jurisdictional waters, PG&E also would obtain any other required permits or authorizations (e.g., CWA Section 401 Water Quality Certification, CWA Section 404 permit, CDFW Section 1600 LSAA). Such permits would be required for in-water work involving covered activities such as repair or replacement of electric tower footings, wood poles, gas pipeline facilities, or boardwalk access to these facilities; permits would also be required for new construction. When required, these permits could involve localized temporary impacts and, more rarely, permanent impacts. Collectively, across all O&M activities and minor new construction, this is not expected to exceed 10 acres of temporary impacts annually and 1 acre of permanent impacts annually. PG&E would be required to follow measures and conditions associated with those specific permits to avoid and minimize potential impacts on water quality or waste discharges. With incorporation of these measures, impacts relating to erosion and sediment control would be less than significant.

A frac-out may be indicated when there is a loss of drilling lubricant, a loss of circulation, or an unexpected change in pressure. PG&E's Bay Area O&M HCP contains AMMs that address water quality considerations. FP-02 and FP-03 would minimize disturbance of undisturbed areas. FP-11 require implementation of sediment control BMPs contained in PG&E's *Stormwater Field Manual for*

Construction Best Management Practices to prevent construction site runoff into waterways. FP-12 would require stockpiling soil within established work area boundaries so that soil does not enter waterbodies or stormwater inlets, and would require covering stockpiled soil prior to precipitation events. FP-15 would restrict vehicular and equipment refueling near vernal pools, other wetlands, streams, and waterways, and would require access to spill prevention and cleanup equipment in refueling areas. Therefore, covered activities associated with minor new construction activities and habitat enhancement and management are not anticipated to violate water quality standards or waste discharge requirements and any impacts would be less than significant. Implementation of APM HYDRO-1 would further minimize the impacts of an unanticipated frac-out by requiring PG&E to cease drilling and contain and clean up any materials produced during a frac-out.

As described in Chapter 2, hydrostatic testing is required to verify the strength and integrity of pipelines. For O&M activities that involve hydrostatic testing, the used water would be discharged in accordance with the Statewide Natural Gas Utility Permit. No effects on water quality standards would result from this ongoing testing, which is part of baseline environmental conditions and would not change after approval of the ITP application. Likewise, hydrostatic testing for pipelines extended as part of minor new construction would be subject to the same permits and water quality standards and would not violate water quality standards or waste discharge requirements. Therefore, any impacts related to hydrostatic testing would be less than significant.

Contaminated groundwater is sometimes encountered during trenching, excavation, and deep-well anode drilling activities. If groundwater is encountered during O&M activities, it is pumped into a temporary holding tank (e.g., a Baker tank) and tested prior to being discharged. All water would be discharged in accordance with the Statewide Natural Gas Utility Permit. Discharges in accordance with this permit ensure that water quality is protected during construction, and any impacts would be less than significant.

Covered activities also would require the handling and use of a wide variety of chemicals, some of which are considered hazardous materials, as described in Section 3.9, *Hazards and Hazardous Materials*. These materials are associated with vehicle and equipment O&M, as well as infrastructure O&M and include fuels, lubricants, and hydraulic fluid, adhesives, waterproofing compounds, concrete, epoxy, paints, and asphalt paving media. However, PG&E would continue to comply with applicable state and federal laws and regulations and would implement AMMs identified in PG&E's Bay Area O&M HCP. The AMMs include stopping work and, pursuant to pertinent state and federal statutes and regulations, arranging for repair and cleanup by qualified individuals of any fuel or hazardous waste leaks or spills, not storing hazardous materials in the Permit Area, and containment and disposal of any unused or leftover hazardous products offsite. Compliance with statutes and regulations would require PG&E to notify adjacent land users and appropriate authorities (e.g., California Office of Emergency Services, local Certified Unified Program Agencies, and local law enforcement and fire departments) immediately in the event of a substantial spill or release. Impacts would be less than significant.

Habitat management and enhancement activities may also result in temporary or permanent impacts on waters of the U.S. or waters of the state. PG&E may construct new stock ponds to support listed species or clean out existing stock ponds to maintain species habitat for California tiger salamander. Similarly, PG&E may enhance California freshwater shrimp habitat by fencing existing habitat or partnering with restoration groups to create or enhance habitat. In these instances, PG&E or its partners would likely need to obtain additional permits, and the management and

enhancement actions would follow standard water quality protection procedures and would have a net beneficial impact on the ITP covered species.

In summary, covered activities could temporarily degrade surface water quality as a result of ground disturbances. With implementation of PG&E's existing practices for complying with applicable laws and regulations and the AMMs in PG&E's Bay Area O&M HCP, impacts on surface water quality would be less than significant. Implementation of APM HYDRO-1, will further reduce the potential impacts of covered activities on surface water quality.

Impact WQ-2: Substantial depletion of groundwater supplies or substantial interference with groundwater recharge (Less-than-Significant Impact)

Potential impacts on groundwater could result from dewatering, hydrostatic testing, dust control, and increasing areas of impermeability. Groundwater is sometimes encountered during trenching, excavation, and deep-well anode drilling activities. Dewatering is also sometimes required, but it typically lasts only a few hours. Dewatered groundwater would be tested and discharged in accordance with the Statewide Natural Gas Utility Permit. Thus, the impacts on groundwater supplies due to dewatering have historically been and are expected to continue to be negligible.

As described in Chapter 2, hydrostatic testing is required to verify the strength and integrity of the pipeline. PG&E normally uses water as the test medium during hydrostatic testing, but compressed air or compressed nitrogen gas can sometimes be used for testing short segments or small-diameter pipes (i.e., less than 6 inches). This water is typically sourced from domestic water provided by local municipal sources (e.g., community water, well water, or water from a well drilled specifically for this purpose). Although hydrostatic testing may require water obtained from groundwater sources or municipal supplies sourced by groundwater, the required volume is anticipated to have a negligible effect on groundwater supplies. Following the hydrostatic test, the used water is tested and discharged in accordance with applicable federal, state, and local regulations. In addition, clean water discharged during hydrostatic testing would infiltrate pervious surfaces in the vicinity of testing activities and recharge groundwater. Because hydrostatic testing has been a component of PG&E's ongoing O&M activities in the Bay Area, these discharges are part of baseline environmental conditions and would not change following approval of the ITP. No effects on groundwater are expected from the ongoing testing or any hydrostatic testing associated with minor new construction activities. With the exception of hydrostatic testing activities, the only substantial use of water would be for dust control purposes, as described in Section 3.18, *Utilities and Service Systems*.

Conversion of permeable surfaces (e.g., grasslands, bare soil) to impermeable surfaces (e.g., pavement, concrete), could locally reduce groundwater infiltration. Installation of new permanent facilities would not typically involve surface conversion, except for gas pressure limiting stations and some electric substation expansions (generally affecting substantially less than the 0.5- to 3-acre expansion area), which are implemented, on average, every few years at different locations where a need for capacity or reliability is identified. Substation expansions and other larger installations are generally not paved or covered with impermeable surfaces except for equipment or building foundations. Likewise, impervious surfacing over gas facilities in non-urban areas is generally unfavorable for facility maintenance purposes. Thus, the impervious surfaces created by covered activities would be small and detached, and would not impede groundwater recharge. Impacts on groundwater supplies and recharge would be less than significant.

Impact WQ-3: Substantial alteration of existing drainage patterns, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite (Less-than-Significant Impact)

Construction activities near surface water features and riparian areas can result in erosion or siltation that could affect water quality onsite and downstream. These activities include grading and trenching to maintain access roads or repair existing facilities. Additionally, pipeline or electric facility erosion repairs within streambeds occasionally require installation of articulated concrete block mats or riprap to stabilize the stream bottom and reduce erosion above the pipeline or adjacent to electric facilities. When this is necessary, PG&E obtains the required authorizations from the appropriate agencies. PG&E would also continue to comply with the requirements of the Construction General Permit, which requires the implementation of a SWPPP for activities disturbing 1 acre or more of land. Stormwater discharge for activities that disturb smaller areas would continue to be addressed through the continued implementation of water quality BMPs that are part of PG&E's Bay Area O&M HCP FP-11, SWPPPs, and the Statewide Natural Gas Utility Permit.

To specifically address erosion and siltation for activities that disturb less than 1 acre of land, PG&E would implement an erosion and sediment control plan, as discussed under *PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures*. Under such a plan, PG&E would return water features to their pre-construction grade and cover disturbed areas with a combination of temporary and permanent vegetative stabilization measures, including reseeding where appropriate. In addition, PG&E would continue to install and maintain a stabilized entrance and exit to work areas, as well as restore disturbed entrance and exit areas following the completion of construction. As a result, any potential impacts on existing drainage patterns have been and would continue to be less than significant.

Impact WQ-4: Substantial alteration of existing drainage patterns, including through the alteration of the course of a stream or river, in a manner that would result in flooding onsite or offsite (Less-than-Significant Impact)

The Permit Area contains facilities that traverse or lie within various drainage courses, including buried pipe, pipeline spans, power lines and towers/poles, access roads, and culverts. Repairs and maintenance of these facilities can temporarily alter existing drainage patterns. Ongoing O&M activities and any effects related to drainage patterns are part of baseline environmental conditions and would not change following approval of the ITP.

PG&E would conduct covered activities associated with minor new construction activities and habitat enhancement and management in compliance with federal, state, and local regulations and in such a manner that localized flooding would be avoided or minimized. Compliance would include the following activities: continuing to implement BMPs for water quality; coordinating with and obtaining any required authorizations from USACE, CDFW, and RWQCB on a per-activity basis; and restoring disturbed areas. In cases where grading or ground disturbance is required to establish a temporary work area, the approximate pre-construction contours would be restored following the completion of construction. Pumps, sandbags, hay bales, or temporary holding tanks would continue to be utilized, where necessary and in accordance with PG&E's BMPs contained in erosion and sediment control plans to prevent any runoff that could cause detriment to drainage patterns. Furthermore, SWPPP BMPs for larger projects near water features and FP-16 from PG&E's Bay Area O&M HCP require conducting major construction activities during the dry season whenever

possible. Therefore, the potential for onsite or offsite runoff and flooding would be minimal, and potential impacts would be less than significant.

Impact WQ-5: Creation of or contribution to runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff (Less-than-Significant Impact)

As described in Impact WQ-2, few covered activities would result in the addition of impervious surfaces. The impervious surfaces created by O&M activities would be small, spatially discrete, and dispersed. Covered activities also have the potential to introduce new sources of pollutants that could enter stormwater and be transported offsite. Sources of pollutants would include diesel fuel, hydraulic fluid, oil, and grease, as well as sediment and trash.

O&M activities are ongoing and any effects related to drainage or runoff are part of baseline environmental conditions that would not change after approval of the ITP. Implementation of minor new construction activities could have effects on stormwater drainage and runoff. As described for Impact WQ-1, PG&E would continue to comply with regulatory requirements and would implement BMPs for water quality. These BMPs include cleaning and safely disposing of any spilled materials, scheduling activities to avoid rainfall events and periods of high flow, checking and maintaining equipment and vehicles, and restoring disturbed areas. In cases where grading or ground disturbance is required to establish a temporary work area, the approximate pre-construction contours would be restored following the completion of construction. AMMs identified in PG&E's Bay Area O&M HCP, specifically FP-11, FP-12, FP-15, and FP-16, require implementation of similar practices. With compliance with regulatory requirements and the implementation of AMMs, minor new construction would not result in a substantial increase in stormwater runoff and would not result in substantial additional sources of polluted runoff. Therefore, impacts would be less than significant.

Impact WQ-6: Other substantial degradation of water quality (No Impact)

Covered activities that have the potential to contribute or introduce pollutants or otherwise degrade water quality are discussed in Impacts WQ-1 through WQ-5. No other foreseeable sources of pollution are anticipated to be associated with these activities. As a result, covered activities would not otherwise substantially degrade water quality, and there would be no impact.

Impact WQ-7: Placement of housing within a 100-year flood hazard area (No Impact)

No housing would be constructed as part of covered activities. Therefore, there would be no impact.

Impact WQ-8: Placement of structures that would impede or redirect flood flows within a 100-year flood hazard area (Less-than-Significant Impact)

Some existing electric and gas facilities are located in the 100-year floodplain, and new facilities associated with minor new construction activities, such as pipelines, tower footings, or power poles, may need to be located within the 100-year flood zone. O&M activities for existing facilities may require access through the floodplain or minor work in the floodplain. The placement of construction equipment could temporarily impede or redirect flood flows in the event of a flood. Aboveground facilities within the 100-year flood zone may be exposed to flooding, which could damage the facilities or result in obstructions to drainages in the event of a flood. However, new or expanded gas and electric lines that would be located in floodplains would either be placed

underground (e.g., pipelines) or in the air (e.g., transmission or distribution line), or would be small and would not obstruct flood flows. In flood-prone areas steel structures supporting electric lines would be designed and constructed to resist flood damage in accordance with applicable safety standards.

Expanded substations or new gas pressure limiting stations that must be located in a special flood hazard area would be designed and constructed to meet or exceed flood-resistant construction standards established by FEMA. These standards ensure that flood conveyance capacities are maintained and that the facilities do not result in additional safety hazards or increased risk through impedance or redirection of flood flows. Based on compliance with applicable floodplain development standards and the location and type of structures that would be placed within a special flood hazard area, it is unlikely that new facilities would increase flood risks. O&M and minor new construction activities would not include additional stormwater discharges or other discharges that would increase the frequency or severity of flooding, and activities would be designed and implemented in accordance with applicable flood and stormwater regulations. Covered activities would not exacerbate flooding or cause flooding in areas that would not be subject to flooding without the covered activity. Therefore, this impact would be less than significant.

Impact WQ-9: Exposure of people or structures to significant risk involving flooding, including flooding as a result of the failure of a levee or dam (Less-than-Significant Impact)

Existing aboveground utility infrastructure in the Permit Area, such as poles, towers, and gas pipeline valves, occupies a very limited footprint that does not consist of structures that introduce new or increased risk of flooding. O&M related to these facilities is part of the environmental baseline. Several reservoirs and associated levees and dams are present within the study area. However, PG&E utility facilities that are located within a mapped flood zone or dam inundation zone are part of existing conditions. Minor new construction activities would include installing gas or electric lines to extend service to new residential or commercial customers, substation expansions or above-ground gas facilities. These facilities would be built to FEMA construction standards and would not exacerbate future flood hazards as a result of the failure of a levee or dam. Covered activities would not expose people or structures to significant loss associated with flooding. Impacts would be less than significant.

Impact WQ-10: Contribution to inundation by seiche, tsunami, or mudflow (Less-than-Significant Impact)

Seiche occurs in an enclosed or partially enclosed body of water, such as a lake or reservoir. Not all bodies of water have a history of or are subject to inundation by seiche. For example, San Francisco Bay is a large, open body of water with no immediate risk of seiche. Therefore, O&M and minor new construction activities adjacent to the Bay are not at risk of inundation by seiche and there would be minimal to no risk of damage from a seiche event.

Approximately 1.3% of the Permit Area is subject to inundation by tsunami. As noted previously, all nine counties within the study area contain low-lying coastal areas (e.g., marshes, tidal flats) subject to tsunami inundation. The risk of inundation from a tsunami is greatest along an exposed coast and greatly decreases with distance from the coast. O&M activities are ongoing and are part of baseline environmental conditions. Minor new construction activities would not contribute to inundation by tsunami.

Some facilities in the Permit Area are located in or near areas of steeply sloping terrain that may be susceptible to mudflows and landslides, depending on slope, soil type and soil moisture content. However, the continuation of O&M activities would not increase the likelihood of mudflows. Covered activities that disturb more than 1 acre of soil would be subject to the General Construction Permit, a SWPPP, and BMPs, as discussed in Impacts WQ-1, WQ-2, and WQ-4, and would not significantly increase the likelihood of mudflow.

Aboveground facilities would continue to occupy a minimal footprint and minor expansion of substation facilities, as discussed in WQ-2, would not add a significant amount of impermeable surface that would exacerbate mudflow. Therefore, impacts related to flooding from inundation by tsunami, seiche, or mudflow would be less than significant.

3.10.3 References Cited

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3.11 Land Use and Planning

3.11.1 Existing Conditions

3.11.1.1 Regulatory Setting

Federal

There are a number of federally owned lands in the San Francisco Bay Area (Bay Area), each with their own specific land use plans. These lands include Point Reyes National Seashore, Golden Gate National Recreation Area, San Pablo Bay National Wildlife Refuge, Marin Islands National Wildlife Refuge, and Don Edwards San Francisco Bay National Wildlife Refuge.

Coastal Zone Management Act

The authority to evaluate projects conducted, funded, or permitted by the federal government is granted to coastal states through the federal Coastal Zone Management Act of 1972, as amended in 1990 under the Coastal Zone Act Reauthorization Amendments (16 United States Code Section 1451 et seq.). The act requires that federal actions be consistent to the maximum extent practicable with federally approved state coastal plans. Generally, Pacific Gas and Electric Company's (PG&E) operations and maintenance (O&M) activities would likely be exempt from a federal action that may trigger a need for a consistency determination because the activities involve O&M of existing gas and electric infrastructure. However, some O&M activities may require a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers if the covered activity involves fill in waters of the United States, which, when located in the coastal zone, would trigger the need for a consistency determination from the California Coastal Commission.

State

There are several state-owned and managed lands in the Bay Area, each with its own specific land use regulations. These include land under jurisdiction of the California State Lands Commission, California Department of Parks and Recreation, and California Department of Fish and Wildlife.

California Public Utilities Commission

Article VII, Paragraph 5 of the California Constitution, through the state Legislature, vests the California Public Utilities Commission (CPUC) with exclusive jurisdiction over the siting and design of gas and electrical facilities. Natural gas infrastructure is regulated under CPUC General Order (G.O.) 112-E, which is intended to augment federal pipeline safety regulations by providing additional minimum requirements for the design, construction, quality of materials, locations, testing, operations, and maintenance of facilities used in the gathering, transmission, and distribution of gas to safeguard property, and public welfare and to provide adequate service. Electrical utility facilities are regulated under G.O. 131-D, which is similarly aimed at ensuring safety and reliability of service, and which establishes requirements for project review and approval, depending upon the nature and scope of the project.

Article XII, Section 8 of the California Constitution explicitly prohibits municipalities regulating “matters over which the Legislature grants regulating power to the Commission [CPUC].” California Public Utilities Code Section 1007.5 and other California statutes and case law detail the nature and extent of this sole discretionary permitting authority. Because state law has preempted local permitting authority, PG&E is not subject to local land use planning or zoning requirements. Nonetheless, PG&E strives to ensure that its facilities are as consistent as possible with local jurisdictions’ planning guidelines.

California Coastal Act

The California Coastal Act (Coastal Act) regulates coastal development throughout the state. The Coastal Act created a “coastal management zone” that generally extends 3 miles seaward and up to 5 miles inland from the mean high tide line. In particularly important and generally undeveloped areas where there can be considerable impact on the coastline from inland development, the coastal zone may extend to a maximum allowable limit. In developed urban areas, the coastal zone generally extends inland for a much shorter distance. Each city or county government whose jurisdiction includes land in the coastal zone must develop a Local Coastal Program (LCP) for the area, which guides the planning, conservation, and use of coastal resources, must be consistent with the Coastal Act, and must be certified by the California Coastal Commission. Any entity wishing to develop land within the coastal zone must obtain a Coastal Development Permit from the relevant city or county with an approved LCP, and the development plan must be consistent with the policies of the LCP.

McAteer-Petris Act

The McAteer-Petris Act of 1965 (Government Code Section 66000 et seq.), as amended, directs the San Francisco Bay Conservation and Development Commission (BCDC) to exercise its authority to issue or deny permit applications for placing fill, extracting materials, or changing the use of any land, water, or structure within the area of its jurisdiction, in conformity with the provisions and policies of both the McAteer-Petris Act and the San Francisco Bay Plan. BCDC’s jurisdiction consists of the tidal waters of the Bay and a 100-foot shoreline band, salt ponds, managed wetlands, tidal marshes 5 feet above mean sea level, and certain named tributary waterways, such as rivers. The BCDC adopted the San Francisco Bay Plan in 1968. It has been amended periodically since, with the latest amendments in 2011. PG&E currently holds an Administrative Permit (Permit No. M87-74[A]) for the Annual Bay Waters Maintenance Program, which covers maintenance activities within the approximately 100-foot shoreline band at various PG&E facilities located in the study area.

Local

Because the CPUC has exclusive jurisdiction over the siting, design, and construction of PG&E electric and gas facilities, O&M and minor new construction covered activities are not subject to local land use and zoning regulations or discretionary permits. This section identifies local land use plans and regulations for informational purposes and to assist with California Environmental Quality Act (CEQA) review.

General Plans

The most comprehensive local land use planning for the Bay Area region is provided by city and county general plans, which local governments are required by state law to prepare as a guide for future development (Government Code Section 65300 et seq.). General plans are divided into elements, of which seven are required: land use, circulation, housing, conservation, open space,

noise, and safety. Other elements that local governments frequently choose to include in general plans address public facilities, parks and recreation, community design, and growth management. PG&E's utility projects are not subject to local general plan requirements.

Zoning

The city or county zoning code is the set of detailed requirements that implement the general plan policies at the level of the individual parcel. The zoning code presents standards for different uses and identifies which uses are allowed in the various zoning districts of the jurisdiction. State law requires the city or county zoning code to be consistent with the jurisdiction's general plan (Government Code Section 65860).

Although PG&E's utility-related activities are solely regulated by CPUC and are thus not subject to local zoning ordinances, PG&E regularly consults with local cities and counties in locating its projects to ensure that land use issues are considered during the project planning process. O&M and minor construction activities are developed and implemented in such a way as to be consistent with local planning policies, when feasible.

3.11.1.2 Environmental Setting

Extent of Urban Development

According to the Metropolitan Transportation Commission, only about 17.8% of the region's approximately 4.4 million acres were developed in 2010 (Association of Bay Area Governments and Metropolitan Transportation Commission 2013). The remaining undeveloped area includes open space, parks, and agricultural lands, as well as waterbodies (excluding the San Francisco Bay). Figure 3.11-1 illustrates the historical development pattern in the Bay Area since 1990 and agricultural and grazing lands. Comparatively, 28% of the region is identified as protected open space. The amount of land developed in each of the nine counties varies from a low of 5% in Napa County to a high of 80% in San Francisco. The Bay Area encompasses 101 cities in the nine counties. Other major urban centers have formed throughout the region, leading to its overall urbanization. The counties with the largest employment totals are Santa Clara, Alameda, and San Francisco, while the counties with the greatest populations are Santa Clara, Alameda, and Contra Costa.

Land Use Patterns

Since World War II, the Bay Area has grown from a primarily agricultural region with one major city (San Francisco) to the seventh most populous combined metropolitan region in the United States with multiple centers of employment, residential development, and peripheral agricultural areas. The pattern of land uses in the Bay Area includes a mix of open space, agriculture, intensely developed urban centers, a variety of suburban employment and residential areas, and scattered older towns. This pattern reflects the landforms that physically define the region: the Bay, rivers, and valleys. Major urban areas are located around the Bay, with the older centers close to the Golden Gate. Newer urban areas are found in Santa Clara County to the south, the valleys of eastern Contra Costa and Alameda Counties, and Sonoma and Solano Counties to the north. The Pacific Coast area and the northern valleys are primarily in agricultural and open space use, while the agricultural areas adjoining the Central Valley have seen substantial suburban development in recent years, particularly in Solano County and eastern Contra Costa County. Table 3.11-1 shows the land use cover types in the study area by acreage and percentage.

Table 3.11-1. Land Uses in the Study Area

Land Use Type	Acres	% of Total
Agriculture	411,399.12	9.05
Barren/Ruderal	27,398.29	0.60
Dunes	269.97	0.01
Forest	1,442,825.21	31.73
Grassland	1,235,034.15	27.16
Riparian	24,889.33	0.55
Row and Field and Orchard/Vineyard Agriculture	105.37	0.002
Shrubland	395,315.09	8.69
Urban	674,449.18	14.83
Wetland	335,766.20	7.38
Total	4,547,451.90	

Source: CALVEG, Multi-Source FRAP and SFEI Baylands.

Note: totals may be off due to rounding.

Zoning and Land Use Designations

Because the study area encompasses such a large area, the city and county general plan-designated land uses and zoning vary significantly depending upon the location. In undeveloped and rural areas, the primary designated land uses and zoning allow for agriculture, low-density rural residential uses, and public lands and open space. Designated land uses and zoning in more urban areas include commercial, industrial, and medium- to high-density residential uses.

Habitat Conservation Plan/Natural Community Conservation Plans

HCPs and NCCPs have been adopted for portions of the Bay Area. A few of the major conservation plans that cover areas within the study area include the East Contra Costa County HCP and NCCP; San Bruno Mountain Area HCP; Alameda Watershed HCP; Solano Multi-Species HCP; Santa Clara Valley HCP; and CALFED Bay-Delta Program Multi-Species Conservation Strategy. Numerous small project-specific HCPs have also been developed to address localized effects of individual projects. In addition, in 2017, PG&E received approval for its own HCP—PG&E's Bay Area O&M HCP—for coverage of 13 federally listed plants and 18 federally listed wildlife species in the Bay Area.

3.11.2 Environmental Impacts

3.11.2.1 Methods for Analysis

Impacts related to land use and planning were assessed qualitatively based on professional judgment in light of the activities, methods, and techniques currently implemented by PG&E. The impact analysis in this chapter focuses on evaluating potential impacts on existing land uses and local land use plans. Because PG&E has been conducting O&M activities in the study area for more than 30 years, O&M impacts described in this section represent baseline environmental conditions that would not change following approval of the Incidental Take Permit (ITP).

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures
PG&E employs land planners, biologists, cultural resource specialists, environmental field

MAP 1.2 Historical development pattern and agricultural lands.

Source: California Department of Conservation, 2014

MAP 1.2
Historical Development Pattern and Agricultural Lands

HISTORICAL DEVELOPMENT PATTERN

- Developed Area in 1990
- New Urban Development on Non-Urbanized Land (1990-2014)

AGRICULTURAL LANDS

- Farmland
- Grazing Lands

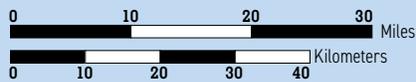
ROADS

- Freeway
- Major Road

2010 POPULATION

- Oakland > 350,000
- Novato 50,000-350,000
- Pacifica < 50,000

28 July 2017



Source: Metropolitan Transportation Commission, 2017

Map is for general information. For more information on local zoning or designations for a particular site or parcel, please contact your city or county.



Figure 3.11-1
Historical Development Pattern and Agricultural Lands

specialists, and other environmental professionals to ensure that ongoing O&M and minor new construction activities are in compliance with applicable state and federal laws and regulations. In accordance with G.O. 131-D, PG&E consults with local (county and city) jurisdictions on certain electric projects concerning land use issues. It also obtains ministerial permits, such as grading and encroachment permits, for both gas and electric projects when necessary.

In addition, PG&E would apply applicable avoidance and minimization measures (AMMs) listed in PG&E's Bay Area O&M HCP to avoid and minimize potential impacts on covered species. These include the following take minimization measures.

- Delineating and avoiding covered species habitat, unique vegetation such as vernal pools, and burrows.
- Locating spoils and burn piles away from covered species habitat and burrows.
- Monitoring by a field biologist, land use planner, and field supervisor during implementation of covered activities.
- Halting work if a covered species individual comes into a work area.
- Limiting activities in Alameda whipsnake core habitat during the winter hibernating period.
- Surveying for species in advance of large covered activities in areas conserved for the benefit of covered species.

Additional AMMs that relate to land use and planning would include the following specific measures.

- Field Protocol (FP)-03: Use existing access and right-of-way (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-10: Minimize the activity footprint and minimize the amount of time spent at a work location to reduce the potential for take of species.
- Hot Zone-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. Covered activities that cannot avoid vernal pool impacts will be completed when pools are clearly dry.

Significance Criteria

In accordance with Appendix G of the State CEQA Guidelines, the potential significance of impacts related to land use from the proposed project and implementation of covered activities was evaluated for each of the following criteria:

- Physical division of an established community.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.

3.11.2.2 Impact Discussion

Impact LU-1: Physically divide an established community (No Impact)

PG&E would continue to implement covered activities associated with O&M of existing facilities and infrastructure within existing ROWs and adjacent areas, and on PG&E-owned properties. Because these activities are part of the existing baseline conditions, they would not create new physical barriers.

Minor new construction activities covered under the ITP consist of new gas pressure limiting stations (PLS), substation expansion, and new lines to extend service to new commercial or residential customers. When conducted in natural vegetation or agricultural lands that contain suitable habitat for covered species, covered gas and electric line work would be limited to O&M within and along existing ROWs and new line extensions up to 2 miles from an existing line. Minor new construction would also be limited to 1.0 acre for a new gas PLS and 3.0 acres for an electric substation expansion. PG&E would construct PLS facilities and expand substations within or adjacent to existing ROWs and PG&E-owned properties. The need for minor new construction activities is solely dictated by customer demand and new development that has been approved by local jurisdictions. Some new or extended facilities would be underground once construction is complete and would not result in new physical barriers. Even when above ground, new towers and poles and their respective lines would typically be located in areas that local planning documents have identified for near-term development and would not, in any case, tend to physically divide an established community.

PG&E electric substation expansions and natural gas PLSs would generally occur to modernize equipment, increase efficiency, and provide additional service capacity. New buildings, where required (e.g., PLS facilities and substation control buildings), would typically be limited to one story or a similar height. Unlike a new airport, highway, or railroad, the size and nature of PG&E's facilities would be insufficient to result in a physical barrier that would divide a community.

In summary, O&M and minor new construction activities would not result in new physical barriers that would divide an established community and would be consistent with existing or planned land uses. Additionally, O&M and minor new construction activities would not conflict with land use and planning laws. No impact would occur.

Impact LU-2: Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect (No Impact)

Utility infrastructure is required as part of local jurisdictions' general plans to serve existing and new development. Both federal and state regulations require the installation, operation, and maintenance of utility facilities, including natural gas pipelines and electrical distribution systems and associated infrastructure. O&M activities currently conducted by PG&E on its electrical and natural gas facilities are part of the existing baseline, and continuing those activities is necessary to continue to support the permitted uses allowed by local land use designations and zoning. Minor new construction activities would also be needed to support existing and proposed development allowed by local land use designations and zoning.

Regulations applicable to PG&E's O&M and minor new construction activities in the study area include those described above in Section 3.11.1.1, *Regulatory Setting*. Because local agencies do not

have jurisdiction over the covered activities, the project would not conflict with any local land use policy, plan, or regulation. PG&E would be required to comply with state and federal regulations where applicable throughout the Bay Area. No changes in land use or zoning would be required as part of the project. Additionally, the project itself would comply with state laws to protect the environment. No impact would result.

3.11.3 References Cited

Association of Bay Area Governments and Metropolitan Transportation Commission. 2013. *Draft Bay Area Plan: Draft Environmental Impact Report*. State Clearinghouse No. 2012062029. April 2013.

Pacific Gas and Electric Company. 2017. *Pacific Gas and Electric Company Bay Area Operations & Maintenance Habitat Conservation Plan*. Final. September. San Francisco, CA. Prepared by ICF, Sacramento, CA.

3.12 Mineral Resources

3.12.1 Existing Conditions

3.12.1.1 Regulatory Setting

Federal

No federal regulations related to mineral resources are applicable to the project.

State

Surface Mining and Reclamation Act of 1975

The California Surface Mining and Reclamation Act (SMARA) of 1975 requires that the State Geologist classify land into mineral resource zones (MRZ) according to the known or inferred mineral potential of the land (Public Resources Code Sections 2710–2796). SMARA was enacted by the California Legislature to address the need for a continuing supply of mineral resources and to prevent or minimize the negative impacts of surface mining on public health, property, and the environment. The Department of Conservation's Office of Mine Reclamation and the State Mining and Geology Board are jointly charged with ensuring proper administration of the SMARA requirements.

SMARA mandates the California Geological Survey to provide economic-geologic expertise to assist in the protection and development of mineral resources through the land-use planning process. The primary products are mineral land classification maps and reports. Local agencies are required to use the classification information when developing land-use plans and when making land-use decisions.

SMARA provides for the evaluation of an area's mineral resources using a system of MRZ classifications that reflect the known or inferred presence and significance of a given mineral resource. The MRZ classifications are based on available geologic information, including geologic mapping and other information on surface exposures, drilling records, mine data, and socioeconomic factors such as market conditions and urban development patterns. The MRZ classifications are defined as follows.

- MRZ-1—areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.
- MRZ-2—areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood for their presence exists.
- MRZ-3—areas containing mineral deposits, the significance of which cannot be evaluated from available data.
- MRZ-4—areas where available information is inadequate for assignment into any other MRZ.

California Assembly Bill 3098 List

The Division of Mine Reclamation publishes daily a list of mines regulated under SMARA that are in compliance with Public Resources Code Section 2717(b). Generally referred to as the “Assembly Bill (AB) 3098 List” in reference to the legislation that established it, this list sets out conditions that mining operations must meet. To be included on the list, an operation must:

- Have an approved reclamation plan.
- Have approved financial assurance.
- Have filed its annual report.
- Have paid its reporting fee.
- Have had its annual inspection by the lead agency that reflects the operation is in full compliance with the law.

Local

Because the California Public Utilities Commission has exclusive jurisdiction over project siting, design, and construction, the project is not subject to local land use and zoning regulations or discretionary permits. The following discussion of general plans is provided for information purposes and to assist with California Environmental Quality Act (CEQA) analysis.

General Plans

California law requires local jurisdictions (including counties and cities) to develop comprehensive, long-term general plans to guide their land use decision making and physical development. Of the seven required “elements,” or chapters, in a general plan, the conservation and open space elements are most applicable to mineral resources. The minerals section of the conservation element should locate and inventory mineral resources designated by the State Mining and Geology Board under the SMARA (Public Resources Code Section 2710 et seq.), and include policies that plan for the protection, use, and development of mineral resources. The element should also locate and plan for the protection, use, and development of rock, sand, and gravel resources, one of the optional issues listed in Government Code Section 65302(d)(2) if those resources are found in the jurisdiction. The open space element should identify areas containing major mineral deposits, including those in short supply (Government Code Section 65560(b)(2)).

3.12.1.2 Environmental Setting

Based on the AB 3098 List (Division of Mine Reclamation 2018), there are 44 active mines in the study area: 7 in Alameda County, 3 in Contra Costa County, 3 in Marin County, 1 in Napa County, 7 in San Francisco County, 3 in San Mateo County, 5 in Santa Clara County, 9 in Solano County, and 6 in Sonoma County. These mines vary in size and are primarily aggregate mines, which produce sand, gravel, and other materials used in building and road construction.

Table 3.12-1 provides a list of active mines in within 2 miles of the Permit Area and the primary products produced.

Table 3.12-1. Active Mines within 2 Miles of the Permit Area

Mine	County	Type	Primary Product
Sunol SMP 33	Alameda	Open pit	Sand and gravel
Sheridan Quarry	Alameda	Quarry	Fill dirt
Sunol	Alameda	Open pit	Sand and gravel
Sunol SMP 24	Alameda	Open pit	Sand and gravel
Mission Valley Rock SMP 32	Alameda	Quarry	Sand and gravel
Eliot	Alameda	Open pit	Sand and gravel
Calmat/Pleasanton	Alameda	Open pit	Sand and gravel
Kellog	Contra Costa	Open pit	Specialty sand
Cemex Clayton Quarry	Contra Costa	Plant or mill, quarry	Sand and gravel
Clayton Quarry	Contra Costa	Quarry	Rock
Point Knox Shoal/SLC Lease No. 2036.1	Marin	Dredge	Sand and gravel
Dutra Materials	Marin	Open pit, plant or mill	Stone
Nicasio Rock Quarry	Marin	Quarry	Stone
4172Redwood/ Silveira Quarry	Marin	Open pit	Sand and gravel
Napa Quarry	Napa	Quarry	Stone
Alcatraz South Shoal/SLC Lease No. 7780.1	San Francisco	Dredge	Sand and gravel
Alcatraz, Presidio, Point Knox/Slc Lease No. 709.1	San Francisco	Dredge	Sand and gravel
Point Knox South/Slc Lease No. 7779.1	San Francisco	Dredge	Sand and gravel
Langley Hill Quarry	San Mateo	Open pit	Rock
Pilarcitos Quarry	San Mateo	Open pit, quarry	Sand and gravel
Marine Oyster Shell Mining	San Mateo	Dredge	Sea shells
Guadalupe Valley Quarry	San Mateo	Quarry	Rock
Freeman Quarry	Santa Clara	Quarry	Sand and gravel
Lexington Quarry	Santa Clara	Quarry	Sand and gravel
Stevens Creek Quarry Plant 1	Santa Clara	Quarry	Sand and gravel
Hanson Permanente Cement Permanente Quarry	Santa Clara	Open pit	Limestone
Curtner Quarry	Santa Clara	Open pit	Fill dirt
Suisun Bay Middle Ground Shoal/SLC Lease No. 7781.1	Solano	Dredge	Sand and gravel
Suisun Bay Marine Middleground TLS39	Solano	Dredge	Sand and gravel
Decker Island	Solano	Dredge, plant or mill	Sand and gravel
Lake Herman Quarry	Solano	Quarry	Stone
Asta Sand Pit	Solano	Quarry	Fill dirt
Rio Vista Sand Pit	Solano	Undetermined	Fill dirt
Potrero Hills Landfill	Solano	Quarry	Sand and gravel

Mine	County	Type	Primary Product
Tule Vista Livestock Company	Solano	Open pit	Sand and gravel
Potrero Hills Quarry	Solano	Open pit, quarry	Sand and gravel
Lakeville Quarry	Sonoma	Quarry	Fill dirt
Name unknown	Sonoma	Quarry	Not reported
Stony Point Rock Quarry Cotati	Sonoma	Open pit	Sand and gravel
Trinity Quarry	Sonoma	Open pit	Not reported
Nuns Canyon Quarry	Sonoma	Open pit	Decorative rock
Canyon Rock Austin Creek	Sonoma	Streambed or gravel bar skimming and pitting	Not reported
Bodean Forestville Quarry	Sonoma	Quarry	Stone
Canyon Rock Co., Inc.	Sonoma	Open pit, plant or mill, quarry	Rock
Canyon Rock Cazadero Quarry	Sonoma	Streambed or gravel bar skimming and pitting, quarry	Rock
Russian River Vested Bars	Sonoma	Streambed or gravel bar skimming and pitting	Sand and gravel
Mark West Quarry	Sonoma	Quarry	Stone
Brooks Quarry	Sonoma	Quarry	Not reported
Twin Bridges	Sonoma	Open pit	Sand and gravel

Source: GIS data.

Note: Not all mines are included on AB 3098 list.

3.12.2 Environmental Impacts

3.12.2.1 Methods for Analysis

The impact analysis in this section focuses on evaluating the potential impacts of Pacific Gas and Electric Company's (PG&E) operations and maintenance (O&M) and minor new construction activities covered by the Incidental Take Permit (ITP) that may result in the loss of availability of a known mineral resource or locally important mineral resource recovery site in the study area. Potential impacts were evaluated qualitatively, based on professional judgment in light of the covered activities and the methods and techniques to implement covered activities, and the additional avoidance and minimization measures that would be enacted under the proposed ITP.

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures

PG&E employs land planners, biologists, cultural resource specialists, environmental field specialists, and other environmental professionals to ensure that O&M and minor new construction activities are in compliance with applicable state and federal laws and regulations. PG&E follows compatible land use policies and practices and, when appropriate, PG&E consults with local (county and city) jurisdictions concerning land use issues and local agency permitting requirements for mineral resources. PG&E does not typically directly affect mineral resources. There are instances where O&M work is done near mines, or oil and gas development wells, but PG&E's activities do not typically result in the temporary or long-term disruption of mineral production. If an activity may

affect these resources, it would be addressed by a PG&E acquisition agent through an appraisal or valuation process that includes negotiation of access and compensation with the landowner in advance of construction activities.

There are no applicable *Bay Area Operations and Maintenance Habitat Conservation Plan* avoidance and minimization measures, or applicant proposed measures.

Significance Criteria

In accordance with Appendix G of the State CEQA Guidelines, the potential significance of impacts related to mineral resources from the proposed project and implementation of covered activities was evaluated for each of the following criteria:

- The loss of availability of a known mineral resource that would be of value to the region and the residents of the state.
- The loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

3.12.2.2 Impact Discussion

Impact MIN-1: Contribute to the loss of availability of a known mineral resource that would be of value to the region and the residents of the state (Less-than-Significant Impact)

Minor new construction activities may be implemented within the Permit Area adjacent to or near areas classified as MRZ-2 or MRZ-3. However, these activities would be in small areas and would likely not be implemented directly on land classified as MRZ-2 or MRZ-3. If construction interfered with mining activities, that interference would be temporary and would be coordinated with the mine owner and operator. Minor new construction activities would, therefore, not contribute to the loss of a known mineral resource of regional or statewide importance.

Ongoing covered O&M activities would require a minimal amount of temporary ground disturbance within existing rights-of-way (ROWs) or on PG&E-owned lands. These activities would not inhibit the ability to recover mineral resources in the future, if such resources are determined to be present. Likewise, work in new ROWs or on land acquired for construction of minor new facilities would require only temporary ground disturbance and would likely not prevent the ability to recover any mineral resources within new utility ROWs if necessary in the future. In urban areas, where many of these ROWs would be located, land designated as MRZ-2 or MRZ-3 is not likely to occur because urban development and mining are considered incompatible land uses. In rural areas, although land designated as MRZ-2 or MRZ-3 could be present, it would likely not be acquired by PG&E for larger facilities because of the higher cost of land with mineral resources. Therefore, ongoing O&M activities and construction of minor new facilities in existing and new ROWs and on PG&E-owned land would not contribute to the loss of a known mineral resource of regional or statewide importance.

Regarding conservation, it is unlikely that land designated as an MRZ-2 or MRZ-3 would be acquired for habitat purposes because of the higher cost of land with mineral resources. Habitat enhancement and management activities would, therefore, not contribute to the loss of a known mineral resource of regional or statewide importance. Therefore, this impact would be less than significant.

Impact MIN-2: Contribute to the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan (Less-than-Significant Impact)

As with Impact MIN-1, covered activities would not significantly affect minerals of local importance because disturbance would not occur or would be temporary and would not contribute to the loss of a mineral resource of local importance. Therefore, this impact would be less than significant.

3.12.3 References Cited

Division of Mine Reclamation. 2018. *AB3098 List*. Last revised: August 30, 2018. Available: <ftp://ftp.consrv.ca.gov/pub/omr/AB3098%20List/AB3908List.pdf>. Accessed: August 30, 2018.

3.13 Noise

3.13.1 Existing Conditions

3.13.1.1 Sound, Acoustics, and Noise Background

Sound travels through the air as pressure waves caused by some type of vibration. In general, sound waves travel away from a noise source at ground level in a hemispherical pattern. The energy contained in a sound wave is spread over an increasing area as it travels away from the source, so loudness decreases at greater distances from the noise source.

Noise is commonly defined as unwanted sound that annoys or disturbs people and potentially causes an adverse psychological or physiological effect on human health. Because noise is an environmental pollutant that can interfere with human activities, an evaluation of noise is necessary when considering the environmental impacts of a proposed project.

Sound level meters measure the air pressure fluctuations caused by sound waves, with separate measurements made for different sound frequency ranges. The decibel (dB) scale for describing sound uses a logarithmic scale to account for the large range of audible sound intensities. Most sounds consist of a broad range of sound frequencies, and several frequency-weighting schemes have been used to develop composite dB scales that approximate the way the human ear responds to noise levels. Because the human ear is not equally sensitive to all frequencies in the entire spectrum, noise measurements are weighted more heavily for frequencies to which humans are sensitive. The “A-weighted” dB scale (dBA) is the most widely used for environmental noise assessments. Typical A-weighted noise levels for various types of sound sources are summarized in Table 3.13-1.

Table 3.13-1. Typical A-Weighted Sound Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	—110—	Rock band
Jet flyover at 1,000 feet		
	—100—	
Gas lawnmower at 3 feet		
	—90—	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	—80—	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower at 100 feet	—70—	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	—60—	
		Large business office
Quiet urban daytime	—50—	Dishwasher in next room

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Quiet urban nighttime	—40—	Theater, large conference room (background)
Quiet suburban nighttime	—30—	Library
Quiet rural nighttime	—20—	Bedroom at night, concert hall (background)
	—10—	Broadcast/recording studio
	—0—	

Source: California Department of Transportation 2013

Different types of measurements are used to characterize the time-varying nature of sound. These measurements include the equivalent sound level (L_{eq}), the minimum and maximum sound levels (L_{min} and L_{max}), percentile-exceeded sound levels (such as L_{10} , L_{20}), the day-night sound level (L_{dn}), and the community noise equivalent level (CNEL). L_{dn} and CNEL values differ by less than 1 dB. As a matter of practice, L_{dn} and CNEL values are considered to be equivalent and are treated as such. These measurements are defined in Table 3.13-2.

Table 3.13-2. Definition of Sound Measurements

Sound Measurements	Definition
Decibel (dB)	A unitless measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals.
A-Weighted Decibel (dBA)	An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
Maximum Sound Level (L_{max})	The maximum sound level measured during the measurement period.
Minimum Sound Level (L_{min})	The minimum sound level measured during the measurement period.
Equivalent Sound Level (L_{eq})	The equivalent steady state sound level that in a stated period of time would contain the same acoustical energy.
Percentile-Exceeded Sound Level (L_{xx})	The sound level exceeded xx % of a specific time period. L_{10} is the sound level exceeded 10% of the time. L_{90} is the sound level exceeded 90% of the time. L_{90} is often considered to be representative of the background noise level in a given area.
Day-Night Level (L_{dn})	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
Community Noise Equivalent Level (CNEL)	The energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the A-weighted sound levels occurring during the period from 7:00 p.m. to 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.

Sound Measurements	Definition
Peak Particle Velocity (PPV)	A measurement of ground vibration defined as the maximum speed (measured in inches per second) at which a particle in the ground is moving relative to its inactive state. PPV is usually expressed in inches/second.
Frequency: Hertz (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure.

The nature of dB scales is such that individual dB ratings for different noise sources cannot be added directly to give the sound level for the combined noise source. Instead, the combined noise level produced by multiple noise sources is calculated using logarithmic summation. For example, if one bulldozer produces a noise level of 80 dBA, then two bulldozers operating side by side would generate a combined noise level of 83 dBA, or 3 dBA louder than the single bulldozer.

In general, human sound perception is such that a change in sound level of 1 dB cannot typically be perceived by the human ear, a change of 3 dB is barely noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving the sound level as it increases or decreases, respectively.

When distance is the only factor considered, sound levels from isolated point sources of noise typically decrease by about 6 dB for every doubling of distance from the noise source. When the noise source is a continuous line, such as vehicle traffic on a highway, sound levels decrease by about 3 dB for every doubling of distance. Noise levels can also be affected by several factors other than the distance from the noise source. Topographic features and structural barriers that absorb, reflect, or scatter sound waves can affect the reduction of noise levels. Atmospheric conditions (wind speed and direction, humidity levels, and temperatures) and the presence of dense vegetation can also affect the degree of sound attenuation.

Groundborne Vibration Background

In addition to generating noise, heavy construction equipment can generate groundborne vibration. Pile driving and similar activities impact the earth's surface and create vibrational waves that radiate outward and downward, away from the point of impact. Such an effect can be an annoyance to nearby noise-sensitive receptors (defined as persons, places, or wildlife that could be adversely affected by noise or vibration) and have the potential to cause structural damage to nearby buildings.

Although groundborne vibration from construction activities usually does not reach the levels that can damage structures, vibration from construction activities can still be heard and felt at buildings near the construction site. A possible exception is the case of fragile buildings, many of them old, where special care must be taken to avoid damage. Construction activities that typically generate the most severe vibrations are blasting and impact pile driving. These activities are rarely employed for Pacific Gas and Electric Company's (PG&E) operations and maintenance (O&M) and minor new construction projects.

As vibrations travel away from the source, they excite the particles of rock and soil through which they pass and cause them to oscillate by a few ten-thousandths to a few thousandths of an inch. Differences in subsurface geologic conditions and distance from the source of vibration directly influence the vibration frequency and intensity. In all cases, vibration amplitudes decrease with

distance. The maximum rate or velocity of particle movement is the commonly accepted descriptor of the vibration “strength.” This is referred to as the peak particle velocity (PPV) and is typically measured in inches per second.

Vibration amplitude attenuates (or decreases) over distance. This attenuation is a complex function of how energy is imparted into the ground as well as the soil or rock conditions through which the vibration is traveling. Variations in geology can result in different vibration levels. Perceptible groundborne vibration from construction equipment is generally limited to areas within a few hundred feet of construction activities. Table 3.13-3 summarizes typical vibration levels generated by construction equipment at a reference distance of 25 feet and other distances.

Table 3.13-3. Vibration Source Levels for Construction Equipment

Equipment	PPV at 25 Feet	PPV at 50 Feet	PPV at 75 Feet	PPV at 100 Feet	PPV at 175 Feet
Pile driver (impact)	1.518	0.5367	0.2921	0.1898	0.0820
Pile driver (sonic/vibratory)	0.734	0.2595	0.1413	0.0918	0.0396
Hoe ram	0.089	0.0315	0.0171	0.0111	0.0048
Large bulldozer	0.089	0.0315	0.0171	0.0111	0.0048
Loaded trucks	0.076	0.0269	0.0146	0.0095	0.0041
Jackhammer	0.035	0.0124	0.0067	0.0044	0.0019
Small bulldozer	0.003	0.0011	0.0006	0.0004	0.0002

Source: California Department of Transportation 2013.

PPV = peak particle velocity

Human response to vibration is difficult to quantify. Vibration can be felt or heard at levels far less than those that produce any damage to structures. The duration and frequency of the event influence human response. Generally, as the duration and vibration frequency increase, the potential for adverse human response grows. Tables 3.13-4 and 3.13-5 summarize the guidelines developed by the California Department of Transportation for damage and human annoyance from the transient and continuous vibration that is usually associated with construction activity.

Table 3.13-4. Vibration Damage Potential, Threshold Criteria Guidelines

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/ Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: California Department of Transportation 2013.

Note: Transient sources create a single, isolated vibration event (e.g., blasting or drop balls). Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

PPV = peak particle velocity

in/sec = inches per second

Table 3.13-5. Vibration Annoyance Potential, Criteria Guidelines

Human Response	Maximum PPV (inches/second)	
	Transient Sources	Continuous/ Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

Source: California Department of Transportation 2013.

Note: Transient sources create a single, isolated vibration event (e.g., blasting or drop balls). Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

PPV = peak particle velocity

Impact pile drivers, small hand-held soil compactors (“pogo-stick” compactors), equipment that breaks and re-seats pavement (crack-and-seat equipment), excavation equipment, static compaction equipment, tracked vehicles, vehicles on highways, vibratory pile drivers, pile-extraction equipment, and vibratory compaction equipment are typically associated with continuous vibration. The activities that are typically associated with single-impact (transient) or low-rate, repeated impact vibration include blasting and the use of drop balls or dropped metal plates (California Department of Transportation 2013).

3.13.1.2 Regulatory Setting

Federal, state, and local agencies regulate different aspects of environmental noise. Generally, the federal government sets noise standards for transportation-related noise sources that are closely linked to interstate commerce. These sources include aircraft, locomotives, and trucks. The state government sets noise standards for transportation noise sources such as automobiles, light trucks, and motorcycles. Noise sources associated with industrial, commercial, and construction activities are generally subject to local control through noise ordinances and general plan policies. Local general plans identify general principles that are intended to guide and influence development plans.

Federal

No federal noise standards are directly applicable to the project.

State

No state noise regulations are directly applicable to the project.

Local

Because the California Public Utilities Commission has exclusive jurisdiction over project siting, design, and construction, the project is not subject to local noise regulations or discretionary permits. The following discussion of local regulation is provided for information purposes and to assist with California Environmental Quality Act (CEQA) review.

Local General Plans

Cities and counties (including those within the study area) adopt a noise element, or include noise guidelines and policies in other relevant elements, as part of their general plans. This helps the local jurisdiction identify land use compatibility standards and related goals and policies for achieving land use compatibility between the noise environment and development. The noise element typically assesses current and projected future noise levels associated with local noise sources, including traffic, trains, aircraft, and industrial operations. Local jurisdictions may adopt their own noise exposure goals and policies, which may or may not be the same or similar to those recommended by the state.

In general, noise-sensitive land uses are compatible with exterior transportation-related noise exposure not exceeding 65 dB L_{dn} /CNEL. Additionally, interior noise exposure (from transportation sources) should not exceed 45 dB L_{dn} /CNEL within noise-sensitive spaces. The standards within the noise element of locally adopted general plans are for planning purposes and are not generally intended to address noise complaints or other code compliance issues. Cities and counties often provide noise level performance standards or guidelines for non-transportation noise sources (e.g., commercial/industrial facilities, mechanical equipment). These standards are used to address intermittent noise exposure, and are often expressed in terms of L_{eq} or L_{max} . These criteria are sometimes tied directly to the standards presented in the noise ordinance of the city or county code.

Local Noise Ordinances

In addition to general plan noise element goals and policies, local jurisdictions often regulate noise exposure through enforcement of a noise ordinance. The noise ordinance is generally applied to address noise complaints associated with non-transportation sources (e.g., public address systems, mechanical equipment), and often addresses construction noise exposure and production limits. Noise exposure criteria presented within local codes should match any performance criteria that may be presented in the noise element of the general plan for the given jurisdiction, if applicable. Although exact time periods differ, most jurisdictions exempt construction noise from local noise limits during daylight hours (or a similar restriction) from Monday through Saturday.

3.13.1.3 Environmental Setting

The existing noise environment in the study area has two primary categories of noise sources: transportation and non-transportation. Transportation sources include surface vehicle traffic; railroad train operations, including light rail and commuter trains; and aircraft operations. Non-transportation, or stationary and fixed sources, include commercial/industrial equipment, construction equipment, and any other sources not associated with the transportation of people or goods. Existing noise exposure in the San Francisco Bay Area (Bay Area) associated with these primary noise sources is presented below.

Traffic Noise Sources

The ambient noise environment in the study area is defined by a wide variety of noise sources. However, traffic noise is the most common noise source in urban areas such as the study area. Traffic noise exposure is primarily a function of the volume of vehicles per day, the speed of those vehicles, the number of those vehicles represented by medium and heavy trucks, the distribution of those vehicles during daytime and nighttime hours, and the proximity of noise-sensitive receivers to the roadway. Existing traffic noise exposure is expected to be as low as 50 dB L_{dn} in the most isolated and less frequented locations of the study area, while receivers near heavily traveled highways are likely to experience levels as high as 75 dB L_{dn} .

Rail Noise Sources

Another common noise source in the Bay Area is rail noise from freight and passenger rail operations. Although these operations can generate substantial noise levels in the immediate vicinity of the railways, train operations are intermittent and area railways are widely dispersed. The contribution of rail noise to the overall ambient noise environment in the study area is relatively minor compared with other sources such as traffic. Train operations may be a source of groundborne vibration near the tracks, and vibration-sensitive receivers within 100 feet of rail operations may be adversely affected by vibration exposure during train events. However, because railways are widely dispersed in the study area, train vibration does not affect the majority of sensitive land uses in the study area.

Aircraft Noise Sources

Many airports are located within the study area, including public use, private use, and military facilities. There are 33 public use airports within 0.5 mile of PG&E facilities in the study area. Major airports include San Francisco International, Oakland International, and Norman Y. Mineta San Jose International airports. In addition to the numerous daily aircraft operations originating and terminating at these facilities, aircraft not utilizing these airports frequently fly over the study area. All of these operations contribute to the overall ambient noise environment. In general, as described for rail noise, the proximity of the receiver to the airport and aircraft flight path determines the noise exposure. Other contributing factors include the type of aircraft operated, altitude of the aircraft, and atmospheric conditions. Noise levels from aircraft activity are generally higher in close proximity to airports. Not all sensitive receptors in the study area are located close enough to airports to be substantially affected by aircraft noise.

Construction Noise Sources

New development and other construction activities generally result in short-term noise increases. Noise associated with heavy equipment, including equipment with diesel engines, often dominates the noise environment in the vicinity of construction sites. Stationary sources such as generators, pumps, and compressors also contribute to the overall noise environment. However, the noisiest construction operations are those requiring the use of impact equipment (e.g., pile driving, pavement breaking); these types of activities generally produce the highest noise levels of any construction equipment, and may also produce vibration that can be perceptible in the vicinity of the construction areas.

Industrial and Other Non-transportation Noise Sources

A wide variety of industrial and other non-transportation noise sources are located within the study area. These types of facilities include manufacturing plants, landfills, water and wastewater treatment plants, power generation facilities, food packaging plants, lumber mills, and aggregate mining facilities. The noise levels generated by these sources can vary, but generally contribute to the noise environment in the immediate vicinity of the noise source.

3.13.2 Environmental Impacts

3.13.2.1 Methods for Analysis

Impacts related to noise and vibration were assessed qualitatively based on professional judgment in light of the activities, methods, and techniques currently implemented by PG&E. Because PG&E has been conducting O&M activities in the study area for more than 30 years, the O&M impacts described in this section represent baseline environmental conditions that would not change following approval of the Incidental Take Permit (ITP).

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures

PG&E's *Bay Area Operations and Maintenance Habitat Conservation Plan* contains no avoidance and minimization measures specifically related to noise. PG&E will implement the following applicant proposed measures (APMs) to reduce noise impacts associated with minor new construction activities.

APM NOI-1: Restrict construction hours

Planned construction activities within 900 feet of occupied residential parcels that require the use of off-road construction equipment will be consistent with local noise ordinance guidelines, which typically limit construction noise to daylight hours, or a similar restriction. Should work in these locations be required outside of these hours due to safety or clearance requirements, construction would be limited to the minimum necessary and would proceed as expediently as safely possible to reach a safe and convenient stopping point.

APM NOI-2: Limit noise during construction near occupied residences

When using off-road construction equipment to conduct construction activities within 250 feet of occupied residences, PG&E will use "quiet" equipment (i.e., equipment designed with noise control elements), standard equipment fitted with noise control devices (e.g., mufflers), or other noise-reduction measures as feasible to limit construction noise to within local noise ordinance limits.

Significance Criteria

In accordance with Appendix G of the State CEQA Guidelines, the potential significance of noise impacts from the proposed project and implementation of covered activities was evaluated for each of the following criteria:

- Exposure of persons to or generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, exposure of people residing or working in the project area to excessive noise levels.

3.13.2.2 Impact Discussion

Impact NOI-1: Exposure of persons to or generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies (Less-than-Significant Impact with Mitigation)

Covered activities could result in the generation of noise from on-road vehicle movement, the use of mobile and stationary equipment, painting and asphalt paving, and earthmoving (e.g., grading). Noise-generating equipment and vehicles may be used during operational activities, maintenance activities, or construction activities, which are each described below. In general, noise effects would vary depending on the type of activity, length of the activity, and the types and numbers of equipment operating.

Operational activities, which would be a continuation of ongoing activities, typically include inspecting, monitoring, testing, and operating valves, enclosures, switches, and other components. These activities involve utility personnel working at existing facilities for discrete and designated periods of time. Although the construction of some new features may occur (e.g., expanded electrical substations, gas pressure limiting stations [PLSs], new electrical distribution/transmission line construction, new customer/business gas pipeline installation) that could generate some operational noise related to the operation of power transformers, switchyards, and other equipment, the types of facilities that would be constructed would generally be adjacent to existing PG&E facilities and would generate noise levels similar to those of the existing facilities. Any replacement of existing facilities would be in kind. In general, most operational activities involving vehicles are and would continue to be minor and temporary, involving few vehicle trips and little noise generation. Relative to existing conditions, noise generated by operational activities are not expected to increase over the 30-year term of the ITP. Noise impacts related to operations would be less than significant.

Maintenance activities include repairing and replacing facilities, structures, and access roads. This work also includes emergency repair and replacement and vegetation management, including tree pruning and removal. Maintenance activities typically involve vehicle trips and, at times, the use of heavy-duty equipment when required for facility repair or replacement. Noise would also result from earthmoving or paving, when required as maintenance. Most maintenance activities are small in scale and short term. Activities requiring the most intensive equipment and vehicle use are pipeline replacement and reconductoring. Noise from pipeline replacement and reconductoring originates from mobile and stationary construction equipment, and employee and haul truck vehicle trips. Pipeline replacement may also involve trenching, which generates noise. Similar to operational activities, maintenance activities would be a continuation of ongoing activities, and noise generated

by these activities would not be expected to increase relative to existing conditions over the 30-year term of the ITP. Noise impacts related to maintenance activities would be less than significant.

Minor new construction activities include installing new gas PLS, substation expansion, and new lines to extend service to locally approved new residential or commercial customers. As discussed in Chapter 2, *Project Description*, there are limitations on the size and types of activities that count as minor new construction under the ITP. Noise would result from the use of mobile and stationary construction equipment, employee and haul truck vehicle trips, and land clearing. Activities on linear projects would not take place at one location and most construction activities would be relatively small in scale (e.g., an average of 0.23 acre of permanent disturbance for each new distribution/transmission line project, and an average of 0.29 acre of disturbance for each electric tower line construction project). Likewise, depending on the activity, minor new construction activities would occur no more than two times per year per activity (refer to Table 2-2 in Chapter 2).

The noise impacts associated with a specific construction activity would depend on the type and duration of the activity, and the types and number of pieces of equipment in use at a given time. Other factors, such as the distance between the activity and any noise-sensitive receivers and any shielding effects that might result from local topography, vegetation, or buildings, also affect the level of potential noise impacts from construction activities.

Noise associated with minor new construction covered activities would be generated primarily by the following sources.

- Vehicles (e.g., trucks, helicopters, and fixed-wing light aircraft, all-terrain vehicles) used for inspection patrols and employee access trips.
- Heavy machinery (e.g., cranes, excavators, scrapers) used for maintenance and construction of PG&E facilities and infrastructure.
- Smaller equipment (e.g., chainsaws, generators) used for a variety of O&M activities.

Minor new construction with the greatest likelihood to generate noise would be new customer pipeline installation, new distribution and transmission line construction, electric tower line construction, new gas PLS, and minor substation expansion. Based on the equipment used, noise from these types of construction activities vary. Table 3.13-6 presents typical noise levels generated by equipment that may be used in minor new construction activities.

Table 3.13-6. Typical Noise Generation for Commonly Used Construction Equipment

Equipment	Typical L _{max} Noise Level (dBA) 50 Feet from Source	Equipment	Typical L _{max} Noise Level (dBA) 50 Feet from Source
Air compressor	78	Grader	85
Backhoe	78	Helicopter (single rotor) ^a	91
Bulldozer	82	Jackhammer	85
Chainsaw	85	Front-end loader	80
Compactor	80	Paver	85
Concrete mixer	85	Pile driver (impact)	101
Concrete pump	82	Pile driver (vibratory)	101
Vibratory concrete mixer	80	Pneumatic tool	85
Crane	85	Pump	77

Equipment	Typical L _{max} Noise Level (dBA) 50 Feet from Source	Equipment	Typical L _{max} Noise Level (dBA) 50 Feet from Source
Concrete saw	90	Rock drill	85
Dump truck	84	Roller	85
Excavator	85	Scraper	85
Generator	82		

Source: Federal Transit Administration 2018.

dBA = A-weighted decibel

L_{max} = maximum sound level

^a At 500 feet (rather than 50 feet) under level flight conditions (Nelson 1987)

Depending on where the project is located, existing ambient noise levels would vary. Urban areas typically have higher sound levels than rural and less developed areas. Areas near highways, rail lines and switching yards, and airports experience some of the highest sound levels. Conversely, national and state parks, national forests, natural preserves, and grazing lands have some of the lowest sound levels. However, natural resource extraction and timber harvesting equipment, trucks, and off-road vehicles may generate substantial noise and vibration even in remote areas. In general, the ambient noise levels in rural areas near rivers and waterways are typically lower than those in metropolitan areas, because there are often fewer noise sources in rural areas. Refer to Table 3.13-7 for approximate average L_{dn} noise levels for various types of locations.

Table 3.13-7. Approximate Average L_{dn} Noise Levels for Various Locations

Qualitative Description of Location	Average L _{dn} in dBA
Rural	40–50
Small town or quiet suburban residential	50
Normal suburban residential	55
Urban residential	60
Noisy urban residential	65
Very noisy urban residential	70
Downtown, major metropolis	75–80
Adjoining freeway or near major airport	80–90

Source: Hoover & Keith 2000.

dBA = A-weighted decibels.

L_{dn} = day-night average level noise.

As shown in Table 3.13-6, temporary noise generated by individual construction equipment used for construction activities would have the potential to result in noise levels that could increase the overall ambient level at a given location, depending on the nature of that location (e.g., if it is rural vs. suburban vs. urban; refer to Table 3.13-7).

Although temporary noise increases may result from construction activities, PG&E would schedule its construction activities, when feasible, to be consistent with local noise requirements contained in the city municipal code or county code, which are generally construction hours. When it is not feasible to comply with local construction-hour requirements, or when working close to noise-sensitive land uses, measures would be incorporated to reduce noise to the extent possible.

Construction noise would be temporary and short-term, because all construction-related projects would be relatively small in scale. In addition, construction for linear projects (e.g., pipeline installation, new electric line construction) would move linearly along the path of the feature, and would not be located in the same location (or near the same sensitive uses) for the duration of the project's construction period. To reduce any potentially-significant impacts from temporary construction noise, all construction activities would also be subject to PG&E's APMs, described previously. APM NOI-1 requires that construction activities within 900 feet of occupied residential parcels comply with the local noise ordinance when feasible, which typically limits construction noise to daytime hours. APM NOI-2 includes a provision to use "quiet" equipment or ensure equipment used is fitted with noise control devices (such as mufflers), blanket or other method to reduce noise from equipment to the extent feasible. With the incorporation of these APMs, temporary and intermittent noise impacts from small-scale construction activities under the project would be less than significant.

Impact NOI-2: Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels (Less-than-Significant Impact)

Operational activities and maintenance activities would not change from baseline conditions so there would be no vibration impacts related to project O&M. \

Minor new construction activities may generate groundborne vibration. Vibration from most (nonimpact) construction and earthmoving activities is typically considered to result in a significant impact if it is the potential to cause sleep disturbance. Typically, if vibration levels exceed the "strongly perceptible" threshold of 0.1 PPV in/sec (refer to Table 3.13-5) during nighttime hours when people commonly sleep, a potentially significant impact related to vibration annoyance could occur. Refer to Table 3.13-8 for vibration levels of typical construction equipment at a distance of 25 feet. As shown in this table, vibration levels from the majority of construction equipment (except for pile drivers) result in vibration levels below the 0.1 PPV inch/second strongly perceptible threshold at 25 feet.

Table 3.13-8. Vibration Source Levels for Construction Equipment

Equipment	PPV at 25 Feet
Pile driver (impact)	1.518
Pile driver (sonic/vibratory)	0.734
Hoe ram	0.089
Large bulldozer	0.089
Loaded trucks	0.076
Jackhammer	0.035
Small bulldozer	0.003

Source: California Department of Transportation 2013.

PPV = peak particle velocity

Although the precise construction equipment proposed for project construction activities is not known at this time, APM NOI-1 would limit construction activities to during daytime hours (when people are less susceptible to the effects of vibration) to the extent feasible. In addition, adverse

effects related to vibration are most often associated with “high impact” activities such as pile driving. No pile driving would occur during nighttime hours for project construction activities, and limited pile driving would be expected to occur overall.

Although vibration could temporarily be perceptible depending on the proximity of sensitive receptors to vibration-generating activity, any such occurrences would be intermittent and temporary and not expected to occur during nighttime hours. Any potential short-term and intermittent daytime vibration effects associated with minor new construction activities would likely be imperceptible and not be expected to cause sleep disturbances, and, thus, would be less than significant.

In addition, with regard to potential operational vibration, any vibration resulting from the operation of new facilities (e.g., expanded electrical substations and gas PLSs) would be low because vibration is most commonly generated from ground-disturbing activities (e.g., earthmoving equipment), and the operation of facilities would not involve the use of earthmoving activities. Vibration impacts related to project operations would also be less than significant.

Impact NOI-3: For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, exposure of people residing or working in the project area to excessive noise levels. (Less-than-Significant Impact)

Major airports in the study area include San Francisco International, Oakland International, and Norman Y. Mineta San Jose International. In addition, several private airstrips are located in the study area. Because airports and private air strips are located in the study area, there is potential for minor new construction activities to be implemented near a private airstrip or within an area covered under an adopted airport land use plan. PG&E’s utility projects are not within the jurisdiction of such local airport land use plans. Any increases in noise levels near minor new construction activities during construction would be short term, intermittent, and temporary. In addition, because covered activities would not involve the siting of any new residences, covered activities would not expose new residents in the area to excessive noise from public airports.

Depending on the proximity of minor new construction activities to an existing airport or private airstrip, there is potential for construction workers to be exposed to elevated noise levels from airport operations. However, compliance with Occupational Safety and Health Administration regulations (29 Code of Federal Regulations 1926: 1926.52, Occupational Noise Exposure, and 1926.101, Hearing Protection) would be expected to protect workers from potential harmful effects of aircraft noise. Therefore, impacts related to the exposure of people residing or working in the project area to excessive aircraft noise from public airports or private airstrips would be less than significant.

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3.14 Population and Housing

3.14.1 Existing Conditions

3.14.1.1 Regulatory Setting

No regulatory background information is relevant to addressing impacts of the project or covered activities on population and housing.

3.14.1.2 Environmental Setting

Population

As shown in Table 3.14-1, the nine counties of the study area—Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma—have populations ranging from a high of 1,919,402 (Santa Clara) to a low of 142,166 (Napa), based on recent U.S. Census estimates. The populations of all nine counties have grown since 2010, with Alameda County experiencing the highest percent increase at 9.1% and Marin County having the lowest percent increase at 3.3%. Plan Bay Area 2040 estimates approximately 2.5 million new residents in 9 San Francisco Bay Area counties over the next 20 years (2020–2040) (Association of Bay Area Governments 2017). Figure 3.14-1 illustrates the population densities of incorporated communities within the study area.

Table 3.14-1. Population Totals and Trends in Study Area

County	2010 Population	2016 Population	Percent Increase
Alameda	1,510,261	1,647,704	9.1%
Contra Costa	1,049,200	1,135,127	8.2%
Marin	252,409	260,651	3.3%
Napa	136,530	142,166	4.1%
San Francisco	805,193	870,887	8.2%
San Mateo	718,498	764,797	6.4%
Santa Clara	1,781,672	1,919,402	7.7%
Solano	413,344	440,207	6.5%
Sonoma	483,880	503,070	4.0%

Source: U.S. Census Bureau 2017.

Housing

As demonstrated in Table 3.14-2, housing unit totals ranged from approximately 665,061 in Santa Clara County to approximately 55,531 in Napa County as of 2016. In 2010, housing unit totals ranged as low as 54,759 in Napa County to 631,920 in Santa Clara County.

Table 3.14-2. Housing Totals and Trends in Study Area

County	2010 Number of Housing Units	2016 Number of Housing Units
Alameda	582,549	599,732
Contra Costa	400,263	410,753
Marin	111,214	112,882
Napa	54,759	55,531
San Francisco	376,942	392,795
San Mateo	271,031	275,947
Santa Clara	631,920	665,061
Solano	152,698	156,819
Sonoma	204,572	208,150

Source: U.S. Census Bureau 2017.

3.14.2 Environmental Impacts

3.14.2.1 Methods for Analysis

Impacts related to population and housing were assessed qualitatively based on professional judgment in light of the activities, methods, and techniques currently implemented by Pacific Gas and Electric Company (PG&E). Because PG&E has conducted operations and maintenance (O&M) activities in the study area for more than 30 years, the O&M impacts described in this section represent baseline environmental conditions that would not change following approval of the Incidental Take Permit.

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures

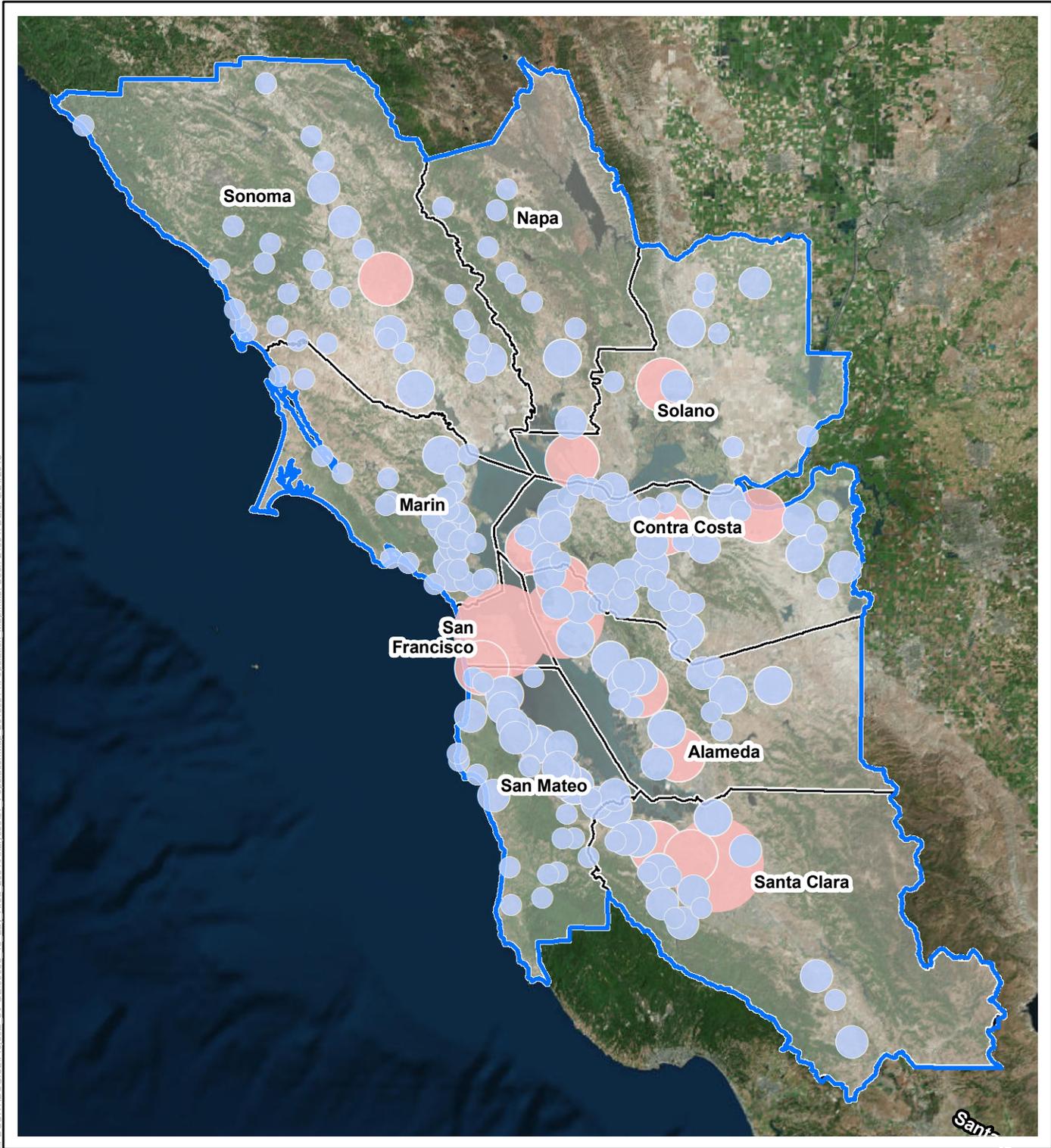
No practices, avoidance and minimization measures from PG&E's Bay Area *Operations and Maintenance Habitat Conservation Plan* or applicant proposed measures are applicable to population and housing.

Significance Criteria

In accordance with Appendix G of the State CEQA Guidelines, the potential significance of impacts related to population and housing from the proposed project and implementation of covered activities was evaluated for each of the following criteria:

- Creation of substantial unplanned population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure).
- Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere.

J:\PDC\ITRD\SIS2\Projects_3\PE\00066_18_Bay_Area_2081\Analyses\07_PopulationMap_20180514\Population_Map.mxd; User: 20991; Date: 5/24/2018



Legend

- Study Area
- Counties

Population

- 500,000 - 999,999
- 250,000 - 499,999
- 100,000 - 249,999
- 50,000 - 99,999
- 10,001 - 49,999
- Less than 10,000



0 10 20
Miles
1:1,200,000



Figure 3-14.1
Population Dot Map

3.14.2.2 Impact Discussion

Impact POP-1: Create substantial unplanned population growth in an area, either directly or indirectly (Less-than-Significant Impact)

Covered activities associated with O&M of existing electrical and gas facilities would be a continuation of existing O&M activities. These activities are intended to ensure delivery of reliable and safe energy to PG&E customers. O&M covered activities would not provide additional infrastructure that could directly or indirectly induce population growth. Regarding minor new construction activities, local jurisdictions typically carry out infrastructure planning concurrent with land use planning. Therefore, minor new construction activities are specifically intended to support development patterns identified in approved general plans. Minor new construction covered activities themselves would not create substantial population growth.

Crews for each covered activity would typically involve fewer than 16 people. This crew size is a similar crew size to those currently working on PG&E's O&M activities and would not represent an increase from baseline conditions. Covered activities would be performed by existing PG&E employees, and sufficient temporary housing exists in the area for the fraction of the workforce that would require temporary lodging during a particular activity.

Covered activities associated with habitat management and enhancement would involve small crews undertaking land management activities on undeveloped land that provides or could provide habitat for covered species. Such activities would have no effect on population growth.

Thus, covered activities would not induce substantial unplanned population growth in the area, and the impact would be less than significant.

Impact POP-2: Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere (No Impact)

No people or housing units would be displaced as a result of the O&M covered activities because these ongoing activities would primarily be conducted on existing pipelines and electrical facilities within or adjacent to existing PG&E rights-of-way (ROWs) and on PG&E-owned properties. Minor new construction activities are generally required to support development patterns identified in approved general plans. Although temporary construction easements and new ROWs and fee property acquisitions to support extension of existing infrastructure and expansion of existing facilities may be required, the facilities would be sited to avoid displacement of people or housing. Covered activities associated with habitat management and enhancement would involve designation and management of undeveloped land that provides or could provide habitat for covered species. Such land contains no residents or housing. Therefore, there would be no impact.

3.14.3 References Cited

Association of Bay Area Governments. 2017. Plan Bay Area 2040 Projections 2040 Forecasts for Population, Household and Employment for the Nine County San Francisco Bay Area Region. Available: <http://projections.planbayarea.org/>. Accessed: September 10, 2020.

U.S. Census Bureau. 2017. *State and County Quick Facts*. Online. Available: <http://www.census.gov/quickfacts/table>. Accessed: February 22, 2018.

3.15 Public Services

3.15.1 Existing Conditions

3.15.1.1 Regulatory Setting

Federal

No federal regulations pertaining to public services are applicable to the project.

State

California Fire Code

Title 24 of the California Code of Regulations is the California Building Standards Code, most recently updated July 1, 2016, with an effective date of January 1, 2017. The code contains complete regulations and general construction building standards of state adopting agencies, including administrative, fire and life safety, and field inspection provisions. Part 9 refers specifically to the California Fire Code, published every 3 years, which contains fire safety-related building standards referenced in other parts of Title 24.

Local

Because the California Public Utilities Commission has exclusive jurisdiction over project siting, design, and construction, the project is not subject to local land use and zoning regulations or discretionary permits with regard to public services. The following discussion of general plans is provided for information purposes and to assist with California Environmental Quality Act (CEQA) analysis.

General Plans

California law requires counties and cities to develop comprehensive, long-term general plans to guide their land use decision making and physical development (Government Code Section 65300 et seq.). Of the seven required elements, or chapters, in a general plan, the safety element is most applicable to public services. The safety element establishes policies and programs to protect the community with public services that protect against and respond to seismic, geologic, flood, and wildfire hazards.

Other related general plan elements include the conservation and open space elements, for example, which are directly related because they require an analysis and policies regarding flood hazards, fire hazards, and other potentially hazardous conditions and the safety systems put in place to protect against risks. Some cities have adopted park or parks and recreation general plan elements to guide designation, development, and management of parkland and the provision of related services. Some cities have adopted public services or public facilities elements that establish goals and objectives for the provision of public services and facilities.

3.15.1.2 Environmental Setting

Fire Protection

The San Francisco Bay Area (Bay Area) faces a number of fire threats, including urban, wildland-urban interface, and wildland fires. According to the California Department of Forestry and Fire Protection (CAL FIRE), fire threat in the region ranges from low to extreme depending on factors such as fuel rank, topography, presence of urban development, and expected fire frequency. See Section 3.9, *Hazards and Hazardous Materials* and Section 3.19, *Wildfire*, for a more complete discussion of fire threats in the study area.

Fire protection services are managed at the local level by cities, counties, fire protection districts, or volunteer fire companies. California Government Code Section 38611 states that any city organized under general law (i.e., any city that has not adopted a city charter) must establish a fire department unless it is included within the boundaries of an established fire protection district. State and federal lands are generally served by state and federal fire agencies (e.g., CAL FIRE, U.S. Forest Service, National Park Service), and in some cases, businesses and Native American tribes manage their own fire departments. Each fire protection agency is responsible for serving its own prescribed area, but mutual aid agreements are in wide use across the region such that agencies rely on assistance from neighboring agencies in the case of overwhelming demand. There are a total of 568 fire departments within the study area. In an effort to prevent fire-related emergencies altogether, most fire departments and agencies sponsor prevention programs (e.g., public education, vegetation clearance) and enforce fire code regulations in built structures.

Fire protection service performance is typically measured by emergency response times or the ratio of service personnel to service area population. Because of the varying needs and challenges of each jurisdiction, however, performance measures differ among agencies, particularly among urban and rural agencies.

Police Protection

Police services are provided on the federal, state, county, and city levels. Police services include law enforcement in areas such as crime prevention, traffic and congestion control, safety management, emergency response, and homeland security.

The California Highway Patrol (CHP) is responsible for police protection along the sections of the interstate highway system that traverse the Bay Area. It provides services for the management of traffic, emergency accident response, and protection of the highway system through safety enforcement on roads. CHP services also include various programs and initiatives aimed at improving road safety and awareness for many categories of drivers. Through collaboration with local, state, and federal public safety agencies, the CHP's purpose is to minimize exposure of the public to unsafe conditions resulting from emergency conditions and highway impediments.

Each of the nine counties in the study area has its own sheriff's department that is responsible to provide police protection in unincorporated areas of each county. Each incorporated city and town has a police department that provides police protection within its own jurisdiction, although some cities contract with the county sheriff's department to provide law enforcement services. There are a total of 153 police departments within the study area. Police service performances vary by jurisdiction, but are typically measured in terms of response times, calculated in the number of minutes it takes a police officer to respond to an incident.

Schools

There are 165 school districts in each of the nine counties of the study area (California School Campus Database 2018).

- Alameda County—19 school districts.
- Contra Costa County—18 school districts.
- Marin County—19 school districts.
- Napa County—5 school districts.
- San Francisco City and County—1 school district.
- San Mateo County—23 school districts.
- Santa Clara County—31 school districts.
- Solano County—7 school districts.
- Sonoma County—42 school districts.

According to geographic information system (GIS) mapping prepared for the project by ICF in 2018, there are more than 3,000 school sites within 0.5 mile of Pacific Gas and Electric Company (PG&E) facilities. However, many of these are historical sites that are no longer in use as schools.

Parks

The parks in the study area vary from federally and state-managed wildlife refuges and recreation areas to locally managed campgrounds and playgrounds. As discussed in Section 3.16, *Recreation*, typical recreation facilities in urban areas include local parks with playgrounds, sports complexes, picnic areas, and pedestrian and bicycle pathways. In less developed areas, typical recreation facilities include open-space areas, wildlife-viewing areas, and camping facilities. Table 3.16-1 in Section 3.16 identifies more than 100 parks and open spaces in the study area operated by federal or state agencies. In addition, cities, counties, and special districts operate parks and various recreational facilities within their jurisdictions, and, in some cases, help operate state and federal assets.

Other Public Facilities

Many other public services are located within the nine-county study area. There are numerous libraries and other public buildings scattered throughout the study area.

3.15.2 Environmental Impacts

3.15.2.1 Methods for Analysis

Impacts related to public services were assessed qualitatively based on professional judgment in light of the nature of this project. Because PG&E has conducted operations and maintenance (O&M) activities in the study area for more than 30 years, O&M impacts described in this section represent baseline environmental conditions that would not change following approval of the Incidental Take Permit (ITP).

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures

A detailed discussion of the hazards and fire safety practices that PG&E implements are discussed in Section 3.9, *Hazards and Hazardous Materials*, and Section 3.19. PG&E's *Bay Area Operations and Maintenance Habitat Conservation Plan* (Bay Area O&M HCP) contains the following avoidance and minimization measures (AMMs) related to public services.

- Wildfire Prevention: When working in a High or Very High Fire Hazard Severity Zone or when the National Oceanic and Atmospheric Administration (NOAA) forecasts high fire danger, PG&E will brush, mow or clear access pathways, staging areas, and work areas as necessary before allowing heavy equipment and vehicles to access the site. Dead vegetation is to be cleared from the immediate work footprint, and basic fire suppression supplies kept onsite at all times.
- Field Protocol (FP)-03: Use existing access and right-of-way (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-05: Notify conservation land owner at least 2 business days prior to conducting covered activities on protected lands (state and federally owned wildlife areas, ecological reserves, or conservation areas); more notice will be provided if possible or if required by other permits. If the work is an emergency, as defined in Permittee's Utility Procedure ENV-8003P-01, PG&E will notify the conservation land owner within 48 hours after initiating emergency work. While this notification is intended only to inform conservation land owner, PG&E will attempt to work with the conservation land owner to address landowner concerns.
- FP-08: Prohibit trash dumping, firearms, open fires (such as barbecues), hunting, and pets (except for safety in remote locations) at work sites.
- FP-09: During fire season in designated State Responsibility Areas, equip all motorized equipment with federally approved or state-approved spark arrestors. Use a backpack pump filled with water and a shovel and fire-resistant mats and/or windscreens when welding. During fire "red flag" conditions as determined by CAL FIRE, curtail welding. Each fuel truck will carry a large fire extinguisher with a minimum rating of 40 B:C. Clear parking and storage areas of all flammable materials.
- FP-10: Minimize the activity footprint and minimize the amount of time spent at a work location to reduce the potential for take of species.

Significance Criteria

In accordance with Appendix G of the State CEQA Guidelines, the potential significance of impacts on public services from the proposed project and implementation of covered activities was evaluated for each of the following criteria:

- Substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or creation of a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services.
 - Fire protection

- Police protection
- Schools
- Parks
- Other public facilities

3.15.2.2 Impact Discussion

Impact PS-1: Create a need for new or physically altered governmental facilities to maintain acceptable service ratios, response times, or other performance objectives for fire protection, police protection, schools, parks, or other public facilities (Less-than-Significant Impact)

Because O&M activities are ongoing, the activities and any effects are part of baseline environmental conditions. Minor new construction activities would include gas pressure limiting station construction, substation expansion and construction of new lines to extend electrical and natural gas service to supply new and existing customers. Extension of service to additional customers would directly serve new growth. However, growth in California is governed by local general plans and zoning ordinances, over which the project would have no effect.

Although providing essential services such as gas and electricity, which are needed for population growth, could be identified as “removing an obstacle to growth,” such services do not by themselves create growth. Moreover, PG&E is legally required to provide new or expanded service as needs are identified through the local jurisdiction planning process, and the company expands its facilities and constructs new ones only in response to specific, identified needs for service. In this sense, covered activities under the project are more properly considered growth accommodating rather than growth inducing. In light of these considerations, the project would not increase demand for public services. Moreover, State CEQA Guidelines Section 15126.2(d) explicitly cautions against assuming that growth is “necessarily beneficial, detrimental, or of little significance to the environment.”

Fire and Police Protection

Covered activities would involve the continuation of existing O&M activities related to PG&E’s electrical and gas facilities. Demand for fire and police protection associated with O&M activities would not change. Covered activities also would involve minor new construction that would tier from existing facilities. Although fire or police services may be required during covered activities as a result of an accident, such an event is unlikely and would not trigger the need for new fire or police protection services. PG&E does coordinate with local fire and police protection agencies in advance for larger projects. Any fire or police protection services required for ongoing O&M and minor new construction activities could be handled by existing facilities, as they currently are under existing conditions.

PG&E would continue to implement fire safety practices in accordance with state fire safety laws and regulations. In addition, PG&E’s Bay Area O&M HCP contains AMMs concerning fire safety that PG&E would apply while conducting covered activities. One AMM requires brushing, mowing or clearing access pathways, staging areas, and work areas as necessary before allowing heavy equipment and vehicles to access work sites in fire hazard areas or if NOAA forecasts fire danger. FP-09 requires implementation of several fire prevention measures, including equipping all motorized equipment with spark arrestors while operating in State Responsibility Areas during fire season, implementing safe welding practices, clearing work sites of flammable vegetation, and

carrying fire extinguishers on fuel trucks. FP-08 prohibits open fires, firearms, and trash dumping at work sites. Implementation of these AMMs would reduce the chances of covered activities starting a fire and requiring emergency service response.

Covered activities would not result in an increase in population within the study area that would require additional fire and police protection facilities or services. With PG&E's implementation of its fire safety practices and continued coordination with service providers, adherence to fire safety regulations, and the AMMs identified in the Bay Area O&M HCP, impacts would be less than significant.

Schools

O&M activities would be conducted primarily within PG&E ROWs and at existing PG&E facilities. At times, O&M activities could need to extend beyond existing ROWs for construction access or staging activities, although such activities would tend to be located within previously disturbed areas. These O&M activities would be frequent and short term, and would not represent a change from baseline conditions. Minor construction activities could require the acquisition of new ROW or other property rights and could extend as far as 2 miles from existing PG&E facilities. PG&E's Bay Area O&M HCP contains AMMs FP-03 and FP-10, which require minimizing development of new access or ROW roads and limiting the footprint of covered activities. Implementation of these AMMs would limit potential encroachment near or onto school grounds. Depending on proximity, potential noise levels, and duration of the activities, PG&E would continue to provide advance notification to schools in the vicinity of proposed activities in the event the activity has a potential to adversely affect school operations or access to and from the school. Covered activities would not result in an increase in population in the study area that would require new schools. Therefore, impacts would be less than significant.

Parks

O&M activities would continue to be implemented within PG&E ROWs and areas beyond the ROWs to allow for construction access and staging. Some PG&E ROWs and facilities are located in or adjacent to parks. These activities would be short term in nature and would be a continuation of existing O&M activities; any impacts would not represent a change from baseline conditions. PG&E would continue to follow FP-05 and provide advance notification to the appropriate land owner if O&M activities are required within a protected lands depending on the proximity, potential noise levels, and duration of the activities, or if access to the public park would be temporarily restricted.

Minor new construction activities could result in the extension of PG&E gas and electric facilities into parkland. However, because activities would be temporary and because such facilities would have a limited ground surface footprint, long-term use of any parkland would be unaffected. In addition, PG&E's Bay Area O&M HCP requires PG&E to coordinate with park operators and with the U.S. Fish and Wildlife Service and California Department of Fish and Wildlife regarding minor new construction activities prior to PG&E working on them. In addition, in the event that road surfaces are altered as a result of covered activities, PG&E would restore roads in accordance with existing easements or franchise agreements. Because covered activities would not cause an increase in population in the study area, no new or altered parks and recreation facilities would be required. Consequently, impacts would be less than significant.

Other Public Facilities

O&M covered activities would be a continuation of existing O&M activities and any impacts on other public facilities would not represent a change from baseline conditions. Although some covered activities, including minor new construction activities, could be implemented adjacent to existing public facilities (e.g., libraries, hospitals, and other public buildings), these activities would be short term in nature, lasting a few days to a maximum of 3 months. To reduce the potential impacts on public facilities, PG&E would continue to coordinate lane and road closures with the appropriate jurisdiction through the encroachment permit process and prior to construction. Further, any aboveground facilities (e.g., gas pressure limiting stations, minor substation expansions, new electrical distribution or transmission lines) would be relatively small in size. Construction of a gas pressure limiting station would disturb no more than 1 acre, and a minor substation expansion would disturb no more than 3 acres. New electrical distribution or transmission lines would be limited to 2-mile extensions from existing facilities. Thus, these new or expanded facilities would not result in the need for expanded or added public facilities. Covered activities would not increase the local population or otherwise result in a change that would require alteration or expansion of existing public facilities. Therefore, impacts would be less than significant.

3.15.3 References Cited

California School Campus Database. 2018. Available:
<http://www.californiaschoolcampusdatabase.org/>. Accessed: March 14, 2018.

3.16 Recreation

3.16.1 Existing Conditions

3.16.1.1 Regulatory Setting

Federal

National Park Service Organic Act

The National Park Service (NPS), as part of the Department of Interior, was established through the Organic Act of 1916 (16 United States Code Sections 1–4). The NPS has the mission “to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.” The NPS maintains the National Park System through preserving the natural and cultural resources and values for the enjoyment, education, and inspiration of this and future generations. Parks that are designated must be managed to ensure the natural and ecological processes operate unimpaired.

State

No state regulations pertaining to recreation are applicable to the project.

Local

No local regulations related to recreation are applicable to the project. Because the California Public Utilities Commission has exclusive jurisdiction over project siting, design, and construction, the project is not subject to local land use and zoning regulations or discretionary permits relating to recreation. The following information regarding general plans is provided for information purposes and to assist with California Environmental Quality Act (CEQA) review.

General Plans

California law requires counties and cities to develop comprehensive, long-term general plans to guide their land use decision making and physical development (Government Code Section 65300). Of the seven required elements or chapters in a general plan, several relate directly or indirectly to recreation and recreation resources. For instance, the land use element must provide for the general location and distribution of land uses for open space, including agriculture, natural resources, recreation, and enjoyment of scenic beauty. The open space element must reflect open space currently used or planned for outdoor recreation. General plans may also contain additional elements on topics of concern to the local community, with common themes that bear on recreation and parks, community design, and heritage or cultural resources. Some cities have adopted recreation or parks and recreation general plan elements, and some communities have adopted ordinances or municipal code provisions in support of specific recreation goals.

3.16.1.2 Environmental Setting

The recreational context for the study area includes all federal, state, and local recreational facilities within the nine San Francisco Bay Area counties: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma. The study area contains more than 1 million acres of parks and open space, with recreational opportunities varying from county to county. Pacific Gas and Electric Company (PG&E) facility corridors cross approximately 7,400 protected areas in the study area. Of PG&E's facilities on protected lands, 27.6% are on state agency lands, 20.1% are on federal agency lands, 18.2% are on regional park district lands, 12.9% are on county lands, 6.8% are on water district lands, 6.5% are on nonprofit land trust lands, 5.9% are on city agency lands, and 1% are on others' lands.

Table 3.16-1 contains a listing of the principal federal and state recreational facilities in the study area and identifies the managing agency and the county in which the facility is located. In addition to these federal and state recreational facilities, there are numerous local recreational facilities in the study area that fall under the jurisdiction of local agencies.

In some areas, PG&E's electricity and natural gas infrastructure may be located within or adjacent to recreation facilities. The types and uses of these facilities vary greatly. In urban areas, typical recreation facilities may include parks containing playgrounds, picnic areas, sports fields, and bike and pedestrian pathways. In less developed areas, recreation facilities may include open-space areas for wildlife viewing and hunting, campgrounds, lakes or other watercourses for fishing, and trails for hiking, equestrian use, mountain biking, and off-road vehicle travel.

The list of facilities provided in Table 3.16-1 is not exhaustive; instead, it includes only those federal and state agency-regulated facilities found within the study area. Federal and state recreational lands and facilities in the study area are shown in Figure 3.1-1 and Figure 3.1-2 and are discussed further in Section 3.1, *Aesthetics*.

Table 3.16-1. Federal and State-Regulated Recreational Facilities in the Nine Bay Area Counties

County	Owner/Manager	Property
Alameda	California Department of Fish and Wildlife	Albany Mudflats Ecological Reserve
		Eden Landing Ecological Reserve
	U.S. Fish and Wildlife Service	Don Edwards San Francisco Bay National Wildlife Refuge
	California State Park System	Albany State Marine Reserve
		Bethany Reservoir State Recreation Area
		Carnegie State Vehicular Recreation Area
		Eastshore State Park
		Emeryville Crescent State Marine Reserve
Lake Del Valle State Recreation Area		
Robert W. Crown Memorial State Beach		
Contra Costa	California Department of Fish and Wildlife	Point Edith Wildlife Area
		Lower Sherman Island Wildlife Area
		Rhode Island Wildlife Area
	U.S. Fish and Wildlife Service	Antioch Dunes National Wildlife Area
	National Park Service	Eugene O'Neill National Historic Site

County	Owner/Manager	Property
Contra Costa, continued		Rosie the Riveter WW II Home Front National Historical Park
	National Park Service, continued	John Muir National Historical Site
		Port Chicago Naval Magazine National Memorial
	California State Park System	Franks Tract
		Mount Diablo
Cowell Ranch/John Marsh State Historic Park		
Marin	California Department of Fish and Wildlife	Petaluma Marsh Wildlife Area
		San Pablo Bay Wildlife Area
		Corte Madera Marsh Ecological Reserve
		Marin Islands Ecological Reserve
		Tomales Bay Ecological Reserve
	National Park Service	Muir Woods National Monument
		Point Reyes National Seashore
	California State Park System	Angel Island State Park
		China Camp State Park
		Marconi Conference Center State Historic Park
		Mount Tamalpais State Park
		Olompali State Historic Park
		Tomales Bay State Park
		Samuel P. Taylor State Park
Napa	California Department of Fish and Wildlife	Cedar Roughs Wildlife Area
		Knoxville Wildlife Area
		Napa-Sonoma Marshes Wildlife Area
		Rector Reservoir Wildlife Area
		Napa River Ecological Reserve
		Lake Berryessa Wildlife Area
	Quail Ridge Wildlife Area	
	U.S. Fish and Wildlife Service	San Pablo Bay National Wildlife Area
	Bureau of Land Management	Cedar Roughs Wilderness Area
	California State Park System	Bale Grist Mill State Historic Park
Bothe-Napa Valley State Park		
Robert Louis Stevenson State Park		
San Francisco	National Park Service	Golden Gate National Recreation Area (also extends into Marin and San Mateo Counties)
		Alcatraz Island
		Fort Point National Historical Site
		Presidio of San Francisco
	California State Park System	San Francisco Maritime National Historical Park
		Angel Island State Park
		Candlestick Point State Recreation Area

County	Owner/Manager	Property
San Mateo	California Department of Fish and Wildlife	Bair Island Ecological Reserve
		Redwood Shores Ecological Reserve
		San Bruno Mountain Ecological Reserve
	California State Park System	Año Nuevo State Natural Reserve
		Año Nuevo State Park
		Bean Hollow State Beach
		Burleigh H. Murray Ranch
		Butano State Park
		Castle Rock State Park
		Gray Whale Cove State Beach
		Half Moon Bay State Beach
		Montara State Beach
		Pacifica State Beach
		Pescadero State Beach
		Pomponio State Beach
		Portola Redwoods State Park
		San Bruno Mountain State Park
		San Gregorio State Beach
		Thornton State Beach
		Pigeon Point Light Station State Historic Park
Point Montara Light Station		
Santa Clara	California State Park System	Castle Rock State Park
		Henry W. Coe State Park
		Martial Cottle Project
		Pacheco State Park
Solano	California Department of Fish and Wildlife	Grizzly Island Wildlife Area
		Hill Slough Wildlife Area
		Peytonia Slough Ecological Reserve
		Putah Creek Wildlife Area
		Calhoun Cut Ecological Reserve
	U.S. Fish and Wildlife Service	San Pablo Bay National Wildlife Refuge
California State Park System	Benicia State Recreation Area	
	Benicia Capitol State Historic Park	
Sonoma	California Department of Fish and Wildlife	Laguna Wildlife Area
		Lake Sonoma Wildlife Area
		Petaluma Marsh Wildlife Area
		Atascadero Creek Marsh Ecological Reserve
		Del Mar Landing Ecological Reserve
	U.S. Fish and Wildlife Service	San Pablo Bay National Wildlife Refuge
California State Park System	Trione-Annadel State Park	

County	Owner/Manager	Property
Sonoma, continued	California State Park System, continued	Armstrong Redwoods State Natural Reserve
		Austin Creek State Recreation Area
		Bothe-Napa Valley State Park
		Fort Ross State Historic Park
		Jack London State Historic Park
		Kruse Rhododendron State Natural Reserve
		Petaluma Adobe State Historic Park
		Robert Louis Stevenson State Park
		Salt Point State Park
		Sonoma State Historic Park
Sonoma Coast State Park		
		Sugarloaf Ridge State Park

Sources: Bureau of Land Management 2017; California Department of Fish and Wildlife 2017; State of California 2017a, 2017b; U.S. Fish and Wildlife Service 2017; National Park Service 2017.

Parks and open space are generally categorized according to their size and amenities. Smaller parks such as pocket parks, neighborhood parks, community parks, urban forests, and community gardens serve local communities, typically are located in urbanized areas, and often include a wide range of improvements ranging from playing fields and picnic areas to playgrounds and fitness trails. These parks are most often managed by local park districts or municipalities, which typically set minimum standards for park acreage based on their population. Larger open-space areas such as regional parks, greenbelts, trails and pathways, natural and wildlife preserves, some private farmlands, and some public rangelands typically are located outside of major urbanized areas, and generally include fewer improvements. Management of these parks is divided among a range of organizations and agencies including regional park districts, private individuals, and nonprofit land trusts.

PG&E has facilities located in the following regional park districts.

- East Bay Regional Park District.
- Marin County Open Space District.
- Midpeninsula Regional Open Space District.
- Napa County Regional Park and Open Space District.
- Santa Clara Valley Open Space Authority.
- Sonoma County Agricultural Preservation and Open Space District.

3.16.2 Environmental Impacts

3.16.2.1 Methods for Analysis

The impact analysis in this section focuses on evaluating the potential impacts of PG&E's operations and maintenance (O&M) and minor new construction activities covered by the Incidental Take Permit (ITP) that may result in increased use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur.

Potential impacts were evaluated qualitatively, based on professional judgment in light of the nature of the proposed project, existing legal requirements and the applicable avoidance and minimization measures (AMMs) from PG&E's *Bay Area Operations and Maintenance Habitat Conservation Plan* (Bay Area O&M HCP). Because PG&E has conducted O&M activities in the study area for more than 30 years, O&M impacts identified in this section are part of baseline environmental conditions that would not change following approval of the ITP.

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures

PG&E employs land planners, biologists, cultural resource specialists, environmental field specialists, and other environmental professionals to ensure that O&M and minor new construction activities are in compliance with applicable state and federal laws and regulations. PG&E's Bay Area O&M HCP requires PG&E to work with the U.S. Fish and Wildlife Service (USFWS) on mitigation activities and notify California Department of Fish and Wildlife (CDFW) before beginning minor new construction activities.

In addition, the Bay Area O&M HCP contains the following AMM that would provide for additional notification and coordination with potentially affected land managers and owners.

- Field Protocol (FP)-05: Notify conservation land owner at least 2 business days prior to conducting covered activities on protected lands (state and federally owned wildlife areas, ecological reserves, or conservation areas); more notice will be provided if possible or if required by other permits. If the work is an emergency, as defined in PG&E's Utility Procedure ENV-8003P-01, PG&E will notify the conservation land owner within 48 hours after initiating emergency work. While this notification is intended only to inform the conservation land owner, PG&E will attempt to work with the conservation land owner to address landowner concerns.

Significance Criteria

In accordance with Appendix G of the State CEQA Guidelines, the potential significance of impacts on recreation from the proposed project and implementation of covered activities was evaluated for each of the following criteria:

- Increased use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.
- Construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

3.16.2.2 Impact Discussion

Impact REC-1: Increased use of existing recreational facilities, resulting in substantial physical deterioration (No Impact)

Because existing rights-of-way (ROWs) for gas and electric transmission or distribution infrastructure are located within or adjacent to recreational facilities, PG&E would continue to conduct O&M covered activities in and adjacent to recreation facilities. Any impacts from these activities would be minor because PG&E ROWs and facilities already exist and activities would last only a few hours to a few days. Moreover, O&M activities would be a continuation of existing activities, and any impacts would be part of baseline environmental conditions. Minor new

construction, including extension of service to additional customers, would directly serve new growth. However, growth in California is governed by local general plans and zoning ordinances, over which the project would have no effect.

Although providing essential services such as gas and electricity, which are needed for population growth, could be identified as “removing an obstacle to growth,” such services do not by themselves create growth. Moreover, PG&E is legally required to provide new or expanded service as needs are identified through the local jurisdiction planning process, and the company expands its facilities and constructs new ones only in response to specific, identified needs for service. In this sense, covered activities under the project are more properly considered growth accommodating rather than growth inducing. Additionally, State CEQA Guidelines Section 15126.2(d) explicitly cautions against assuming that growth is “necessarily beneficial, detrimental, or of little significance to the environment.”

Construction of new gas pressure limiting stations and expanded substations may also be implemented in and near recreation facilities. These activities could necessitate temporary closure or limitation of access to existing recreational facilities. However, these construction activities would generally be of short duration (3 months or less) and facilities would be relatively small in size (e.g., no more than 1 acre for a gas pressure limiting station, and 3 acres for minor substation expansion). In addition, PG&E would continue to consult local jurisdictions on land use issues and, pursuant to FP-05 of PG&E’s Bay Area O&M HCP, would consult with park operators, USFWS, and CDFW in advance of implementing minor new construction activities on protected lands. Thus, activities and facilities associated with minor new construction are unlikely to decrease use of existing recreation facilities and increase the use of alternative neighborhood or regional parks in such a manner that it would result in the substantial physical deterioration of park facilities. There would be no permanent recreational impacts related to habitat conservation lands because there would be no permanent physical barriers that would prevent access to conservation lands nor would there be any closures of conservation lands.

O&M activities are intended to ensure the reliable and safe delivery of gas and electric services to existing customers. Minor new construction activities would be implemented to provide service to new customers and businesses that have been approved by the local jurisdiction. Habitat management and enhancement activities would be undertaken to mitigate impacts from other covered activities. None of the covered activities in and of themselves would trigger population growth that results in increased use of existing recreation facilities. Therefore, there would be no impact related to existing recreation facilities.

Impact REC-2: Construction or expansion of recreational facilities that might have an adverse physical effect on the environment (No Impact)

As described under Impact REC-1, covered activities would not increase the use of existing facilities or result in population growth requiring additional facilities; therefore, covered activities would not result in the need to construct or expand recreation facilities. Some mitigation lands acquired as compensation might accommodate very limited, passive recreational uses, but new infrastructure would be minimal and consistent with the primary land use purpose of habitat compensation.

Although providing essential services such as gas and electricity, which are needed for population growth, could be identified as “removing an obstacle to growth,” such services do not by themselves create growth. Moreover, PG&E is legally required to provide new or expanded service as needs are identified through the local jurisdiction planning process, and the company expands its facilities and

constructs new ones only in response to specific, identified needs for service. In this sense, covered activities under the project are more properly considered growth accommodating rather than growth inducing. Additionally, State CEQA Guidelines Section 15126.2(d) explicitly cautions against assuming that growth is “necessarily beneficial, detrimental, or of little significance to the environment.” In light of these considerations, the project has no potential to induce growth resulting in construction or expansion of recreational facilities that might have an adverse physical effect on the environment and would result in no impact.

3.16.3 References Cited

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3.17 Transportation

3.17.1 Existing Conditions

3.17.1.1 Regulatory Setting

Federal

Transportation of Hazardous Materials

The U.S. Department of Transportation (USDOT) and the California Department of Transportation (Caltrans) are the administrating agencies for the following regulations.

- Title 49 Code of Federal Regulations (CFR) Parts 171–177 govern the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles.
- 49 CFR Parts 350–399 and Appendixes A through G, Federal Motor Carrier Safety Regulations, address safety considerations for the transport of goods, materials, and substances over public highways.
- 49 CFR Part 397.9, the Hazardous Materials Transportation Act of 1974, directs USDOT to establish criteria and regulations for the safe transportation of hazardous materials.

Aviation Regulations

Under 14 CFR Parts 77.7 and 77.9, an applicant is required to submit a Notice of Proposed Construction or Alteration to the Federal Aviation Administration (FAA) for construction projects proposed in the vicinity of an airport or runway. Parts 77.13, 77.15, and 77.17 outline the criteria used by the FAA to determine whether an obstruction would create an air navigation conflict. In general, the following types of construction projects are considered potential obstructions and require FAA notification.

- Projects exceeding 200 feet in height.
- Projects extending at a ratio greater than 100 to 1 (horizontal to vertical) from a public or military airport runway more than 3,200 feet long, out to a horizontal distance of 20,000 feet.
- Projects extending at a ratio greater than 50 to 1 (horizontal to vertical) from a public or military airport runway 3,200 feet or shorter, out to a horizontal distance of 10,000 feet.

State

Streets and Highways Code

Caltrans owns the rights-of-way (ROWs) for State Routes (SRs), including any on- and off-ramps. The use of California state highways for purposes other than normal transportation may require written notification of or an encroachment permit from Caltrans. California Streets and Highways Code Section 660 allows Caltrans to issue encroachment permits authorizing activities within, under, or over state highway ROWs. Caltrans reviews all requests from utility companies that plan to

conduct activities within state highway ROWs. Caltrans's encroachment permits may include conditions or restrictions on the timeframe for construction activities performed within or above roadways that are in Caltrans's jurisdiction.

The Streets and Highways Code also contains regulations intended to protect the condition of SRs and other roadways. The code requires permits for any load that exceeds Caltrans's weight, length, or width standards for public roadways. Sections 700 through 711 contain provisions that are specific to utility providers. Additionally, the California Streets and Highways Code outlines directions for cooperation with local agencies, guidelines for permits, and general provisions relating to highways in Caltrans's jurisdiction.

Local

Because the California Public Utilities Commission has exclusive jurisdiction over project siting, design, and construction, the project is not subject to local land use and zoning regulations or discretionary permits. The following discussion of local planning is provided for information purposes and to assist with California Environmental Quality Act (CEQA) review.

Congestion Management Agency Transportation Plans

Each of the nine San Francisco Bay Area (Bay Area) counties has a congestion management agency (CMA) designated to manage traffic congestion through implementation of multimodal transportation projects. These CMAs work with Metropolitan Transportation Commission (MTC) to advance road, bicycle, pedestrian, and transit projects in line with regional objectives. In addition, many CMAs develop county transportation plans that should be consistent with the MTC's regional transportation plan, *Plan Bay Area* (Metropolitan Transportation Commission 2013). *Plan Bay Area* is a long-range integrated transportation and land-use/housing strategy for the Bay Area through 2040 that includes the region's sustainable communities strategy and the regional transportation plan. Countywide transportation plans adopted by CMAs are supposed to reflect the goals of the regional transportation plan and sustainable communities strategy. The most recent county transportation plans are listed below.

- Alameda County Transportation Commission: *2012 Alameda Countywide Transportation Plan*.
- Contra Costa Transportation Authority: *2009 Countywide Comprehensive Transportation Plan*.
- San Francisco County Transportation Authority: *San Francisco Transportation Plan 2035*.
- Santa Clara Valley Transportation Authority: *Valley Transportation Plan 2035*.
- Solano Transportation Authority: *2009 Comprehensive Transportation Plan 2035 Update*.
- Sonoma County Transportation Authority: *2009 Comprehensive Transportation Plan for Sonoma County*.

The remaining three CMAs do not develop such plans on a regular basis, but they still play a major role in implementing regional transportation priorities.

- City/County Association of Governments of San Mateo County.
- Napa County Transportation and Planning Agency.
- Transportation Authority of Marin.

General Plans

California law requires counties and cities to develop comprehensive, long-term general plans to guide their land use decision making and physical development. All elements, or chapters, in a general plan relate directly or indirectly to transportation. The circulation element is directly related and includes a strategy addressing infrastructure needs for the circulation of people, goods, energy, water, sewage, storm drainage, and communications. By statute, the circulation element must correlate directly with the land use element, but also has direct relationships with other elements. Creating accessible, connected, and complete circulation networks and ensuring access to opportunities within a community requires coordination between land use and circulation planning. The Sustainable Communities and Climate Protection Act of 2008 (Sustainable Communities Act, Senate Bill 375, Chapter 728, Statutes of 2008) supports the state's climate action goals to reduce greenhouse gas emissions through coordinated transportation and land use planning with the goal of making communities more sustainable for the long term. In addition to identifying transportation routes, the circulation element must identify the location and necessity of public utilities and facilities. General plans may also contain additional elements on topics of concern to the local community, and some jurisdictions have adopted transportation and bicycle elements. Some communities also adopt ordinances or municipal code provisions in support of specific transportation-related goals.

3.17.1.2 Environmental Setting

Existing Regional Transportation Conditions

The Bay Area features a large and complex transportation network, allowing for multimodal access across the region. The transportation system includes interstate and state highways, local arterial roadways, local streets and roads, public transit systems, bicycle and pedestrian facilities, seaports, and airports. These facilities allow for the movement of people and goods throughout the region. The various elements of the Bay Area transportation system are described below.

Roadway Network

The Bay Area contains more than 1,300 directional miles of limited-access highways. These facilities form the backbone of the transportation system, providing access to major employment centers and to destinations outside of the Bay Area. Besides providing mobility for automobiles, these facilities also support express and transbay bus services and freight movement. In addition, the Bay Area has more than 33,000 directional miles of arterials and local streets, providing more localized access to individual communities. Together, these roadway facilities accommodate nearly 17 million vehicle trips per day.

Bicycle and Pedestrian Facilities

The availability of nonmotorized facilities in the Bay Area supports the region's transportation, air quality, health, and livability goals. In addition to pedestrian facilities, such as paths and sidewalks, which exist throughout the region, the Bay Area has an extensive local system of bikeways. The *California Highway Design Manual* defines three classes of bikeways (California Department of Transportation 2017).

- Class I Bikeway (Bike Path): A completely separated ROW for exclusive use of bicycles and pedestrians.

- Class II Bikeway (Bike Lane): A dedicated lane for bicycle travel on a street or highway.
- Class III Bikeway (Bike Route): A shared lane for bicycle travel on a street or highway.

Under the *California Highway Design Manual* definitions, the Bay Area has 700 miles of Class I facilities, more than 2,000 miles of Class II facilities, and more than 1,300 miles of Class III facilities.

Seaports and Airports

The Bay Area is served by five seaports, which provide the opportunity for intermodal transfers to trucks and railcars. The Port of Oakland, the largest of the five, is the third largest U.S. seaport on the West Coast (after the ports of Los Angeles and Long Beach). Other seaports are the Port of San Francisco, the Port of Richmond, the Port of Benicia, and the Port of Redwood City. These seaports are supported by freight railroad services operated by Union Pacific and Burlington Northern Santa Fe.

The Bay Area is also served by three major international airports: San Francisco International Airport, Oakland International Airport, and Norman Y. Mineta San Jose International Airport. Each of these airports provides mobility for people and freight nationally and internationally. The region is also served by one smaller airport with limited commercial service, Charles M. Schulz Sonoma County Airport, as well as numerous smaller general aviation airports. There is a total of 33 public use airports within 0.5 mile of Pacific Gas and Electric Company (PG&E) facilities within the study area.

3.17.2 Environmental Impacts

3.17.2.1 Methods for Analysis

Impacts related to traffic, particularly regarding minor new construction projects, were assessed qualitatively based on professional judgment in light of the activities, methods, and techniques currently implemented by PG&E. Because PG&E has conducted operations and maintenance (O&M) activities in the study area for more than 30 years, O&M impacts identified in this section represent baseline environmental conditions that would not change following approval of the Incidental Take Permit (ITP).

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures

When feasible, PG&E implements a variety of traffic control measures while conducting O&M and construction activities to ensure that they do not unduly impede traffic flow or affect emergency response. In addition, PG&E coordinates with state and local jurisdictions when conducting O&M and minor new construction activities in and near transportation facilities, and obtains encroachment permits when necessary. PG&E's *Bay Area Operations and Maintenance Habitat Conservation Plan* contains no avoidance and minimization measures specifically related to transportation.

PG&E would implement the following applicant proposed measure (APM) with regard to transportation and traffic.

APM TRA-1: Implement transportation best management practices

PG&E will continue to implement the following transportation best management practices.

- Prepare and implement traffic control plans as required by necessary encroachment permits to minimize disruption of roadways and of bicycle, pedestrian and transit routes to ensure the provision of adequate alternative access.
- Provide through access for emergency vehicles at all times. If lane closures must occur during the course of construction, local fire and police departments will be notified to allow the design of alternative evacuation and emergency access routes. PG&E will make every effort to allow emergency service providers adequate lead time to ensure that emergency access and response times are maintained during work periods.
- Maintain access for private roads.
- Provide adequate off-road parking and staging for vehicles, equipment, and materials throughout the work period.
- Restrict all construction parking and staging to ROW, utility-owned property and approved staging areas, and keep construction equipment in designated staging areas when not in use.
- Post construction warning signs in advance of activities at the construction area and at intersections that provide access to the construction area.
- Restrict all nonemergency construction traffic, including haul and delivery trucks, to normal daytime business hours, unless a local jurisdiction identifies a need for off-hours routing to avoid impacts on peak-hour commute traffic.
- Avoid key commute routes and “rate-limiting” intersections during peak traffic periods, either by traveling different routes or by traveling during non-peak times as feasible, and by providing adequate parking for expanded facilities.
- If temporary lane closures are required, use caution signs and/or flaggers to regulate traffic, cyclists, and pedestrians to maintain a safe transportation corridor.

Significance Criteria

In accordance with Appendix G of the State CEQA Guidelines, the potential significance of impacts on transportation from the proposed project and implementation of covered activities was evaluated for each of the following criteria:

- Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.
- Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b).
- Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Result in inadequate emergency access.

3.17.2.2 Impact Discussion

Impact TRA-1: Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities (Less-than-Significant Impact)

Traffic generated directly by covered activities would generally be minimal, involving a varying number of personnel driving to and from work areas throughout the day. Depending on the activity, crews would typically consist of two to five workers for O&M activities and 10 to 20 workers for minor new construction activities. Traffic for habitat management and enhancement activities would be similar to O&M activities. The limited number of vehicle trips generated by crew members traveling and hauling equipment to and from work areas is not anticipated to significantly increase the average daily traffic load of the circulation system in the study area as compared with the existing conditions, especially considering that O&M activities would be a continuation of existing activities and those trips are part of baseline environmental conditions.

O&M activities would typically be implemented within and adjacent to PG&E ROWs, which are frequently located along or adjacent to roads and other transportation facilities. Any effects of these O&M activities, such as temporary lane closures, are part of baseline environmental conditions.

Minor new construction activities would be implemented within and adjacent to existing PG&E facilities and would extend up to 2 miles from existing facilities. Some activities could require limiting access to roads, bicycle facilities, or sidewalks, and could require temporary lane closures to ensure construction activities do not present a safety hazard and to provide for movement of construction-related vehicles and equipment. Minor new construction activities could last up to 3 months, although any traffic impacts are likely to be intermittent at a given location. Although minor new construction activities would be localized, short term and unlikely to cause a substantial increase in traffic, the activities could affect the performance of a circulation system by temporarily impeding vehicle, bicycle, and pedestrian traffic and emergency vehicle travel. This could be a significant impact. However, PG&E would continue to coordinate with state and local agencies and would obtain the necessary encroachment permits and perform the work according to relevant permit conditions. As a result, impacts on traffic circulation would be less than significant. Implementation of APM TRA-1, which elaborates on these practices and legal requirements, would further reduce less-than-significant impacts. Specifically, PG&E would implement a traffic control plan as necessary to minimize disruption of roadways and of bicycle, pedestrian, and transit routes to ensure the provision of adequate alternative access, and PG&E would use caution signs and/or flaggers to regulate traffic, cyclist, and pedestrian movement to maintain a safe transportation corridor when temporary lane closures are required. PG&E would provide through access for emergency vehicles at all times and would provide emergency service providers adequate lead time to ensure that emergency access and response times are maintained during PG&E work periods. PG&E would avoid travel on key commute routes and through congested intersections during peak hours. APM TRA-1 would further ensure that impacts on the circulation system in the study area would be less than significant.

Impact TRA-2: Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b) (Less-than-Significant Impact)

Transportation associated with O&M activities is considered part of the baseline and would continue with or without the issuance of the ITP. The only 'new' transportation might be associated with

minor new construction or selection and/or establishment of species/habitat mitigation sites related to MM BIO-1. Minor new construction as well as any creation or enhancement of habitat would follow the same practices, legal requirements, and APM as identified in Impact TRA-1, and impacts would be similar. No permanent increase in vehicle miles traveled (VMT) would result. Most habitat mitigation would be completed through purchase of credits from existing banks, which would create no increase in VMT. If mitigation could not be established through a third party and had to be identified and evaluated by PG&E staff or contractors, the site(s) would be within the study area. It is assumed that any trips to evaluate the site would also originate from within the study area and PG&E's offices in either San Francisco or San Ramon. A round-trip visit to such sites (likely in the east Bay Area for Alameda whipsnake, or to Napa or Sonoma County for California freshwater shrimp or California tiger salamander) would range between 40 miles and 150 miles for each of two or three trips (a total of up to 450 miles VMT). This would be minimal and would not constitute a substantial increase in VMT, and the impact would be less than significant.

Impact TRA-3: Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) (Less-than-Significant Impact)

As discussed under Impact TRA-1, traffic flow along roads or lanes may be temporarily impeded during covered activities. Such impediments during O&M activities would be a continuation of baseline environmental conditions. Encroachment onto public roadways or ROWs during implementation of minor new construction activities could increase hazards if safety measures are not implemented. Such safety measures are included in local permits that are required by law. PG&E would continue to obtain the necessary encroachment and traffic control permits and would implement the required traffic control measures specified in applicable permits. Any equipment brought to a site would travel on public roads and would comply with the Streets and Highways Code. These legal requirements would reduce any temporary impacts related to traffic hazards to a less-than-significant level. In addition, APM TRA-1 would further reduce less-than-significant impacts by elaborating on local requirements and best management practices. APM TRA-1 requires preparation of a traffic control plan as necessary to minimize disruption of roadways and of bicycle, pedestrian and transit routes to ensure the provision of adequate alternative access, and requires use of caution signs and/or flaggers to regulate traffic, cyclist, and pedestrian movement to maintain a safe transportation corridor.

No aspect of O&M or minor new construction would result in a design feature or incompatible use that would substantially increase hazards. No permanent impacts would occur.

Impact TRA-4: Result in inadequate emergency access (Less-than-Significant Impact)

As discussed under Impact TRA-1, covered activities may result in temporary road blockages. Such impediments during O&M activities would be a continuation of baseline environmental conditions. Temporary impediments during minor construction activities could impair emergency access, which could be a significant impact. However, PG&E would continue to coordinate with appropriate agencies to obtain the necessary traffic control and encroachment permits and would implement provisions required by the permits, thereby reducing any impacts to a less-than-significant level. APM TRA-1, which requires PG&E to provide through access for emergency vehicles at all times, notify local fire and police departments to allow the design of alternative evacuation and emergency access routes, and make every effort to allow emergency service providers adequate lead time to

ensure that emergency access and response times are maintained during PG&E work periods, would further ensure that any impacts on emergency vehicle access would be less than significant.

3.17.3 References Cited

California Department of Transportation. 2017. *California Highway Design Manual*. Available: <http://www.dot.ca.gov/> Accessed March 1, 2018.

Metropolitan Transportation Commission. 2013. *Plan Bay Area: Regional Transportation Plan and Sustainable Communities Strategy for the San Francisco Bay Area 2013–2040*. Adopted July 18.

3.18 Utilities and Service Systems

3.18.1 Existing Conditions

3.18.1.1 Regulatory Setting

Federal

U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency (EPA) identifies stormwater as urban runoff. After a precipitation event, polluted runoff is discharged over land or through storm sewer systems, often untreated and directly into waterbodies. If left uncontrolled, this polluted water can result in the destruction of wildlife and aquatic ecosystems and can threaten public health. Capture and management of stormwater is used to ensure protection of water quality, aquatic life, and public health throughout the study area. The National Pollution Discharge Elimination System (NPDES) permitting program, which is overseen by the EPA but which is run by the state in California, provides implementation measures for controlling potentially harmful pollutants found in stormwater runoff from entering waterbodies or affecting public health. Additionally, stormwater capture systems assist in maintaining flood protection and create opportunities for ecosystem protection and restoration.

State

California Government Code

Section 4216 of the California Government Code protects underground structures during excavation. Under this law, excavators are required to contact a regional notification center at least 2 days prior to excavation of any subsurface installations. In the study area, Underground Service Alert notifies utility providers with buried lines within 1,000 feet of the excavation, and those providers are required to mark the specific location of their facilities prior to excavation. The code also requires excavators to probe and expose existing utilities, in accordance with state law, before using power equipment.

Local

Because the California Public Utilities Commission has exclusive jurisdiction over project siting, design, and construction, the project is not subject to local land use and zoning regulations or discretionary permits. The following discussion of local plans and regulations is provided for information and to assist California Environmental Quality Act (CEQA) review.

Planning for water management, wastewater and stormwater management, and solid waste disposal is done by local agencies to support their long-term resource planning and ensure adequate service to meet existing and future demands. In addition to federal and state regulations governing these planning efforts, cities, counties, and water districts may also provide regulatory advisement on water resources, treatment, and solid waste disposal. Many jurisdictions incorporate policies relating to these topic areas in their municipal codes, development standards, or other regulations.

General Plans

California law requires local jurisdictions (including counties and cities) to develop comprehensive, long-term general plans to guide their land use decision making and physical development. Utilities and service systems are identified in the statute for the circulation and open space elements and have closely related statutory requirements to the remaining elements. In addition to transportation routes, the circulation element must identify the location and necessity of public utilities and facilities. Relevant utilities include water, sewers, stormwater systems, telecommunications and broadband, electric vehicle charging stations, electricity, and natural gas lines. These facilities relate directly to the land uses planned in the land use element. For disadvantaged communities where the environmental justice element is required, the element must identify objectives and policies to reduce the unique or compounded health risks in disadvantaged communities by promoting public facilities. General plans may also contain additional elements on topics of concern to the local community that could have an effect on utilities and service systems. Some communities also adopt ordinances or municipal code provisions in support of specific goals.

3.18.1.2 Environmental Setting

Water Supply

Water supply for each county is provided by its respective water supply department or agency. Some counties contain several water providers. This section describes major water suppliers located in the study area.

Alameda County Water District

The Alameda County Water District serves the cities of Fremont, Newark, and Union City. The district is a retail water purveyor that allocates approximately 70% of its water to residential customers and approximately 30% to commercial, industrial, institutional, and large landscape customers (Alameda County Water District 2016).

Contra Costa Water District

The Contra Costa Water District (CCWD) provides water to approximately 500,000 people in Contra Costa County, covering a total area of 140,000 acres. It operates and maintains a complex system of water transmission, treatment, and storage facilities to supply both treated and untreated (raw) water to its customers. CCWD is both a retail and wholesale water supplier. As a retailer, CCWD provides treated water to approximately 200,000 customers in Clayton, Clyde, Concord, Pacheco, Port Costa and parts of Martinez, Pleasant Hill, and Walnut Creek. CCWD also provides retail untreated water to industrial and irrigation customers. As a wholesaler, CCWD provides treated water to the City of Antioch, the Golden State Water Company in Bay Point, and a portion of the City of Brentwood. CCWD also provides wholesale untreated water to the Cities of Antioch, Martinez, and Pittsburg, and Diablo Water District. CCWD pumps water from four intakes in the Sacramento–San Joaquin Delta (Delta). The intakes are located at Rock Slough, on Old River, on Victoria Canal, and at Mallard Slough. The backbone of the district's water conveyance system is the 48-mile Contra Costa Canal, which starts at Rock Slough and ends at the Martinez Reservoir (Contra Costa Water District 2015).

East Bay Municipal Utility District

The East Bay Municipal Utility District (EBMUD) water service area encompasses incorporated and unincorporated areas within Alameda and Contra Costa Counties. EBMUD's principal water source is the Mokelumne River Basin in the Sierra Nevada Range. EBMUD has water rights and facilities to divert up to 325 million gallons per day from the Mokelumne River, which is approximately 90% of the agency's water supply. EBMUD's Mokelumne River facilities include Pardee Dam and Reservoir located near Valley Springs, and Camanche Dam and Reservoir located 10 miles downstream of Pardee. Snowmelt from Alpine, Calaveras, and Amador Counties that feeds the upper Mokelumne River is collected in Pardee and Camanche Reservoirs, where it is stored for use by EBMUD (East Bay Municipal Utility District 2016). Based on 2010 census data and Association of Bay Area Government's Projections 2013, approximately 1.4 million people are currently served by EBMUD's water system in a 332-square-mile area extending from Crockett on the north, southward to San Lorenzo and portions of Hayward (encompassing the major cities of Oakland and Berkeley), eastward from the San Francisco Bay to Walnut Creek, and south through the San Ramon Valley (including Alamo, Danville, and San Ramon).

Marin Municipal Water District

The Marin Municipal Water District (MMWD) serves the populous eastern corridor of Marin County from the Golden Gate Bridge northward up to, but not including, Novato. The district is bounded by the San Francisco Bay on the east and stretches through the San Geronimo Valley in the west. The incorporated cities and towns of San Rafael, Mill Valley, Fairfax, San Anselmo, Ross, Larkspur, Corte Madera, Tiburon, Belvedere, and Sausalito are within the district's service area. The district covers approximately 147 square miles and serves a population of approximately 190,000 customers through about 61,800 active service connections. The majority of the district's water supply comes from a network of seven local, rain-fed reservoirs. MMWD's potable water distribution system includes approximately 886 miles of water mains, 94 pump stations, and 127 treated water storage tanks with a total storage capacity of 81.9 million gallons. Water within the district's service area is largely used for single-family and multifamily residential homes, which make up 75% of the district's total demand. Commercial, institutional, and landscape constitute the remaining 25% of total demand (Marin Municipal Water District 2016).

City of Napa Water Department

The City of Napa is a major water supply source in Napa County, receiving its annual State Water Project (SWP) entitlement through the Napa County Flood Control and Water Conservation District, which is the contract administrator. The designated water service areas include most of the lower Napa Valley, the Rural Urban Limit Line, and all areas within the Napa city limits. The City exports water to American Canyon, St. Helena, Calistoga, Yountville, and the California Veterans Home. As of 2015, the population served by the City of Napa Water Department was 87,615. The City of Napa currently meets its demands by supplying water from three major sources: Lake Hennessey, the Milliken Reservoir, and the SWP, as delivered through the North Bay Aqueduct (City of Napa 2017).

San Francisco Public Utilities Commission

Over 2.6 million people in San Francisco and throughout the San Francisco Bay Area (Bay Area) rely on water supplied by the San Francisco Public Utilities Commission (SFPUC), a department of the City and County of San Francisco, to meet their daily water needs (San Francisco Public Utilities

Commission 2016). The Hetch Hetchy Regional Water System (RWS) is a municipally owned utility operated by the SFPUC, and serves both retail and wholesale customers.

The RWS supplies high-quality drinking water from the Tuolumne River watershed and from local reservoirs in the Alameda and Peninsula watersheds. The RWS draws an average of 85% of its supply from the Tuolumne River watershed, collected in Hetch Hetchy Reservoir in Yosemite National Park. This water feeds into an aqueduct system delivering water 167 miles by gravity to Bay Area reservoirs and customers. The remaining 15% of the RWS supply is drawn from local surface waters in the Alameda and Peninsula watersheds. The split between these resources varies from year to year depending on the water year hydrology and operational circumstances.

Separate from the RWS, the in-city distribution system is also owned and operated by the SFPUC and serves a population of nearly 850,000 in San Francisco. In-city retail customers are primarily served with RWS supply, but a few customers receive groundwater and recycled water. Similarly, suburban retail customers are primarily served with RWS supply, but a few customers receive groundwater.

Santa Clara Valley Water District

The Santa Clara Valley Water District (SCVWD) is Santa Clara County's primary water provider. The SCVWD is an independent special district that provides wholesale water supply, groundwater management, flood protection and stream stewardship. Its service area includes all of Santa Clara County, which is located at the southern end of the San Francisco Bay. The county encompasses approximately 1,300 square miles and has a population of about 1.9 million. Most water use occurs on the valley floor between the Santa Cruz Mountains to the west and the Diablo Range to the east (Santa Clara Valley Water District 2016).

About half of the county's water supply currently comes from local sources and about half comes from imported water sources. Imported water includes the SCVWD's SWP and Central Valley Project contract supplies and supplies delivered by the SFPUC to cities in northern Santa Clara County. Local sources include natural groundwater recharge and surface water supplies, including surface water rights held by the SCVWD, San Jose Water Company, and Stanford University. A small but growing portion of the County's water supply is recycled water. The SCVWD supplies are used to recharge the local groundwater subbasins, treated at drinking water treatment plants, released to local creeks to meet environmental needs, or sent directly to water users.

Solano County Water Agency

The Solano County Water Agency is a wholesale water agency that provides untreated water to cities and agricultural districts in Solano County from the federal Solano Project and the North Bay Aqueduct of the SWP.

The Solano County Water Agency's service area population in 2015 was 429,400. It has water contracts to deliver water to Fairfield, Suisun City, Vacaville, Vallejo, Solano Irrigation District, Maine Prairie Water District, the University of California, Davis, and the California State Prison in Solano. The SWP has rights to water originating from the Sacramento and San Joaquin Rivers, and it stores water at Lake Oroville on the Feather River. The SWP provides water to the Solano County Water Agency through the North Bay Aqueduct, a 27-mile-long pipeline that delivers untreated municipal water from Barker Slough in the Delta to Napa and Solano Counties (Solano County Water Agency 2016).

The major facilities of the Solano Project are the Monticello Dam, which captures water from Putah Creek in Lake Berryessa, the Putah Diversion Dam, which diverts water out of lower Putah Creek, and the Putah South Canal, which delivers water to local agencies. The Putah South Canal is 33 miles long.

The Solano County Water Agency has contracted with the California Department of Water Resources (DWR) for an ultimate allocation of 47,756 acre-feet of water per year from the SWP. In 2015, the Solano County Water Agency delivered a total of 206,030 acre-feet of water to its respective agencies.

Sonoma County Water Agency

The Sonoma County Water Agency serves a large portion of Sonoma County as well as the eastern portion of Marin County. The primary water source for the Sonoma County Water Agency is the Russian River. The Russian River originates in central Mendocino County and discharges into the Pacific Ocean near Jenner, about 20 miles west of Santa Rosa, and is approximately 110 miles in length. Additionally, the Santa Rosa Plain provides groundwater. Groundwater is an important source of water in Sonoma County because it provides the domestic water supply for most of the unincorporated portion of the county, and is a primary source of water for agricultural users. Three Sonoma County Water Agency wells located along the Russian River-Cotati Intertie Pipeline in the Santa Rosa Plain also provide a portion of the Sonoma County Water Agency's water supply. The Sonoma County Water Agency diverts water from the Russian River and delivers it to customers through a transmission system. The transmission system consists of six radial collector wells at the Wohler and Mirabel production facilities adjacent to the Russian River (Sonoma County Water Agency 2016).

Zone 7 Water Agency

Zone 7 Water Agency's water service area is located about 40 miles southeast of San Francisco and encompasses an area of approximately 425 square miles of the eastern portion of Alameda County, including the Livermore-Amador Valley, Sunol Valley, and portions of the Diablo Range.

Zone 7 Water Agency's service area overlies the Alameda Creek watershed. This watershed encompasses almost 700 square miles, and extends from Altamont Pass to the east, San Francisco Bay to the west, Mount Diablo to the north, and Mount Hamilton to the south.

Zone 7 Water Agency is the water wholesaler for the Livermore-Amador Valley as well as the area's flood control agency. It supplies untreated water for agriculture and treated drinking water to the California Water Service Company, Dublin San Ramon Services District, the City of Livermore, and the City of Pleasanton (Zone 7 Water Agency 2016).

Recycled Water

In the 1990s, a number of local agencies joined with DWR and the U.S. Bureau of Reclamation to study the feasibility of using high-quality recycled water to augment water supplies and help the Bay-Delta ecosystem. This cooperative effort, known as the Bay Area Regional Water Recycling Program, produced a Master Plan for regional water recycling in 1999 for the five South Bay counties. Since then, local water agencies have built a number of projects consistent with the water recycling program and recycled water has come to be widely used in the study area for a number of applications, including landscape irrigation, agricultural needs, commercial and industrial purposes,

and as a supply to the area's wetlands. The 2006 Bay Area Integrated Regional Water Management Plan identified 43 potential recycled water projects that could be implemented by the year 2020. The potential market for recycled water is estimated to be 240,000 acre-feet per year by 2025.

Water Supply Infrastructure

Approximately two-thirds of the water used by Bay Area water agencies comes from non-local sources, primarily the Sierra Nevada and the Delta. As a result, the region relies on a diverse network of water infrastructure including aqueducts and storage facilities to convey supplies to its residents. Major facilities include the following.

- **Contra Costa Canal.** Originally constructed to serve agricultural needs, the Contra Costa Canal now is the backbone of the CCWD transmission system. The canal spans 48 miles, conveying water from the Delta to CCWD's treatment facilities and raw water customers.
- **Delta-Mendota Canal.** The Delta-Mendota Canal is a 120-mile segment of the Central Valley Project, which provides water to much of the Central Valley. It runs south along the western edge of the San Joaquin Valley and conveys water to the San Luis Reservoir, which stores water supplies for SCVWD customers.
- **Hetch Hetchy Aqueduct.** The 156-mile Hetch Hetchy Aqueduct roughly parallels the Tuolumne River, conveying SFPUC supplies from the Hetch Hetchy Reservoir across the San Joaquin River and San Francisco Bay, up the peninsula and into Upper Crystal Springs Reservoir, located north of Redwood City.
- **Mokelumne Aqueducts.** The three aqueducts that compose the Mokelumne Aqueduct System convey most of EBMUD's supply 87 miles from Pardee Reservoir on the Mokelumne River to Walnut Creek.
- **North Bay Aqueduct.** The aqueduct is an underground pipeline operated remotely by the DWR. The aqueduct extends from the Delta to Napa County, Vallejo, and Benicia. Solano County Water Agency and the Napa County Flood Control Water and Conservation District, which includes the City of Napa as a member agency, receive Delta supplies through the North Bay Aqueduct.
- **Russian River Transmission Facilities.** Sonoma County Water Agency operates diversion facilities at the Russian River and an aqueduct system composed of pipelines, pumps, and storage tanks.
- **South Bay Aqueduct.** The South Bay Aqueduct conveys water from the Delta through more than 40 miles of pipelines and canals. Alameda County Water District, Zone 7 Water Agency, and SCVWD receive SWP supplies conveyed through the South Bay Aqueduct.

Wastewater Treatment and Disposal

Wastewater is generated by residential, commercial, and industrial sources throughout the study area. Treatment of wastewater provides protection for human health and receiving waterbodies, preservation of the health of aquatic and riparian species, and improved supply reliability through the removal of harmful pollutants from discharges.

Cities, counties, and special district throughout the Bay Area provide wastewater treatment facilities. These facilities include systems made up of pipelines, pipe stations, interceptor stations, and discharge stations. Treatment plants usually send wastewater through three treatment processes, as well as disinfection, storage, and eventual possible reclamation. Many of the Bay Area's

wastewater treatment plants include primary and secondary treatment for wastewater, as well as recycled water programs that produce tertiary treated recycled water for various uses. In many cases, secondary effluent is discharged into the San Francisco Bay, and wastewater from Solano County is pumped into the Delta. Wastewater is also recycled for other uses such as agriculture, irrigation, or landscaping. Wastewater treatment in the Bay Area is provided by various agencies as well as individual city and town wastewater treatment systems.

Stormwater Treatment

Within the study area, stormwater discharge is regulated at the regional, county, and city level. In the early 1990s, regional water quality control boards (RWQCBs) issued countywide municipal stormwater permits to operators of municipal separate storm sewer systems (MS4s) serving populations of more than 100,000. Subsequently, in 2009, the San Francisco Bay RWQCB reissued these countywide municipal stormwater permits as one Municipal Regional Stormwater NPDES Permit to regulate stormwater discharges from municipalities and local agencies in Alameda, Contra Costa, San Mateo, and Santa Clara Counties, as well as the cities of Fairfield, Suisun City, and Vallejo. MS4s are defined as conveyance systems that are owned by cities or other public entities, designed to collect or convey stormwater (including gutters, storm drains, pipes, and ditches), and are not part of a combined sewer or a publicly owned sewage treatment plant. Additionally, a General Permit for Discharge of Stormwater from Small MS4s regulates the discharge of stormwater for the following municipalities: Marin County and its cities, Napa County and its cities, the City and County of San Francisco, Solano County and the City of Benicia, and Sonoma County and the Cities of Petaluma and Sonoma. Title 40 of the Code of Federal Regulations (CFR) Section 122.26(b)(16) defines Small MS4s as those not defined as “large” or “medium” MS4s under Section 122.26(b)(4) or (b)(7) or designated under 40 CFR Section 122.26(a)(1)(v), and is not a combined system. The term *Small MS4s* includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares.

Each county has its own stormwater pollution prevention programs that aim to facilitate compliance with state and federal regulations through coordination with local municipalities, local residents, businesses, and schools. These programs provide initiatives for preventing stormwater pollution, protecting and enhancing water quality in watersheds, waterways, creeks and wetlands, as well as water pollution prevention in the San Francisco Bay and Pacific Ocean.

Solid Waste Disposal

Solid waste is the garbage, refuse, and other discarded solid materials generated by residential, commercial, and industrial activities. The California Department of Resources Recycling and Recovery identifies 10 categories of wastes: paper, glass, metal, electronics, plastic, other organic, construction and demolition, household hazardous waste, special waste, and mixed residue. Solid waste generation is measured by disposal and diversion. The California Public Resources Code Section 40192 defines disposal as “the final deposition of solid wastes onto land, into the atmosphere, or into the waters of the state.” Solid waste that is disposed in landfills is measured in volume (cubic yards) and weight (tons). Diversion includes programs and practices such as waste prevention and source reduction, recycling, reuse, and composting that reduce the total amount of waste that requires disposal.

The study area is currently served by 16 privately operated landfills and one operated by the Sonoma County Public Works Department. The 17 landfills have a total remaining capacity of 321,816,851 cubic yards, a total daily throughput of 46,374 tons per day, and an estimated average of 63% remaining capacity.

3.18.2 Environmental Impacts

3.18.2.1 Methods for Analysis

Impacts related to utilities were assessed qualitatively based on professional judgment in light of the activities, methods, and techniques currently implemented by Pacific Gas and Electric Company (PG&E). Because PG&E has conducted operations and maintenance (O&M) activities in the study area for more than 30 years, O&M impacts identified in this section represent baseline environmental conditions that would not change following the approval of the Incidental Take Permit (ITP).

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures

PG&E employs land planners, biologists, cultural resource specialists, environmental field specialists, and other environmental professionals to ensure that O&M and minor new construction activities are in compliance with applicable state and federal laws and regulations.

PG&E also implements best management practices (BMPs) for water quality as standard practices to avoid or minimize potential impacts on water quality. Refer to Section 3.10.2, *Environmental Impacts*, for a summary of the company's water quality practices. Additionally, O&M activities involving the creation or alteration of stormwater drainage facilities would be conducted in accordance with applicable BMPs found in State Water Resources Control Board (SWRCB) Order WQ 2017-0029-DWQ and General Permit No. CAG670001 and SWRCB Order No. 2006-0008-DWQ and NPDES No. CAG990002.

In addition, PG&E's *Bay Area Operations and Maintenance Habitat Conservation Plan* (Bay Area O&M HCP) contains the following avoidance and minimization measures (AMMs) related to utilities and service systems.

- **Dust Control:** While implementing dust control measures during covered activities, PG&E will keep the amount of water used to the minimum amount needed, and will not allow water to form puddles. Chemical additives used for dust suppression will not cause harm to sensitive species.
- **Trash Abatement:** PG&E will initiate a trash abatement program before starting covered activities and will continue the program for the duration of the project. PG&E will ensure that trash and food items are contained in animal-proof containers and removed at least once a week.
- **Field Protocol (FP)-08:** Prohibit trash dumping, firearms, open fires (such as barbecues), hunting, and pets (except for safety in remote locations) at work sites.
- **FP-11:** Utilize standard erosion and sediment control BMPs 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 waterbodies, stormwater inlets, other standing bodies of water. Cover stockpiled soil prior to precipitation events.

Significance Criteria

In accordance with Appendix G of the State CEQA Guidelines, the potential significance of impacts related to utilities and service systems from the proposed project and implementation of covered activities was evaluated for each of the following criteria:

- Exceedance of wastewater treatment requirements of the applicable RWQCB.
- Construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Creation of a need for new or expanded entitlements to ensure sufficient water supplies to serve the project.
- A determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.
- Project-related exceedance of the relevant landfill's permitted capacity to accommodate the project's solid waste disposal needs.
- Inconsistency with federal, state, and local statutes and regulations related to solid waste.

3.18.2.2 Impact Discussion

Impact UT-1: Exceedance of wastewater treatment requirements of the applicable Regional Water Quality Control Board (No Impact)

O&M activities associated with PG&E's Bay Area existing electrical and gas facilities, within the approximately 402,440-acre study area, would not result in an exceedance of various RWQCB wastewater treatment requirements. With the exception of hydrostatic testing activities (described below), O&M activities utilize and discharge water primarily for dust control purposes and would not result in the generation of new wastewater. Water discharged during dust control activities is distributed over the work areas and evaporates or infiltrates into the ground. The mitigation sites may require restoration or enhancement work; however, this work would have no effect on wastewater. For these reasons, no impact would result.

As described in Chapter 2, *Project Description*, hydrostatic testing is performed to verify the strength and integrity of newly installed pipe and some portions of existing pipe. Wastewater resulting from hydrostatic testing would continue to be discharged in accordance with applicable federal and state regulations to ensure that the discharge does not violate water quality standards and/or waste discharge requirements. Compliance with SWRCB Order WQ 2017-0029-DWQ General Permit No. CAG670001 is required for discharges from natural gas utility construction and O&M activities. PG&E is anticipating it would be able to discharge water to baker tanks or existing onsite sewer systems after testing. If baker tanks or sewer systems are not feasible when working in natural vegetation areas, crews would lay temporary plastic or rubber pipe to discharge the test water to

less sensitive natural areas or agricultural land. PG&E discharges only clean water, and the water is not released under pressure. Dewatering for vaults, if necessary because of a high groundwater table or stormwater runoff, is conducted using a pump or well-pointing to remove water from the trench and is regulated under SWRCB Order No. 2014-0174-DWQ and NPDES No. CAG990002. Wastewater generated by O&M activities would be discharged consistent with SWRCB Order WQ 2017-0029-DWQ and General Permit No. CAG670001, and SWRCB Order No. 2006-0008-DWQ, SWRCB Order no. 2003-0003-DWQ, and NPDES No. CAG990002 requirements or other State or Regional Board Orders for low threat discharges. These discharges may be to storm drains with proper filtration or to land with proper filtration and where no ponding or vector issues would be created. PG&E would also comply with water sampling, monitoring, and reporting requirements required by these orders. As a result, discharged wastewater would continue to not exceed applicable regional water quality objectives or the federal water quality criteria set forth by Section 303 of the Clean Water Act. Therefore, no impact would result. AMMs in PG&E's Bay Area O&M HCP further ensure that there will be no wastewater impacts by addressing water quality considerations. FP-11 requires implementation of sediment control BMPs contained in PG&E's *Stormwater Field Manual for Construction Best Management Practices* to prevent construction site runoff into waterways. FP-12 would require stockpiling soil within established work area boundaries so that soil does not enter waterbodies or stormwater inlets, and would require covering stockpiled soil prior to precipitation events.

A minimal amount of wastewater would be generated during minor new construction, from activities such as excavation dewater or equipment washing stations. Additionally, portable toilets would be used in accordance with Occupational Safety and Health Administration sanitation regulations, which generally require one portable toilet for every 15 workers. Based on the minimal amount of effluent generated by workers during construction, the amount of wastewater generated would be negligible. Portable toilets would be available for workers and maintained by a licensed sanitation contractor. The licensed contractor would dispose of the waste offsite in compliance with RWQCB requirements. Additionally, AMMs in PG&E's Bay Area O&M HCP further ensure that there will be no wastewater impacts by following FP-11 require implementation of sediment control BMPs contained in PG&E's *Stormwater Field Manual for Construction Best Management Practices* to prevent construction site runoff into waterways. FP-12 would require stockpiling soil within established work area boundaries so that soil does not enter waterbodies or stormwater inlets, and would require covering stockpiled soil prior to precipitation events. Thus, no impact would result.

Impact UT-2: Construction of new water or wastewater treatment facilities or expansion of existing facilities, with the potential to cause significant environmental effects (No Impact)

O&M activities conducted in the study area would not require or result in the permanent construction of new water or wastewater treatment facilities. O&M activities would not create any significant new ongoing use of water that would trigger the construction or expansion of wastewater treatment facilities. Water utilized during O&M activities would generally be transported to the activity site in a water truck. However, O&M activities (e.g., dewatering and hydrostatic testing) may require the use of an available water source, as well as the discharge of wastewater. PG&E O&M activities do not currently cause a measurable impact on water facilities. PG&E anticipates conducting up to five hydrostatic tests per year and potentially 150 hydrostatic tests over the next 30-year ITP term, which is approximately the frequency and duration of these activities currently occurring under baseline conditions. The mitigation sites may require restoration or enhancement work; however, this work would have no effect on water or wastewater

treatment facilities. Therefore, O&M activities would not require the expansion of water or wastewater treatment facilities, and there would be no impact.

Minor new construction activities would not require or result in the construction or expansion of water or wastewater treatment facilities. Water would be temporarily required during construction for worker consumption, compaction of substation soils, and dust control. Water consumed by construction workers would be obtained from municipal sources; thus, it would already be treated and not require further treatment. Water used for soil compaction activities is not anticipated to require treatment; however, should treatment be required, it would be conducted on site in accordance with RWQCB requirements. Water to be used for dust control would be dispersed onsite to be absorbed into the ground and does not need to be treated. As a result, existing water treatment facilities would not be affected, nor would they require expansion. Therefore, no impact would result.

Wastewater service would be provided by portable toilets, and waste would be disposed of at appropriately licensed offsite facilities. No other wastewater would be generated. As a result, no new wastewater treatment facilities would need to be constructed, and no existing facilities would need to be expanded to accommodate the treatment of the construction wastewater. Therefore, no impact would occur.

Impact UT-3: Construction of new stormwater drainage facilities or expansion of existing facilities, with the potential to cause significant environmental effects (Less-than-Significant Impact)

For some O&M activities, alteration or replacement of culverts may be required during right-of-way or access road repair. In addition, erosion control techniques implemented during O&M activities may require constructing new stormwater drainage facilities (e.g., diversion channels and terraces), installing ditch plugs, and implementing additional soil stabilization practices. However, O&M activities involving the creation or alteration of stormwater drainage facilities would be conducted in accordance with applicable BMPs found within SWRCB Order WQ 2017-0029-DWQ and General Permit No. CAG670001 and SWRCB Order No. 2006-0008-DWQ to minimize impacts associated with stormwater runoff. PG&E would continue to minimize disturbance areas, properly dispose of waste and spilled materials, remove materials and equipment upon the completion of an activity, and train employees on the implementation of BMPs. PG&E employs erosion control techniques to preclude pipeline washout, gully development, and sedimentation of local drainages. Standard erosion control measures may include installation of water bars along temporary or dirt roads, diversion channels and terraces to reduce erosion and runoff, ditch plugs installed in ditches to prevent washout, and other soil stabilization practices such as jute mats, wood mulching, straw mulching, and other methods described in the California Stormwater Best Management Practices Handbook. The methods selected depend on the situation and the condition of the site. If the alteration or replacement of a culvert or minor expansion of an electrical substation is proposed within jurisdictional waters, PG&E would obtain the necessary resource permits prior to the disturbance in jurisdictional areas. The mitigation sites may require restoration or enhancement work; however, this work would have no effect on stormwater drainage facilities. Refer to Section 3.10, *Hydrology and Water Quality*, for a discussion of stormwater runoff, erosion control, BMPs, and applicable AMMs. BMPs include cleaning and safely disposing of any spilled materials, scheduling activities to avoid rainfall events and periods of high flow, checking and maintaining equipment and vehicles, and restoring disturbed areas. Therefore, potential impacts resulting from the alteration of stormwater drainage facilities would be less than significant.

For minor new construction activities such as minor substation expansion, up to 3 acres of new disturbance. As with O&M activities, minor new construction activities involving the creation or alteration of stormwater drainage facilities would be conducted in accordance with applicable BMPs to minimize impacts associated with stormwater runoff and include standard erosion control techniques, as described above. If the alteration or replacement of a culvert or minor expansion of an electrical substation is proposed within jurisdictional waters, PG&E would obtain the necessary resource permits prior to the disturbance in jurisdictional areas. Therefore, potential impacts resulting from the alteration of stormwater drainage facilities associated with minor new construction would be less than significant.

Impact UT-4: Creation of a need for new or expanded entitlements or resources for sufficient water supply (No Impact)

The majority of the O&M activities associated with the study area are limited in both size and scope. Water would either be transported to work areas or supplied by local public utility districts. In addition, water requirements during construction would not exceed the available supply in the study area. PG&E O&M activities do not currently affect water supply availability, and the frequency and duration of these activities are not expected to change significantly. New construction would not result in a substantial increase in water demand because existing offsite water entitlements and resources would be sufficient to accommodate the project's minor temporary and short-term water needs and relatively small number of construction workers. Emergency work would be similar in nature to O&M activities. The mitigation sites may require restoration or enhancement work; however, this work would have no effect on the water supply. For these reasons, no impact would result.

Impact UT-5: Project-related exceedance of existing wastewater treatment capacity (No Impact)

As described above under Impact UT-1, water used for dust control would be distributed over the work areas and would evaporate or infiltrate the ground and would not be disposed of at wastewater treatment facilities. As described under Impact UT-2, water used for hydrostatic testing or water from groundwater dewatering would initially be discharged to steel liquid storage tanks or existing sewer systems. Water used for hydrostatic testing would be tested and treated if required to meet the requirements of applicable permits prior to being discharged. O&M activities lasting for extended periods of time could require the use of one or two portable restrooms. Depending on the O&M activity, crews would generally consist of two to five workers, and O&M activities would typically last between 1 and 60 days. Due to the relatively small crew size, a minimal amount of wastewater would be generated during O&M activities. Wastewater would be hauled to and disposed of at the nearest wastewater treatment facility with available capacity. PG&E O&M activities do not currently have a measurable impact on wastewater treatment facilities, and the frequency and duration of these activities are not expected to change significantly. The mitigation sites may require restoration or enhancement work; however, this work would have no effect on wastewater treatment capacity. Therefore, O&M activities in the study area would result in no impact on existing wastewater treatment providers and their capacities.

Minor new construction activities such as minor substation expansion may require 10 to 20 workers and take between 1 and 4 months to complete. Due to the relatively small crew size and short duration, a minimal amount of wastewater would be generated during minor new construction activities. Wastewater would be hauled to and disposed of at the nearest wastewater treatment

facility with available capacity. PG&E minor new construction activities do not currently have a measurable impact on wastewater treatment facilities, and the frequency and duration of these activities are not expected to change significantly. Therefore, minor new construction activities in the study area would result in no impact on existing wastewater treatment providers and their capacities.

Impact UT-6: Project-related exceedance of the relevant landfill's permitted capacity (Less-than-Significant Impact)

Solid waste materials generated as a result of covered activities would be similar to trash from existing O&M activities: trash from consumables; pipe bandings and spacers; spent welding rods; timber skids; and cleared vegetation, stumps, soil and rocks. Nonhazardous construction debris would also include empty bags, plastic wrapping, cardboard boxes, and shipping containers. When feasible, materials (e.g., cardboard and metal) would be recycled, and the overall amount of waste generated would be minimized. Waste generated during O&M activities would be disposed of at Class III landfill sites, which are designated for disposal of nonhazardous wastes. The study area has 17 landfills available for use to accommodate disposal needs of covered activities. Based on the frequency and duration of ongoing O&M activities in the study area, it is expected that existing landfill capacity levels would be sufficient to accommodate O&M and minor new construction activities, as demonstrated by the lack of conflicts currently experienced during O&M activities. The mitigation sites may require restoration or enhancement work; however, this work would have no effect on landfill capacity. Therefore, covered activities would not result in greater amounts of waste than could be accommodated by existing landfills in the study area, and potential impacts resulting from generation of solid waste would be less than significant.

Additional solid waste generated during minor new construction would include material packaging, wooden skids, excess conductor, insulators and construction debris. These materials would be cleared from construction areas, stored in approved containers on site, and hauled away for recycling or disposal periodically during construction. Minor new construction activities would also generate minimal solid waste from food, glass, paper, plastic, and packing materials produced by construction workers during construction periods. Existing landfills in the Bay Area would be sufficient to accommodate the negligible amount of solid waste generated during construction. Therefore, potential impacts resulting from generation of solid waste during construction would be less than significant.

Impact UT-7: Inconsistency with federal, state, and local statutes and regulations related to solid waste (No Impact)

It is PG&E's practice to comply with all applicable laws and regulations. While implementing covered activities, PG&E would continue to dispose of waste in accordance with applicable federal, state, and local statutes and regulations related to solid waste. Therefore, no impact would result.

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3.19 Wildfire

3.19.1 Existing Conditions

3.19.1.1 Regulatory Setting

Federal

No federal regulations regarding wildfires apply to this project.

State

California Department of Forestry and Fire Protection

Pursuant to Public Resources Code (PRC) Sections 4201–4204 and Government (Gov’t) Code Sections 51175-89, the California Department of Forestry and Fire Protection (CAL FIRE) has created Fire Hazard Severity Zone (FHSZ) maps for the state that identify areas that are within state or local responsibility for preventing or suppressing fires. These maps identify areas of significant fire hazard based on fuels, terrain, weather, and other relevant factors. The FHSZs then define the application of various mitigation strategies to reduce risks associated with wildland fires. State Responsibility Areas (SRAs) are areas of the state in which the financial responsibility of preventing and suppressing fires has been determined to be primarily the responsibility of the state (PRC Section 4201). Local Responsibility Areas (LRAs) are areas in which the financial responsibility of preventing and suppressing fires is primarily the responsibility of local agencies, including cities and counties (Government Code Sections 51175–51189). SRAs were originally mapped by CAL FIRE in 1985 and LRAs in 1996.

Within SRAs, the Director of CAL FIRE has designated areas as moderate, high, and very high fire hazard severity zones (PRC Section 4202). Outside of SRAs, within LRAs, the Director of CAL FIRE was charged with recommending the locations of very high fire hazard severity zones (VHFHSZs) (Government Code Section 51178.). These recommendations were to be reviewed and adopted in ordinances by local agencies (Government Code Section 51179), although not all local agencies have complied. All designations are mapped on the CAL FIRE website.

California Public Resources Code

PRC Sections 4292 and 4293 identify construction and operations and maintenance (O&M) requirements to minimize fire hazards for electrical transmission or distribution lines located in SRAs, in which the financial responsibility of preventing and suppressing fires has been determined to be primarily the responsibility of the state. These PRC sections are as follows.

PRC Section 4292 addresses power line hazard reduction. It identifies the requirements for firebreaks around “any pole or tower which supports a switch, fuse, transformer, lightning arrester, line junction, or dead end or corner pole” in wildland areas.

PRC Section 4293 provides specific clearances for electrical transmission or distribution lines in wildland areas.

Rules for Overhead Electric Line Construction

General Order (G.O.) 95 from the California Public Utilities Commission (CPUC) regulates all aspects of design, construction, and O&M of electrical power lines and fire safety hazards for utilities subject to its jurisdiction. On February 5, 2014, the CPUC adopted its Decision Adopting Regulations to Reduce the Fire Hazards Associated with Overhead Electric Utility Facilities and Aerial Communications Facilities (Decision 14-02-015). In addition to updating various G.O. 95 requirements and ordering further study, the decision called for the CPUC to create a High Fire-Threat District map identifying zones of high hazard, elevated risk, and extreme risk for destructive utility-associated wildfires.

In January 2018, the CPUC adopted its High Fire-Threat District Map, which designates three areas where there is an increased risk from wildfires: Tier 3 (extreme fire risk), Tier 2 (elevated fire risk), and Zone 1 (CAL FIRE Tree Mortality High Hazard Zone Tier One not included in Tier 3 or Tier 2). Tier 2 fire-threat areas depict areas where there is an elevated risk (including likelihood and potential impacts on people and property) from utility-associated wildfires. Tier 3 fire-threat areas depict areas where there is an extreme risk (including likelihood and potential impacts on people and property) from utility-associated wildfires (California Public Utilities Commission 2018). These CPUC designations do not replace CAL FIRE's FHSZs.

On October 25, 2018, the CPUC entered an Order Instituting Rulemaking to Implement Electric Utility Wildfire Mitigation Plans Pursuant to Senate Bill 901 (2018), R.18-10-007, facilitating SB 901's requirement that the Pacific Gas and Electric Company (PG&E) and other utilities submit wildfire mitigation plans. PG&E submitted its Amended 2019 Wildfire Safety Plan on February 6, 2019 (Pacific Gas and Electric Company 2019), which "describes the enhanced, accelerated, and new programs that PG&E is and will aggressively continue to implement to prevent wildfires in 2019 and beyond." On February 7, 2020, PG&E submitted its updated 2020 Wildfire Mitigation Plan (Pacific Gas and Electric Company 2020).

Fire Prevention Standards for Electric Utilities

The Fire Prevention Standards for Electric Utilities (California Code of Regulations Title 14, Sections 1250–1258) provide definitions, maps, specifications, and clearance standards for applying the requirements of PRC Sections 4292–4296 to projects in SRAs under CAL FIRE's jurisdiction.

Local

Because the CPUC has exclusive jurisdiction over the siting, design, and construction of PG&E electric and gas facilities, the project is not subject to local land use and zoning regulations or discretionary permits. The following discussion is provided for information purposes and to assist with California Environmental Quality Act (CEQA) analysis.

General Plans

California law requires counties and cities to develop comprehensive, long-term general plans to guide their land use decision making and physical development. Of the seven required elements, or chapters, in a general plan, several relate directly or indirectly to wildfire, primarily with regard to how local jurisdictions will manage growth in fire hazard severity zones. For instance, the land use element identifies an appropriate balance and distribution of the various types of land uses (e.g., residential, commercial, industrial, recreational) present in a community. The safety element provides policy direction that supports laws and regulations related to safety hazards such as

wildfire. The conservation element addresses conservation, development, and utilization of natural resources including water and hydraulic force, forests, soils, rivers and other waters, harbors, fisheries, wildlife, minerals, and other natural resources. The open-space element contains goals and strategies to preserve open space for a range of purposes.

3.19.1.2 Environmental Setting

The CAL FIRE FHSZ maps identify areas that are within federal (FRA), state (SRA) or local (LRA) responsibility for preventing or suppressing fires. Within SRAs, the Director of CAL FIRE has designated areas as moderate, high and very high fire hazard severity zones based on factors such as potential fuel sources, terrain, weather, fire behavior characteristics, burn probabilities, and the likelihood of vegetation exposure. Within LRAs, CAL FIRE has recommended the locations of VHFHSZs that may or may not be adopted by local governing agencies. The CAL FIRE maps also show federal areas and fire hazard designations within those federal areas.

According to CAL FIRE maps for the study area, there are several areas throughout the nine Bay Area counties that have lands designated as VHFHSZs (California Department of Forestry and Fire Protection 2020a). Refer to Figure 3.19-1 for FHSZs in the study area.

The CPUC has also adopted fire hazards mapping. As described in Section 3.19.1.1, *Regulatory Setting*, the CPUC adopted its High Fire-Threat District Map in January 2018, which designates fire-threat areas requiring application of enhanced fire safety. As shown on Figure 3.19-2, the study area includes many areas mapped as Tier 2 (elevated) or Tier 3 (Extreme) fire hazard zones on the CPUC's High Fire-Threat District map (California Public Utilities Commission 2018). Fire protection services and equipment within the area are discussed in detail in Section 3.15, *Public Services*.

According to CAL FIRE Incident Reporting between 2013 and 2020, there have been dozens of wildfire incidents throughout the study area. In 2020 alone, there have been two wildfire incidents in Alameda County, one in Marin, two in Napa, seven in Santa Clara, one in San Mateo, and two in Sonoma (California Department of Forestry and Fire Protection 2020b).

Evacuation routes in the study area include all major freeways and highways. These major freeway/highway routes would be highly utilized by both city and county residents and visitors as possible evacuation routes in the event of an emergency.

3.19.2 Environmental Impacts

3.19.2.1 Methods for Analysis

The potential for activities and equipment to pose fire hazards was evaluated through review of the CAL FIRE and CPUC fire hazard maps. The CPUC and PG&E fire hazard rules and policies, as well as PG&E's Company Emergency Response Plan (CERP) were also reviewed.

PG&E Practices, HCP Avoidance and Minimization Measures, and Applicant Proposed Measures

PG&E will follow its own CERP, which is updated annually and submitted to the CPUC in compliance with G.O. 166. The CERP includes PG&E's in-place plans and protocols for a coordinated response to emergencies. In 2018, the CERP added a Wildfire Safety Operations Center, staffed 24 hours a day, to detect, mitigate, communicate, and respond to fire threat hazards throughout PG&E's service area.

\\PDC\ITRDS\GIS2\Projects_3\PG&E\00068_18_Bay_Area_2081\mapdoc\Figures\ER\Wildfire\Fig_3_18_1_FireHazardSeverityZone.mxd (WCP\Mar 16, 2012)

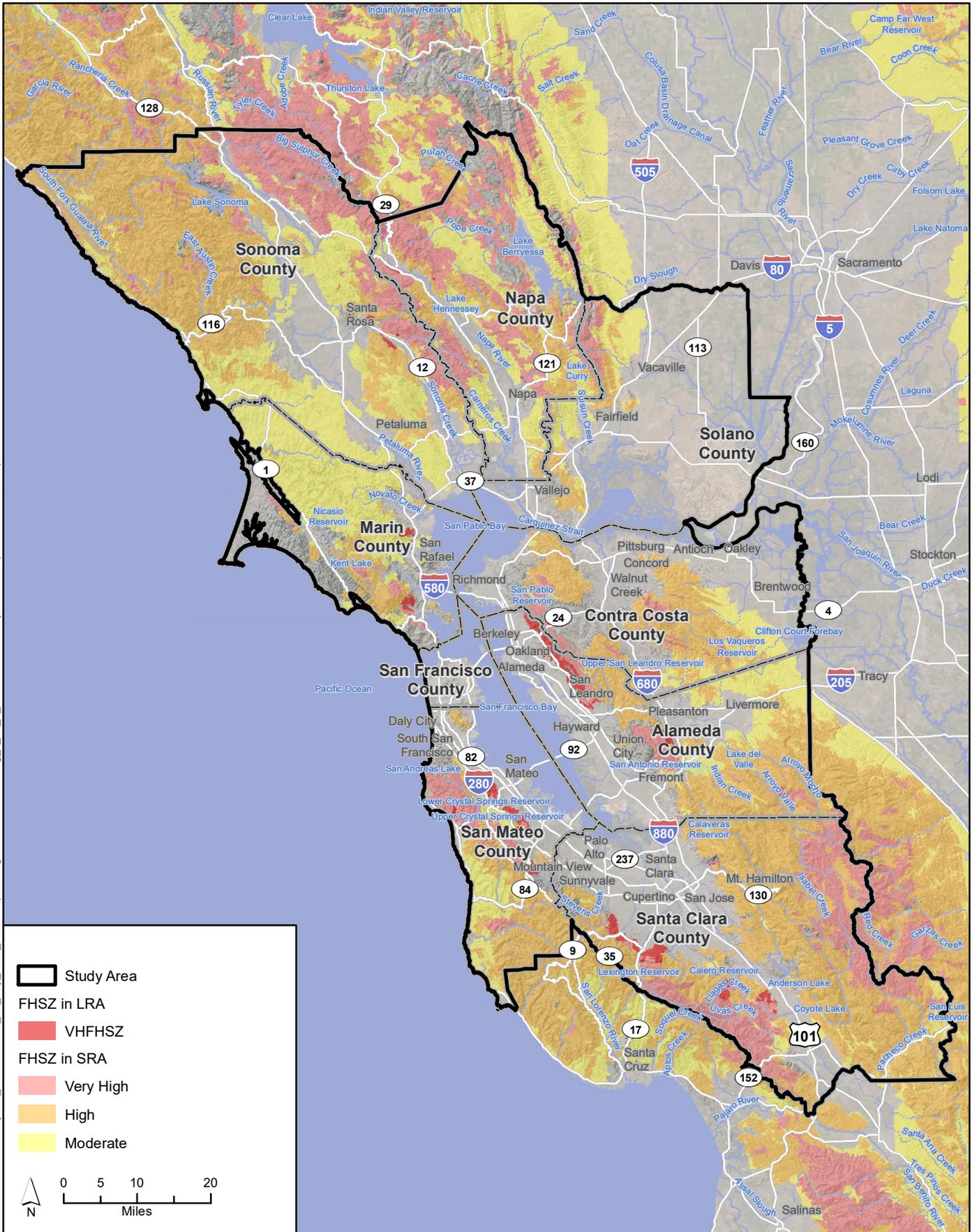
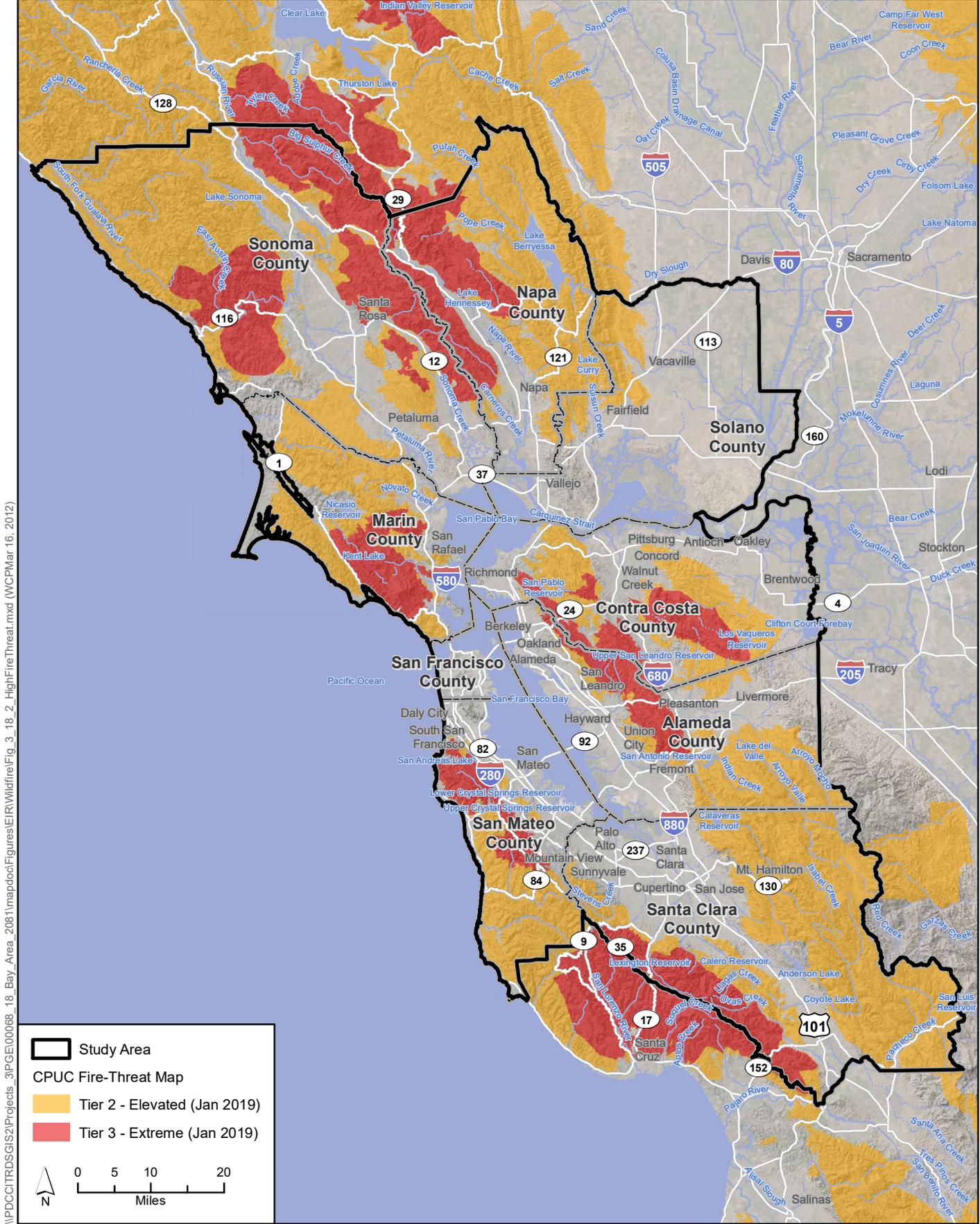


Figure 3.19-1
Fire Hazard Severity Zones in the Study Area





\\PDC\ITRDSGIS2\Projects_3\PG&E\00068_18_Bay_Area_20811\mapdoc\Figures\ER\Wildfire\Fig_3_18_2_HighFireThreat.mxd (WCPMar 16, 2012)



Figure 3.19-2
High Fire-Threat District Map

PG&E has standard company requirements for reducing fire risks during work in any forest, brush, or grass-covered land, currently set forth in Utility Standard: TD-1464S. Those requirements include measures such as tailboard training, restricting overland driving, carrying specified fire-fighting tools, ensuring water availability, parking in cleared areas, restricting smoking, review of the current fire index, and requiring a dedicated fire watch.

PG&E will also adhere to relevant CPUC, Institute of Electrical and Electronics Engineers 693, and building code earthwork standards to minimize damage from slope failure and minimize safety risk.

PG&E will also comply with all federal, state, and applicable local laws regarding fire hazards. These rules include the following construction, operation, and maintenance requirements for power lines:

- CPUC G.O. 95 regulates all aspects of design, construction, operation, and maintenance of electrical power lines and fire safety hazards for utilities subject to their jurisdiction.
- National Electric Reliability Corporation Reliability Standard FAC-003-4 establishes vegetation management standards for electric transmission lines.
- California Public Resources Code Sections 4292–4293 and 4295.5 address fire hazard reduction for electric lines and establish minimum clearances.
- PG&E's 2020 Wildfire Mitigation Plan (submitted to the CPUC on February 7, 2020).

In order to minimize risks associated with altered drainage patterns or downslope or downstream flooding, PG&E will also follow the practices detailed in Section 3.10, *Hydrology and Water Quality*.

In addition, the following AMMs from PG&E's *Bay Area Operations and Maintenance Habitat Conservation Plan* (Bay Area O&M HCP) are incorporated into the project and will aid in reducing fire risks during construction. Those that apply to all activities include:

- Field Protocol (FP)-02: Park vehicles and equipment on pavement, existing roads, or other disturbed or designated areas (barren, gravel, compacted dirt).
- FP-08: Prohibit trash dumping, firearms, open fires (such as barbecues), hunting, and pets (except for safety in remote locations) at work sites.
- FP-09: During fire season in designated SRAs, equip all motorized equipment with federally approved or state-approved spark arrestors. Use a backpack pump filled with water and a shovel and fire-resistant mats and/or windscreens when welding. During fire "red flag" conditions as determined by CAL FIRE, curtail welding. Each fuel truck will carry a large fire extinguisher with a minimum rating of 40 B:C. Clear parking and storage areas of all flammable materials.
- FP-16: Maintain a buffer of 250 feet from the edge of vernal pools and 50 feet from the edge of wetlands, ponds, or riparian areas, where feasible. If maintaining the buffer is not possible because, e.g., the areas are in or adjacent to facilities, the field crew will implement other measures as prescribed by the land planner, biologist, or administrator to minimize impacts, such as by flagging access, requiring foot access, restricting work until the dry season, or requiring a biological monitor during the activity.

The following Bay Area O&M HCP best management practices (BMPs) apply to vegetation management activities:

- BMP 3: During fire season in designated SRAs, motorized equipment will have federally approved or state-approved spark arrestors; all vehicles will be equipped with firefighting tools

as appropriate and in accordance with all applicable laws, rules, regulations, orders, and ordinances.

- BMP 4: Contractor will be responsible for checking the daily Project Activity Level (a measure of fire weather conditions that, at certain levels, restricts activities otherwise permitted) during fire season when working on U.S. Forest Service property.
- BMP 5: Smoking will not be permitted during fire season, except in a barren area or in an area cleared to mineral soil at least 3 feet in diameter. Under no circumstances will smoking be permitted during fire season while employees are operating light or heavy equipment, or walking or working in grass and woodlands.
- BMP 6: Hunting, firearms, portable stoves, open fires (such as barbecues) not required for the vegetation management activity, and pets (except for safety in remote locations) will be prohibited in vegetation management work activity sites. All trash, food items, and human-generated debris will be properly contained and/or removed from the site.

In addition to the above BMPs and AMMs from PG&E's Bay Area O&M HCP, PG&E would also implement the following applicant proposed measures (APMs) to reduce impacts associated with O&M and minor new construction activities.

APM FIRE-1: Construction Fire Prevention Practices

PG&E will implement the following fire prevention practices at active construction sites.

- During Red Flag Warning events, as issued daily by the National Weather Service, all construction activities will cease, with an exception for transmission line testing, repairs, unfinished work, or other specific activities that may be allowed if the facility/equipment poses a greater fire risk if left in its current state.
- All construction crews and inspectors will be provided with radio and cellular telephone access that is operational in all work areas and access routes to allow for immediate reporting of fires. Communication pathways and equipment will be tested and confirmed operational each day prior to initiating construction activities at each work site. All fires will be reported to the fire agencies with jurisdiction in the area immediately upon discovery of the ignition.
- Construction personnel will be trained in fire-safe actions, initial attack firefighting, and fire reporting. Construction personnel will be trained and equipped to extinguish small fires in order to prevent them from growing into more serious threats.
- All construction personnel will carry a laminated card and be provided a hard hat sticker that list pertinent telephone numbers for reporting fires and defining immediate steps to take if a fire starts. Information on laminated contact cards and hard hat stickers will be updated as needed and redistributed to all construction personnel prior to the day the information change goes into effect.
- Construction personnel will have fire suppression equipment on all construction vehicles and will be required to park vehicles away from dry vegetation. PG&E will coordinate with applicable local fire departments prior to construction activities to determine the appropriate amounts of fire equipment to be carried on vehicles and, should a fire occur, to coordinate fire suppression activities.

- Water tanks and/or water trucks will be sited or available at active project sites for fire protection during construction.

Significance Criteria

In accordance with Appendix G of the CEQA Guidelines, the proposed project, if located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would be considered to have a significant effect if it would result in any of the conditions listed below.

- Substantially impair an adopted emergency response plan or emergency evacuation plan.
- Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.
- Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment.
- Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.

3.19.2.2 Impact Discussion

Impact WF-1: Substantially impair an adopted emergency response plan or emergency evacuation plan (Less-than-Significant Impact)

PG&E annually updates its own CERP, which is prepared and submitted to the CPUC in compliance with G.O. 166. The CERP includes PG&E's in-place plans and protocols for a coordinated response to emergencies. In 2018, the CERP added a Wildfire Safety Operations Center, staffed 24 hours a day, to detect, mitigate, communicate, and respond to fire threat hazards throughout PG&E's service area. All project covered activities will comply with the CERP and, as such, the project would not impair continued implementation of its emergency response plan.

As indicated in Section 3.9, *Hazards and Hazardous Materials*, the project would likewise not substantially impair any other adopted emergency response plan or emergency evacuation plan. As described in S Section 3.17, *Transportation*, emergency access would not be directly impacted during construction because PG&E would implement traffic control plans as required by local encroachment permits, ensuring that impacts on emergency access would be less than significant. In addition, APM TRA-1 would require PG&E to provide through access for emergency vehicles at all times and would provide emergency service providers adequate lead time to ensure that emergency access and response times are maintained during PG&E work periods. PG&E would avoid travel on key commute routes and through congested intersections during peak hours. Implementation of APM TRA-1 would further ensure that impacts on the circulation system in the study area would be less than significant. The project would not substantially impair the implementation of or physically interfere with an adopted emergency response or evacuation plan; therefore, the impact would be less than significant.

Impact WF-2: Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire (Less-than-Significant Impact)

PG&E's covered activities would not exacerbate wildfire risks due to slope, prevailing winds or other factors that would expose project occupants to wildfire pollutants or cause the uncontrolled spread of a wildfire. Although the existing and proposed O&M activities, as well as minor new construction, are and would be located in very high fire hazard severity zones in some locations, PG&E's internal standards, compliance with existing laws and the additional requirements in PG&E's Bay Area O&M HCP will ensure that wildfire risks are not exacerbated by PG&E's covered activities.

The primary risk for potential fire hazards would be associated with the use of vehicles and equipment during construction and vegetation management that could generate heat or sparks that could ignite dry vegetation and cause a fire. PG&E's O&M activities are part of the existing baseline and will not change with implementation of the ITP. In both its O&M and minor new construction, PG&E will continue to implement its internal standards, set forth in TD-1464S, as well as all CPUC and other legal requirements to mitigate wildfire risks including the 2020 Wildfire Mitigation Plan. In addition, PG&E will implement the AMMs in PG&E's Bay Area O&M HCP, which include requirements such as carrying fire-fighting equipment, parking in cleared areas, and prohibiting smoking, open fires and improper storage of flammable materials. The risk for potential fire hazards associated with covered activities in the Permit Area would not be exacerbated with implementation of these measures.

In addition, PG&E will implement APM FIRE-1 to further reduce less-than-significant impacts. APM FIRE-1 would require workers to be trained in fire prevention practices and carry emergency fire suppression equipment as well as adequate water to reduce the wildland fire risk in the Permit Area. Construction is prohibited during Red Flag Warning events and coordination with local fire departments is required. These measures will further ensure that wildfire risks will not be exacerbated.

Most PG&E covered activities will decrease fire risk and increase the safety of gas and electric utility facilities. O&M activities include maintaining existing facilities and clearing vegetation that will make existing gas and electric lines safer. Minor new construction will add new, state-of-the-art facilities that will help to fire-harden the system. These activities will have a positive impact on existing fire safety.

Impact WF-3: Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment (Less-than-Significant Impact)

The project would include O&M activities related to maintaining existing and installing new infrastructure, including natural gas pipelines and electric transmission and distribution lines, as well as other minor new construction activities. These infrastructure activities could also require creation or improvement of access roads. However, most covered activities, including replacing outdated facilities and vegetation clearing, would decrease operational fire risk. Any new roadways would be more likely to provide a fire break than to exacerbate fire risk. PG&E would continue to implement fire risk management procedures during O&M and minor new construction activities, including its internal standards, existing legal requirements and the enhanced wildfire reduction programs and measures described in PG&E's 2020 Wildfire Safety Plan. PG&E would also implement

the AMMs in PG&E's Bay Area O&M HCP. Impacts related to installation of new infrastructure would be less than significant.

Implementation of APM FIRE-1 would further reduce less-than-significant impacts.

Impact WF-4: Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes (Less-than-Significant Impact)

The project will not expose people or structures to significant risks as a result of runoff, post-fire slope instability, or drainage changes. As indicated in Section 3.7, *Geology, Soils, and Paleontological Resources*, much of the study area is situated on flat or gently sloping topography where the risk of slope failure is moderate to high. In areas where slopes are steep or substantial landslide hazard exists adherence to relevant CPUC, Institute of Electrical and Electronics Engineers 693 standards, and California Building Standard Code earthwork standards would significantly reduce the risk of slope failure after a wildfire event. Based on site-specific conditions and recommendations, PG&E would take the following measures as required by these standards to prevent slope failure: place development constraints on building sites; require slope recontouring or other stabilization methods prior to construction; ensure adequate slope drainage; avoid identified landslides and unstable areas; and other site-specific approaches as deemed necessary. These measures would reduce the risk of slope instability and the associated damage that could result from post-fire slope instability.

Similarly, as indicated in Section 3.10, the project would not include substantial changes to existing drainage patterns or create new risks due to downslope or downstream flooding. PG&E would conduct covered activities associated with minor new construction activities and habitat enhancement in compliance with federal, state, and local regulations to ensure that localized flooding would be avoided or minimized. Compliance would include the following activities: continuing to implement BMPs for water quality; coordinating with and obtaining any required authorizations from the U.S. Army Corps of Engineers, California Department of Fish and Wildlife, and Regional Water Quality Control Board on a per-activity basis; and restoring disturbed areas. Furthermore, Stormwater Pollution Prevention Plan BMPs for larger projects near water features and FP-16 from PG&E's Bay Area O&M HCP require conducting major construction activities during the dry season whenever possible. The impact will be less than significant.

3.19.3 References Cited

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4.1 Introduction

This chapter presents a comparison of alternatives to the proposed project and the activities covered by the proposed Incidental Take Permit (ITP) that are identified in Chapter 2, *Project Description*, and analyzed in Chapter 3, *Impact Analysis*. This chapter considers an alternative involving changed operations and maintenance (O&M) practices, an alternative composed only of large maintenance projects, an alternative under which the ITP would cover fewer species, and the No Project Alternative.

The size and configuration of the various O&M activities were largely informed by Pacific Gas and Electric Company's (PG&E) objective to streamline incidental take permitting for the continuing O&M activities on its natural gas and electrical infrastructure in the nine San Francisco Bay Area counties of the study area, comprising approximately 4,430 miles of electrical transmission lines, 23,015 miles of distribution lines, 19,350 miles of natural gas distribution pipelines, and 1,820 miles of natural gas transmission lines. With minor exceptions, this infrastructure is already in place in PG&E's existing rights-of-way (ROWs) or fee properties. The California Department of Fish and Wildlife's (CDFW) primary objective is to minimize and fully mitigate environmental impacts on the covered species in a manner that contributes to the long-term survival of these species and other species with similar habitat requirements. CDFW considered alternatives that would meet the CDFW's objectives and the applicant's objective while minimizing project-related environmental effects, including take of three covered species: California freshwater shrimp (*Syncaris pacifica*), California tiger salamander (*Ambystoma californiense*), and Alameda whipsnake (*Masticophis lateralis euryxanthus*).

4.2 Alternatives Considered

During the alternatives development process, CDFW and PG&E pursued a variety of avenues to meet the identified objectives for conservation of potentially affected species while supporting an effective and fiscally responsible O&M program. The following alternatives were considered for evaluation in the environmental impact report (EIR).

- No Project Alternative
- Changed Practices Alternative
- Large Projects Alternative
- Fewer Covered Species Alternative
- Alternative Location

4.2.1 Alternatives Eliminated from Further Consideration

During the screening process, CDFW determined that the alternatives listed below would not be considered and they were eliminated from further analysis because they did not meet the objectives of the project and would not reduce environmental effects.

- Changed Practices Alternative
- Large Projects Alternative
- Fewer Covered Species Alternative
- Alternative Location

Because O&M activities must be conducted where facilities and ROWs already exist, there is no feasible alternative location for these activities. The following sections describe each of the other alternatives that were eliminated from further consideration and discuss the rationale for their dismissal.

4.2.1.1 Changed Practices Alternative

A variety of changed practices were considered to avoid the take of covered species when conducting O&M and minor new construction activities. Changed practices considered in this alternative involved changing construction activities, modifying activities, restricting activities seasonally, and conducting pre-activity biological surveys for a majority of activities. PG&E already modifies its practices on a project-by-project basis through its existing environmental review and screening processes. A total reduction of impacts is often impossible due to the public safety, regulatory, and site-specific requirements that are necessary to complete O&M and minor new construction work. Changed practices may be ineffective at reducing take and could introduce new and inconsistent work practices into PG&E's operations.

PG&E's approach to construction has evolved based on the regulatory requirements for public safety and environmental compliance. PG&E eliminated the prospect of changing its construction activities because PG&E has a legal and public safety obligation to maintain its facilities and because it implements avoidance and minimization measures (AMMs) on a project-by-project basis. PG&E's environmental management group of land planners and biologists work closely with construction and project staff to coordinate construction activities to avoid and minimize impacts associated with all aspects of construction.

Modifying activities to completely avoid impacts is also infeasible because O&M activities are needed to maintain, repair, or upgrade existing facilities in order to maintain public safety and comply with California Public Utilities Commission (CPUC) regulations. As an example, pipeline replacement and recoating are necessary to ensure that facilities continue to operate correctly and safely. O&M activities are ongoing and, therefore, are considered part of baseline environmental conditions. Although activities could result in take, modifying practices for implementing thousands of activities, or even a portion of these activities, might not substantially reduce the overall loss of habitat or take of California freshwater shrimp, California tiger salamander, or Alameda whipsnake (the three covered species) or other listed species. Rather, because implementing changed practices would no longer be a continuation of existing practices and may not be part of baseline environmental conditions, changing practices could result in additional impacts. Changing practices for minor new construction activities would be unlikely to reduce the potential for take of covered

species. Under the proposed project, minor new construction activities in wetlands and riparian areas that support special-status plant and wildlife species would be conducted only with appropriate permits from agencies with jurisdiction over specific activities in wetlands and other waters that could support covered species. To minimize direct mortality in an area that would be trenched as part of minor new construction activities, PG&E would utilize one or more techniques, including pre-work biological surveys; flagging of access routes; restricting access or seasonal timing of activity; requiring a biological monitor to be present during the activity; or excavation of potential California tiger salamander burrows to relocate individuals. Except in very rare instances, PG&E would perform minor new construction activities during daytime hours, reducing potential for take of salamanders dispersing at night. Minor new construction activities could adversely affect individuals of covered species through movement of vehicles, removal of scrub or chaparral vegetation, and grading of roads. Grading, trenching, and excavation could result in death or injury of adults, juveniles, or eggs. However, the proposed project contains numerous take minimization measures and other AMMs, many of which are built on, or which would be a continuation of, PG&E practices.

Regulatory, legal, and logistical considerations such as North American Electric Reliability Corporation's (NERC's) standards and requirements to maintain conductor clearances and reliability also limit PG&E's ability to modify some activities. NERC reliability standards and requirements, as an example, limit PG&E's ability to restrict some covered activities seasonally because some repairs must be corrected within a given time (typically 12 months or less from when a deficiency is reported). Additionally, as part of compliance with NERC standards, PG&E must remove vegetation around lines year-round to maintain access to facilities and reduce fire risk.

Seasonally restricting O&M and minor new construction activities beyond what is proposed in the AMMs would be logistically and economically prohibitive because it would require that PG&E forego maintenance when the maintenance activity is needed, which would compromise PG&E's ability to make necessary inspections, repairs, and upgrades, potentially leading to emergency repairs and unnecessary outages. Restricting O&M and minor new construction activities to only a few months per year, typically outside of the rainy or wet times of year or outside of nesting bird season, could limit PG&E's ability to operate and maintain its infrastructure, leading to interruptions in service and potentially reduced public safety.

PG&E also evaluated the possibility of conducting pre-activity biological surveys for most covered activities. Conducting such surveys for a majority of covered activities would be cost-prohibitive and would not appreciably reduce impacts on species because most of PG&E's impacts are temporary disturbances to habitat. Further, PG&E performs tens of thousands of activities per year, and the effort required to schedule, monitor, and report on so many biological surveys would be insurmountable given the number of staff members and budget available. The costs would increase substantially and would not result in tangible benefits for the three covered species and other state-listed species. Accordingly, this alternative was rejected.

4.2.1.2 Large Projects Alternative

Under this alternative, only the largest of PG&E's minor new construction activities that have historically needed take coverage and required coordination with multiple stakeholders would be included. These activities consist of most large gas transmission work (i.e., G15), and large electric transmission work (i.e., E12 through E14) (see Table 2-3 in Chapter 2). Under this alternative, gas pressure limiting station construction and underground electric line construction would not be

covered activities. By covering fewer activities in the ITP application, PG&E's take request would be reduced. However, the same potential impacts on some species would result. For example, there would still be instances when PG&E needs take coverage for gas pressure limiting station construction and underground electric line construction. PG&E would continue to screen its work, and if PG&E determines that one of these species could be killed, a project-specific ITP would be needed, which could delay projects. Therefore, this alternative was rejected.

4.2.1.3 Fewer Covered Species Alternative

Under this alternative, PG&E would drop one of the covered species (California freshwater shrimp) from its ITP application. By covering fewer species in the ITP application, PG&E's take request under the ITP would be reduced, as would PG&E's potential for take of species covered by the ITP. However, as discussed in Section 4.2.1.1, *Changed Practices Alternative*, O&M and minor new construction activities will take place regardless of whether the ITP covers two or three species because the activities are required to maintain, repair, or upgrade existing facilities in order to maintain public safety, comply with CPUC regulations, or provide service to locally approved new residential or commercial customers. Thus, CPUC orders and standards require PG&E to perform covered activities. The same physical construction impacts would occur regardless of how many species are covered by the ITP, although with fewer species covered, the opportunities for landscape-level mitigation would be reduced. PG&E would continue to screen its work, and, if PG&E determines that take of a species not covered by the ITP could result, PG&E would need to apply for a project-specific ITP.

4.2.2 Alternatives Considered in this EIR

Because no feasible alternatives were available that would reduce impacts on covered species other than the proposed project or the No Project Alternative, as discussed above, the only alternative to the proposed project considered in this EIR is the No Project Alternative.

4.2.2.1 Alternative 1—No Project Alternative

Under the No Project Alternative (Alternative 1), PG&E would apply for separate ITPs for each individual activity as needed to carry out O&M and minor new construction activities that have the potential to result in the take of state-listed species. A regional ITP would not be prepared, as described for the project, and the need for consultation with CDFW would be determined on a project-by-project basis. O&M and minor new construction activities would continue to be implemented as they currently are, following PG&E's environmental programs and practices and in compliance with any permits that are necessary for implementation. Minor new construction activities would be subject to additional evaluations and applicable permitting, as appropriate to comply with existing laws. The large volume of activities implemented by PG&E makes project-by-project permitting by CDFW logistically challenging and difficult to implement for both the agency and PG&E. Operations activities typically include inspecting, monitoring, testing, and operating valves, enclosures, switches, and other components at existing facilities and in existing ROWs. Maintenance activities include repairing and replacing facilities, structures, and access roads. This work includes reconductoring electric transmission distribution projects and gas pipeline replacement. This work also includes emergency repair and replacement and vegetation management, including tree pruning and removal. PG&E must continue to conduct these activities to comply with CPUC orders to provide safe and efficient gas and electric service. A piecemeal

approach to permitting could be a potential impediment to the efficient and timely maintenance of PG&E facilities, needed system repairs, minor expansion, and improvements.

Moreover, the No Project Alternative would preclude the ability to capture the efficiencies of a programmatic compliance system that provides benefits, such as coordinated minimization measures and mitigation actions that, in combination, result in enhanced conservation practices. Most activities covered by the proposed ITP would affect tiny areas often best measured in square feet rather than acres. Providing mitigation a few square feet at a time would not improve habitat conditions in a way that benefits the covered species. Piecemeal mitigation would be inefficient from the perspective of both CDFW and PG&E, and would not provide the environmental benefits to California freshwater shrimp, California tiger salamander, and Alameda whipsnake that a regional approach would provide. The No Project Alternative could result in inconsistently applied mitigation policies and practices, potentially resulting in a haphazard conservation strategy for the three covered species.

4.2.2.2 Environmentally Superior Alternative

California Environmental Quality Act (CEQA) Guidelines require the lead agency to identify the environmentally superior alternative, or the alternative that would least affect the environment while accomplishing project objectives. The environmentally superior alternative is identified by comparing the environmental impacts of the various alternatives analyzed. Per the Guidelines, the range of potential alternatives of the project shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects (CEQA Guidelines Section 15126.6[c]). The EIR should briefly describe the rationale for selecting the alternatives to be discussed. CEQA Guidelines Section 15126.6(e)(2) states that, if the environmentally superior alternative is the No Project Alternative, then the EIR must also identify an environmentally superior alternative among the other alternatives.

In this instance, the No Project Alternative is not the environmentally superior alternative because greater impacts would result under the No Project Alternative than under the proposed project. As discussed in Section 4.2.2.1, *Alternative 1—No Project Alternative*, the proposed project's regional approach would provide greater mitigation for impacts on California freshwater shrimp, California tiger salamander, and Alameda whipsnake habitat than would the No Project Alternative.

4.3 References Cited

Pacific Gas and Electric Company. 2017. *Pacific Gas and Electric Company Bay Area Operations & Maintenance Habitat Conservation Plan*. Final. September. San Francisco, CA. Prepared by ICF, Sacramento, CA.

5.1 Overview

Additional California Environmental Quality Act (CEQA) requirements, found in State CEQA Guidelines Section 15126.2 (b), (c), and (d), not addressed in previous chapters are discussed in this chapter. Specifically, this chapter addresses cumulative impacts, growth-inducing impacts, significant and unavoidable impacts, and significant irreversible environmental changes.

5.2 Cumulative Impacts

CEQA requires an evaluation of a proposed project's potential to contribute to cumulative effects in the project area or in the larger study area that may be affected. *Cumulative impacts* refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. The individual effects may be changes resulting from a single project or a number of separate projects. The cumulative impact from several projects is the change in the environment that results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable, probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. The purpose of the cumulative effects analysis is to determine whether the proposed project's incremental contribution is cumulatively considerable and thus significant.

A cumulative effects analysis broadens the scope of analysis to include effects beyond those attributable solely to the implementation of the project. The process of analyzing cumulative effects, or impacts, requires consideration of cumulative effects in each of the resource categories in the environmental impact report (EIR). The incorporation of cumulative effects analysis also aids in the development of alternatives and appropriate mitigation measures.

The status of affected resources is based on the information provided in Chapter 3, *Impact Analysis*. The geographic boundaries of the cumulative effects area were determined based on the nature of the resources affected and the distance that such effects may travel. As an example, increased sedimentation of waterways that results from a project is limited to the watershed in which sedimentation increases. Therefore, it is only necessary to examine effects within that watershed. In contrast, air quality or greenhouse gas (GHG) emissions from a project can travel over far greater distances and, therefore, necessitate analysis on a county, air basin, or regional level. For this analysis, the geographic boundary of the cumulative effects area is generally that of the nine counties of the study area (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties), although smaller, natural, or cultural boundaries are used in analyses of some resources (e.g., biological resources, cultural resources, geology and soils, hazards, noise).

5.2.1 Approach to Analysis

The analysis addresses the change in the environment that results from the incremental impact of the project when added to other, closely related past, present, or reasonably foreseeable, probable future projects. There are two approaches to identifying cumulative projects and their associated impacts. The *list approach* identifies individual projects in order to identify potential cumulative impacts. The *projection approach* uses a summary of projections in an adopted general plan or related planning document to identify potential cumulative impacts. This EIR uses the projection approach for the following reasons. First, the project covers a large and diverse geographic area within nine San Francisco Bay Area (Bay Area) counties and multiple local jurisdictions, each of which establishes land use plans and determines whether projects within their jurisdictions will be approved and proceed to construction. However, the covered activities described in Chapter 2, *Project Description*, are subject only to California Public Utilities Commission requirements and other state and federal regulations, and not to local plans and ordinances. Second, covered activities, although described in Chapter 2, have not been specifically identified for implementation, meaning the precise locations, timing, and extent of covered activities have not been determined. Rather, the analysis provided in this EIR would facilitate California Department of Fish and Wildlife's permitting process as it relates to the incidental take of California tiger salamander, Alameda whipsnake, and California freshwater shrimp that may result during the implementation of operations and maintenance (O&M) activities, minor new construction, and habitat enhancement and management, collectively referred to as *covered activities*. These covered activities would be implemented at the same time as construction projects implemented by both public and private entities in the study area over the course of the 30-year time frame of the Incidental Take Permit (ITP).

The Association of Bay Area Governments (ABAG) is the regional planning organization that monitors planning activities of the various Bay Area jurisdictions, develops regional growth forecasts, and adopts regional plans to help guide and respond to anticipated growth. *Plan Bay Area 2040* is ABAG's latest regional plan and was adopted on July 26, 2017 (Association of Bay Area Governments 2017). That plan is based largely on *Regional Forecast for Plan Bay Area 2040* (Association of Bay Area Governments 2016). The forecast provides growth projections for the period of 2010 through 2040, which overlaps most of the time period of the ITP. The forecast indicates that from 2010 and 2015, employment in the Bay Area grew by 19%, and the pace of population growth accelerated from 0.5% annually between 2000 and 2010 to more than 1% annually from 2010 to 2015; this growth represented a shift from net out-migration of working-aged adults to net in-migration.

ABAG's forecast recognizes the cyclic nature of growth in the Bay Area, which is affected by the national economy, product cycles of the region's key industrial sectors, and local land use policy. From 2010 to 2040, the region is projected to grow from 3.4 million jobs and 7.2 million people to 4.7 million jobs and 9.5 million people. The following are specific forecasts for the 2010 to 2040 time period.

- Addition of 1.3 million jobs
- Addition of 2.4 million people
- Addition of 783,000 households
- Addition of 823,000 housing units

The projected growth in the Bay Area will be accompanied by construction, both infill development and greenfield development (i.e., development on previously undeveloped land), in various portions of the Bay Area, which will have varying environmental effects. The environmental effects of the proposed project and covered activities, which are mostly construction-related, will add to the cumulative environmental effects of other private and public projects related to the projected growth described in *Plan Bay Area 2040*. However, because Pacific Gas and Electric Company (PG&E) has been conducting O&M activities in the study area for more than 30 years, O&M impacts described in this section represent baseline environmental conditions that would not change following approval of the ITP. The impacts from minor new construction and habitat conservation and enhancement activities are considered below.

5.2.2 Cumulative Effects Analysis

CEQA requires that an EIR analyze a project's contribution to a cumulative impact when that contribution would be cumulatively considerable, meaning that it is considerable (significant) when viewed in connection with the effects of other past, current, and probable future projects (State CEQA Guidelines Section 15130[a][b]). This requirement ensures that EIRs fully analyze any project effects that are less than significant on an incremental (project-specific) scale but which may be considerable in combination with the related effects of other projects. The requirement also serves to focus EIR analysis only on those cumulative impacts to which a project has the potential to make an important contribution.

In practice, the lead agency typically identifies past, current, and foreseeable projects and programs related to the undertaking being analyzed and evaluates their combined (cumulative) effects on the environment. If any cumulative impacts are identified as significant, the lead agency must then assess the degree to which the proposed undertaking would contribute to those impacts and identify ways of avoiding or reducing any contribution evaluated as "cumulatively considerable" (State CEQA Guidelines Section 15130[b]). This analysis used the summary of planning projections approach to identify existing and foreseeable cumulative impacts, based on local jurisdiction general plans and prior project experience in the study area.

5.2.2.1 Aesthetics

Undeveloped lands, agricultural areas, and the Pacific Ocean coastline provide some of the study area's key aesthetic resources as well as habitat for covered species in the ITP. Views along roads and highways in the study area vary from essentially undisturbed views of rural open space, the ocean, and coastal landscapes to crowded urban settings with limited distant views. Covered activities could result in short-term visual effects during construction, including removal of vegetation, alteration of land forms, and introduction of reflective or illuminated objects, although most of these impacts are ongoing and part of baseline environmental conditions. Moreover, many covered activities would not be readily visible from beyond the immediate vicinity of an O&M or construction site. In limited instances, long-term visual effects could result from construction of larger or taller structures in certain locations, some of which may require nighttime illumination for security purposes or which may reflect sunlight. In other instances, covered activities could have long-term visual effects because of the close proximity to an urbanized area or a roadway or because of the site's location on a prominent hillside. However, these effects would not be typical given that O&M activities are ongoing and most minor new construction would occur adjacent to or extending from existing facilities. Also, in most cases, replacement or expansion of existing facilities with larger

or taller facilities would represent an incremental change in the visual baseline and would not be significant. Any effects would be further reduced through implementation of the applicable avoidance and minimization measures (AMMs) identified in PG&E's *Bay Area Operations and Maintenance Habitat Conservation Plan* (Bay Area O&M HCP and applicant proposed measures (APMs) identified in Section 3.1, *Aesthetics*. Thus, the cumulative effect of O&M and minor new construction activities on aesthetics would not be cumulatively considerable.

5.2.2.2 Agricultural and Forestry Resources

The principal cumulative effect related to agricultural resources would be conversion of agricultural land to nonagricultural uses. The Bay Area has a substantial amount of land in agricultural uses. In 2012, almost half of the Bay Area's approximate 5 million acres were classified as farmland, as defined by the California Department of Conservation. Of these 2.3 million acres of agricultural land, about 1.7 million acres (approximately 73%) are used for grazing (California Department of Conservation 2016). The other nearly 600,000 acres of Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance (collectively, Important Farmland) produce field crops, fruit and nut crops, seed crops, vegetable crops, and nursery products.

Covered activities would result in conversion of small areas of agricultural land to nonagricultural use to support the installation of new facilities and expansion of existing facilities. Covered activities would result in the permanent conversion of agricultural land at a rate that averages approximately 1 acre per year throughout the study area over the 30-year term of the ITP. The majority of agricultural land impacts would be temporary during the implementation of covered activities. Temporarily affected agricultural lands would be returned to use once covered activities are complete. Regionwide, agricultural conversion is expected to continue during the term of the ITP, although one goal of *Plan Bay Area 2040* is the preservation of agricultural and open space land by directing development to the existing urban footprint. The estimated 30-acre loss resulting from covered activities throughout the project area represents a minimal amount of total agricultural land and would not constitute a cumulatively considerable contribution to the conversion of agricultural land to nonagricultural use, either in the study area, or in the state as a whole.

Some additional land could be acquired to support habitat enhancement and management. This would primarily affect grazing lands, which would likely continue to be grazed after acquisition, and thus would not undergo a change in use. Moreover, in contrast to a residential development or similar urban development, the project would not result in the loss or conversion of agricultural land to urban or other developed use. Rather, any grazing lands acquired for mitigation use would be permanently protected from urban development and managed to benefit biological resources in perpetuity. Because of the commitment to manage mitigation lands for biological benefit, the physical attributes of unirrigated grazing lands that may be acquired under the project would not be lost or otherwise altered. Consequently, habitat mitigation is not expected to result in any significant physical impact on agricultural land on an incremental basis, nor would habitat mitigation result in a cumulatively considerable contribution to regional agricultural conversion impacts.

As discussed in Section 3.2, *Agricultural and Forestry Resources*, the project and covered activities would have no impact on forest resources; therefore, the project and covered activities would make no contribution to cumulative impacts on forest resources.

5.2.2.3 Air Quality

The nine counties of the study area are mostly located in the San Francisco Bay Area Air Basin (SFBAAB), with parts of Solano County located in the Sacramento Valley Air Basin (SVAB), and parts of Sonoma County located in the North Coast Air Basin (NCAB). Table 3.3-2 in Section 3.3, *Air Quality*, shows most of the study area is in nonattainment for federal ozone and particulate matter less than or equal to 10 microns in diameter (PM10) standards, and state ozone, particulate matter less than or equal to 2.5 microns in diameter (PM2.5), and PM10 standards (excluding the NCAB). The analysis under Impact AQ-3 in Section 3.3 already reflects a cumulative analysis.

As discussed in Section 3.3, all three air districts in the study area have adopted thresholds to assist lead agencies in evaluating the significance of project-generated criteria pollutant and precursor emissions. The thresholds consider existing air quality concentrations and attainment or nonattainment designations under the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS). The NAAQS and CAAQS are informed by a wide range of scientific evidence that demonstrates there are known safe concentrations of criteria pollutants. Recognizing that air quality is a cumulative problem, local air districts typically consider projects that generate criteria pollutants and ozone precursor emissions below the thresholds to be minor; they would not adversely affect air quality such that the health-protective NAAQS or CAAQS would be exceeded.

Because existing cumulative impacts have been identified for only three of the regulated criteria pollutants, analysis of cumulative impacts on air quality must address two independent but related issues.

- The potential for emissions of ozone precursors and PM2.5 and PM10 under the project and covered activities to constitute a cumulatively considerable contribution to existing impacts.
- The potential for emissions of other pollutants under the project and covered activities to create a new, additive cumulative impact for pollutants other than ozone precursors, PM2.5, and PM10.

Individual O&M activities would continue to be relatively small in scale and short in duration and would use progressively “cleaner” equipment over the permit term, and as a result emissions of ozone precursor gases would not exceed the cumulatively considerable threshold.

The transition to cleaner gasoline- and diesel-powered equipment would also reduce the contribution of tailpipe emissions of PM2.5 and PM10 levels over time. In addition, PG&E has committed to implementing best management practices (BMPs) to reduce generation of fugitive dust, which would continue to reduce dust-related PM2.5 and PM10 impacts to the extent feasible. It is not currently possible to eliminate PM2.5 and PM10 generation entirely, but, in light of the anticipated reduction in tailpipe particulate emissions, and particularly because PG&E has committed to implementing BMPs (see Section 3.3.2.1, *Methods for Analysis*), the project’s contribution to regional particulate matter impacts would not exceed the cumulatively considerable threshold, and the project is unlikely to make a cumulatively considerable contribution to existing impacts on ozone or particulate matter levels in the study area.

Carbon monoxide is the principal pollutant other than ozone precursors and particulate matter likely to be generated by O&M activities and minor new construction under the project. O&M activities and minor new construction activities would generate small increases in carbon monoxide levels, principally, if not exclusively, as a component of tailpipe emissions. Because vehicle and equipment use would be intermittent and short term, with substantially more downtime than time

in operation, additive cumulative effects over the 30-year permit term would not be cumulatively considerable. Furthermore, as vehicles and equipment transition to electricity and other cleaner sources of power, CO from tailpipe emissions is likely to be reduced.

5.2.2.4 Biological Resources

Like much of the rest of California, the study area is subject to significant cumulative impacts related to loss and degradation of habitat as a result of land use practices over approximately the past 150 years. Conversion to agricultural use has been a primary factor in loss of the study area's native grassland, scrub, and riparian/wetland habitats. Additional losses have resulted from urbanization in recent decades. The study area's aquatic habitats have been affected by various types of pollutants, including agricultural and petrochemical, pollutants delivered by urban runoff, and increased sediment delivery resulting from ground disturbance for construction and agriculture.

As discussed in Section 3.4, *Biological Resources*, and Section 3.10, *Hydrology and Water Quality*, PG&E proposes to avoid and minimize effects on aquatic natural habitats to the extent practicable and, where necessary, apply for and comply with separate permits for covered activities affecting wetlands or stream courses. Although aquatic habitats could also be further degraded as a result of in-channel construction activities, impacts would be limited to very small areas, and PG&E would implement AMMs included in PG&E's Bay Area O&M HCP and other permit conditions that are issued on a case-by-case basis, including compensatory mitigation for impacts on covered species. Thus, impacts on aquatic, wetland, and riparian habits, would not be cumulatively considerable.

Over the course of the 30-year permit term, implementation of covered activities would lead to extension of some linear gas and electric facilities into or near potential nursery sites or migratory corridors for wildlife. As described in Section 3.4, since such facilities are interspersed across the landscape (i.e., intermittent poles or towers) or buried underground, such facility extensions do not create impermeable or impassable barriers to wildlife. In addition, since PG&E would implement measures to limit activities near active nests or bat breeding/pupping sites, impacts on nursery sites and wildlife corridors would not be cumulatively considerable.

Over the course of the 30-year permit term, and as described in Section 3.4, implementation of covered activities would contribute incrementally to cumulative impacts of temporary and permanent loss of habitat for the three species covered by the proposed ITP: California freshwater shrimp, California tiger salamander (Central California distinct population segment [DPS] and Sonoma County DPS), and Alameda whipsnake. These are impacts for which mitigation would be required under the proposed ITP. Mitigating impacts on a regional basis rather than mitigating the impacts of small, individual projects provides substantial habitat benefits. Specifically, a regional approach to mitigation provides permanent protection and management of lands that are large enough to support populations of covered species. Mitigation of impacts on a project-by-project basis does not necessarily provide the opportunity for this landscape-level approach.

As discussed in Section 3.4, the study area may also support a number of additional plant and wildlife species that are not currently listed for protection under the federal Endangered Species Act or California Endangered Species Act and that are not expected to be listed within the proposed 30-year ITP term. These species are not covered in the proposed ITP but still hold special status (see Tables 3.4-4 and 3.4-5 in Section 3.4) and are known to occur or may occur in the Permit Area, where covered activities have some potential to result in injury, mortality, and loss of habitat. Under the proposed ITP, PG&E proposes to avoid and minimize effects on natural habitats for these

species, to the extent practicable, through the implementation of its environmental screening process and the applicable AMMs from PG&E's Bay Area O&M HCP and APMs. Compensatory mitigation as provided in APM MM BIO-1 may also benefit special-status species using the same habitat.

APM MM BIO-1 provides for acquisition, enhancement, management, and restoration of habitat to compensate for any unavoidable aquatic or terrestrial habitat disturbance or loss associated with covered species. Compensatory mitigation would be arranged in advance, based on a 5-year planning cycle, and PG&E would track actual impact acreages versus compensatory mitigation acreages acquired as covered activities proceed. With these protections and mitigation mechanisms in place, covered activities will not make a cumulatively considerable contribution to regional loss of natural habitats for the three species covered under the ITP as well as other species with similar habitat requirements.

5.2.2.5 Cultural Resources

Throughout California, the Native American cultural legacy, including culturally important sites and traditional cultural practices, has been substantially affected by land management practices since the 1850s. The nine counties of the study area are no exception, and a significant cumulative impact is considered to exist with regard to loss of cultural resources and cultural heritage. Because they would require ground disturbance, covered activities, particularly minor new construction activities, would have the potential to contribute to this loss.

As discussed in Section 3.5, *Cultural Resources*, the principal concern is that ground disturbance required for some covered activities would have the potential to damage or destroy buried cultural (archaeological, historical, or tribal cultural) materials. O&M activities disturb comparatively small footprints, and primarily affect ROW corridors that have already been disturbed, but there is still some potential that additional disturbance could adversely affect unknown buried resources. Minor new construction would require cultural resources studies in advance of ground disturbance.

For all covered activities, PG&E would continue to comply with applicable laws for protecting cultural resources and would continue to implement environmental practices under its Cultural Resources Program. In addition, applicable AMMs from PG&E's Bay Area O&M HCP, specifically Field Protocol (FP)-02 and FP-03 that minimize ground disturbance, would help protect cultural resources and reduce the potential for disturbance or damage. Additional APMs identified in Section 3.5.2.1, *Methods for Analysis*, which would require worker awareness training, management of unanticipated cultural resource discoveries, and monitoring in sensitive locations, would further protect cultural resources. Consequently, although there is some potential that minor new construction activities under the project could contribute to a cumulative loss of cultural resources in the study area, the effects would be avoided, minimized, and mitigated to the extent practicable, and any residual effect would be limited and would not represent a cumulatively considerable contribution, nor would it result in a significant new additive cumulative effect.

5.2.2.6 Energy

Analysis of the project's contribution to cumulative impacts related to energy focuses on whether the project would contribute to the wasteful, inefficient, and unnecessary consumption of energy. As discussed in Section 3.6, *Energy*, O&M and related activities would have a positive impact on energy resources by providing for the safe and efficient operation of PG&E's gas and electrical systems, as

mandated for public safety and reliable energy. O&M and related activities would help support state and local plans for developing renewable energy and energy efficiency. Minor new construction activities would lead to more efficient facilities in the study area. The project would also help support California's transition to 100% renewable energy as required by Senate Bill 100 and would have a beneficial impact on the availability of renewable energy in the study area. The project would also promote energy efficiency by replacing older conductors and support structures and older pipelines and enhancing transmission system reliability. For these reasons, the project would have a beneficial impact on energy and would not result in the wasteful, inefficient and unnecessary consumption of energy; therefore, there would be no cumulatively considerable impact.

5.2.2.7 Geology and Soils

Analysis of the project's contribution to cumulative impacts related to geology and soils focuses on topsoil resources. Accelerating development in the study area over recent decades has contributed to progressive unavailability and loss of topsoil resources, representing a significant cumulative impact in parts of the study area. Areas where topsoil loss has been particularly substantial include the fringes and suburbs of rapidly expanding suburban communities such as Dublin, Fremont, San Ramon, Antioch, Santa Rosa, Vallejo, Fairfield, Vacaville, Morgan Hill, and Gilroy.

Loss of topsoil resources is a concern for two reasons. First, topsoil has intrinsic value as part of a healthy ecosystem, recycling nutrients, supporting vegetation, and capturing and to some extent filtering incident precipitation. Topsoil is also essential to support agriculture, so it has economic importance in the agricultural regions of the Bay Area. From a cumulative impacts perspective, the loss of topsoil as an agricultural resource is related to concerns regarding loss and conversion of agricultural lands, but is distinct in that it focuses specifically on the physical resource itself, rather than the broader perspective of an area's existing and planned land uses.

As discussed in Section 3.7, *Geology, Soils, and Paleontological Resources*, O&M activities under the project would be conducted in or immediately adjacent to existing PG&E ROWs, which have undergone varying degrees of disturbance, and most O&M activities would not permanently remove large amounts of topsoil. As a result, O&M activities will not make a cumulatively considerable contribution to loss of topsoil resources in the study area.

Minor new construction projects could be sited outside existing ROWs and could have footprints of as much as 3 acres, potentially affecting topsoil; however, during the grading phase, PG&E segregates topsoil from subsoil and windrows the topsoil within the designated work site as feasible. Most, new facilities would be constructed near or extend from existing infrastructure, and some of the sites would likely already be disturbed, offering little topsoil value. Construction on sites contiguous with open space or agricultural land could result in loss of undisturbed topsoil resources. Overall, losses would be small enough that they would be less than significant on an activity-by-activity basis (see Impact GEO-2 in Section 3.7), and they would likewise not be cumulatively considerable.

The principal concern for paleontological resources is that ground disturbance required for some covered activities would have the potential to damage or destroy paleontological resources. O&M activities disturb comparatively small footprints, and primarily affect ROW corridors that have already been disturbed, but there is still some potential that additional disturbance could adversely affect unknown buried resources. Similarly, most minor new construction is located on or adjacent to, or extends from, existing PG&E facilities, but construction could affect unknown buried

resources. However, PG&E would implement APMs GEO-1 and GEO-2 to protect unanticipated paleontological resource discoveries and provide worker awareness training and would also continue to comply with all federal and state regulations for the protection of paleontological resources. Consequently, although there is some potential that minor new construction activities under the project could contribute to a cumulative loss of paleontological resources, the effects would be avoided, minimized, and mitigated to the extent practicable, and any residual effect would be limited and would not represent a cumulatively considerable contribution, nor would it result in a significant new additive cumulative effect.

5.2.2.8 Greenhouse Gas

GHG emissions worldwide contribute, on a cumulative basis, to the significant adverse environmental impacts of global climate change. Although no single land use project could generate enough GHG emissions on its own to noticeably change the global average temperature, the combination of GHG emissions from past, present, and future projects in the county, state, nation and around the world contribute cumulatively to global climate change and its associated environmental impacts. Environmental impacts associated with GHG emissions are therefore exclusively cumulative in nature, which is in accordance with contemporary scientific knowledge of their effects on climate change.

As discussed in Section 3.8, *Greenhouse Gas Emissions*, O&M activities and minor new construction would require transportation and construction activities that use fossil fuels and generate CO₂, methane (CH₄), and nitrous oxide (N₂O), from diesel and gasoline combustion.

PG&E complies with all applicable federal and state air quality regulations. The company's air quality program and BMPs, as described in Section 3.3, also help with the reduction of GHG emissions from PG&E activities. PG&E has committed to a 55% renewable energy target by 2031, and also has been working to reduce GHG emissions from its vehicle fleet by deploying alternative-fuel vehicles, including hybrid-electric bucket trucks and compressed natural gas vehicles. PG&E is continuing to invest in new vehicles and technologies that further reduce GHG emissions from its vehicle fleet. Some of these efforts include the deployment of bucket trucks equipped with electric power takeoff, which allows crews to operate the trucks without idling the engines, and installing electric vehicle chargers at PG&E facilities to promote the adoption of electric vehicles by employees. Implementation of PG&E's existing air quality program, including use of a "clean" fleet, has reduced GHG emissions from ongoing O&M activities.

Covered activities would generate small amounts of GHG emissions, principally as a component of tailpipe emissions. Vehicle and equipment use would be intermittent and short term, with substantially more downtime than time in operation. Improved engine efficiency over time, PG&E's compliance with air quality district measures, and PG&E's implementation of its own environmental programs and practices would result in reduced emissions. Accordingly, covered activities would not generate net GHG emissions, relative to existing conditions, that would have a cumulatively considerable impact (refer also to Section 3.8).

5.2.2.9 Hazards and Hazardous Materials

Cumulative impacts related to hazards or hazardous materials could result from covered activities in conjunction with other planned and proposed projects having an increased effect on public or worker safety. Increased exposure to hazardous materials, fire, or physical hazards could result.

Nearly all construction projects, including covered activities, involve some use of petroleum products as fuel or lubricant. These are hazardous materials that can inadvertently be spilled during refueling, during O&M of equipment, or if equipment fails. Construction activities, including covered activities, could take place close to schools. However, the likelihood of accidental spills and leaks to occur at the same time and in the same area is extremely small. In addition, PG&E complies with state and federal regulations, and would implement applicable AMMs from PG&E's Bay Area O&M HCP. A hazardous waste AMM requires PG&E to halt work and clean up any spill as soon as it is safe to do so. The same AMM would apply should PG&E encounter a site containing hazardous material. PG&E's compliance with regulations and implementation of applicable HCP AMMs would greatly minimize any contribution to a potential cumulative impact.

Covered activities could require temporary lane closures affecting emergency response or evacuation routes. Other construction projects could present similar impediments. However, considering the short-term nature of covered activities, it is very unlikely that they would impair emergency routes at the same time and in the same area as other projects. Additionally, APM TRA-1 would require PG&E to provide through access for emergency vehicles at all times, notify local fire and police departments to allow the design of alternative evacuation and emergency access routes, and make every effort to allow emergency service providers adequate lead time to ensure that emergency access and response times are maintained during PG&E work periods.

Considering PG&E compliance with existing regulations, and implementation of AMMs and APM-TRA-1, covered activities would not make a cumulatively considerable contribution to impacts related to hazards and hazardous materials.

5.2.2.10 Hydrology and Water Quality

Water resources in the study area are subject to several cumulative effects: continual modification of natural drainage patterns in much of the nine-county region; degradation of surface water quality in a number of drainage systems throughout the study area; and localized degradation of groundwater quality. The O&M and minor new construction activities of the project would not result in substantial drainage modifications and, thus, are not expected to make a considerable contribution to cumulative drainage modification impacts, nor would it alter patterns of groundwater use or result in new demand for groundwater. This analysis therefore focuses on water quality issues.

As discussed in Section 3.10, and shown in Table 3.10-1, the quality of surface waters in the study area varies widely. Groundwater quality in the Bay Area is generally suitable for most urban and agricultural uses, with only local impairments. The primary constituents of concern are high total dissolved solids, nitrate, boron, and organic compounds. Numerous reports of groundwater contamination have resulted from contamination from leaking underground storage tanks, the release of fuel hydrocarbons, and spills or persistent leaks of organic solvents at industrial sites.

Many covered activities would result in ground disturbance with the potential to increase sediment delivery through runoff to surface waterbodies, which can increase water turbidity, degrade habitat quality for some native species, alter stream function, and increase infrastructure and channel maintenance costs. In-channel work can also increase sediment mobility and water turbidity, with some potential for adverse effects on water quality.

As discussed in Section 3.10, PG&E would continue to comply with requirements of the federal Clean Water Act (CWA), including preparation and implementation of a stormwater pollution prevention plan (SWPPP) for activities with the potential to disturb more than 1 acre. In-channel work is

strictly regulated under Section 1602 of the California Fish and Game Code, which requires development of a lake and streambed alteration agreement that includes specific commitments and measures to protect water quality during any in-channel work. For smaller projects, PG&E would continue to implement erosion and sediment control plans, which contain water quality measures similar to those in a SWPPP. PG&E also would continue to comply with the Statewide Natural Gas Utility Permit, which limits discharges to drainage systems and requires implementation of BMPs to protect water quality. PG&E's Bay Area O&M HCP contains several sediment control requirements, including FP-11 and FP-12 (erosion control BMPs), FP-15 and FP-16, (limit disturbance near vernal pools, wetlands, and waterways), and FP-02 and FP-03 (minimize staging areas and access roads). In light of the continuing protection that would be afforded by PG&E's compliance with the CWA and California's Porter-Cologne Water Quality Control Act through various discharge permits including the Statewide Natural Gas Utility Permit, and PG&E's implementation of AMMs contained in PG&E's Bay Area O&M HCP, sediment generated by covered activities is not expected to result in a cumulatively considerable contribution to regional water quality degradation in impaired systems over the permit term, nor is the likely level of increase in sediment delivery expected to create a new, significant additive cumulative effect on systems not already identified as impaired.

Spills and releases present another major water quality concern. As discussed in Section 3.10, various covered activities would entail handling and use of a wide variety of substances that could degrade surface water or groundwater quality in the event of a spill. However, PG&E would prepare and implement a SWPPP for activities with the potential to disturb more than 1 acre, and would implement erosion and sediment control plans for smaller projects. Additionally, a hazardous waste AMM in PG&E's Bay Area O&M HCP would require halting work and immediately cleaning up any fuel or hazardous waste spill and would prohibit storage or handling of hazardous materials in the Permit Area.

A frac-out may occur if there is a loss of drilling lubricant, a loss of circulation, or an unexpected change in pressure of the lubricant during drilling. In these situation, drilling lubricant could rise to the surface and affect water quality. Implementation of APM HYDRO-1 would mitigate impacts of an unanticipated frac-out by requiring PG&E to cease drilling and take steps to contain and clean up any materials produced during a frac-out.

In light of these measures, the potential for a cumulatively considerable contribution to regional water quality degradation in impaired systems would be minimal. The likely additive effect would not represent a significant cumulative impact in systems not already identified as impaired.

5.2.2.11 Land Use and Planning

Land use in the study area is evolving as Bay Area urban centers continue to expand. This growth is guided by city and county general and specific plans and zoning ordinances. The areas affected by O&M activities would be limited primarily to ROWs and immediately adjacent lands. Because O&M is inherently focused on use and maintenance of these existing facilities, these activities would not result in any additive cumulative effect on land use. Minor new construction activities and establishment of new preserves for habitat compensation could both affect land use planning; however, new facilities and compensation lands would be distributed throughout the study area and thus would not result in additive cumulative effects on any one location or vicinity. Because the size of new facilities would be small, any additive effects would not be cumulatively considerable for the study area as a whole.

5.2.2.12 Mineral Resources

As described in Section 3.12, *Mineral Resources*, most of the 44 active mines in the study area are aggregate mines that produce sand, gravel, and other materials used in building and road construction (Division of Mine Reclamation 2018). O&M activities would require a minimal amount of temporary ground disturbance within or adjacent to existing ROWs or on PG&E-owned lands. These activities would not inhibit the ability to recover mineral resources in the future, if such resources are determined to be present. Minor new construction activities may be implemented at existing facilities adjacent to or near areas classified as mineral resource zone (MRZ) -2 or MRZ-3, which are areas where significant mineral deposits are known to be, or may be, present. However, minor new construction activities would be in small area and would likely not be implemented directly on land classified as MRZ-2 or MRZ-3. In the unlikely event that construction interfered with mining activities, that interference would be temporary and would be coordinated with the mine owner and operator. It is unlikely that land designated as an MRZ-2 or MRZ-3 would be acquired for habitat purposes because of the higher cost of land with mineral resources. Thus, because covered activities would not impair recovery of mineral resources, covered activities would not make a considerable contribution to cumulative effects on mineral resources.

5.2.2.13 Noise

As discussed in Section 3.13, *Noise*, O&M activities would generally be a continuation of ongoing activities, and generally involve utility personnel working at or inspecting and monitoring existing facilities for discrete and designated periods of time, or personnel repairing or replacing existing facilities and structures. Some operational activities and vehicle trips for operational activities could generate noise. However, these activities are currently ongoing prior to project implementation and the noise they generate is considered to be part of baseline environmental conditions. Therefore, since an increase in O&M noise is not generally expected to occur, impacts combined with other area construction activities would not be cumulatively considerable.

With regard to minor new construction, activities would have the potential to result in noise increases at nearby noise-sensitive uses. However, as a result of APMs NOI-1 and NOI-2, construction would occur primarily during daytime hours when people are less sensitive to noise, and would include the use of noise control devices on equipment, or the use of “quiet” equipment. Limiting hours of noise-generating activities and requiring use of noise-control equipment near residences would reduce project-related noise effects substantially. While other projects not affiliated with the proposed project could undergo construction at the same time and in close proximity, thereby increasing overall noise levels, the project’s contribution to this potential cumulative impact would not be cumulatively considerable with incorporation of APMs NOI-1 and NOI-2.

5.2.2.14 Population and Housing

As discussed in Section 3.14, *Population and Housing*, O&M activities are intended to ensure delivery of reliable and safe energy to PG&E customers. Minor new construction activities are specifically intended to support development patterns identified in approved general plans. Habitat management and enhancement would involve small crews undertaking land management activities on undeveloped land. None of these activities would have direct or indirect effects on population or

housing. Therefore, covered activities would make no contribution to cumulative effects related to population and housing.

5.2.2.15 Public Services

Numerous public entities provide police protection, fire protection, schools, parks, and other public services and facilities in the study area. Covered activities would involve the continuation of existing O&M activities and any demand on, or effects related to, public services would be part of baseline environmental conditions. Covered activities would not directly result in increased population that would increase the need for public services or facilities. PG&E's Bay Area O&M HCP contains AMMs (FP-08 and FP-09) intended to minimize any potential increase in demand for police or fire protection. Other HCP AMMs (FP-03 and FP-10) require minimizing development of new access or ROW roads and limiting the footprint of covered activities, which would serve to minimize potential effects on schools and parks. Moreover, because covered activities would be short-term and any effects would be temporary, covered activities would not be cumulatively considerable or result in a significant additive cumulative effect on public services.

5.2.2.16 Recreation

The most likely ways in which the project would affect recreational uses or opportunities in the study area are by the construction of new facilities and the establishment of new preserves for habitat compensation. Both of these types of effects would be in discrete, separated locations throughout the study area, and the extent of the effects would be small. For these reasons, the effects on recreation would not be cumulatively considerable and there would be no significant additive cumulative effect on recreation.

5.2.2.17 Transportation

Cumulative traffic concerns have been identified in many parts of the study area, particularly in urban areas and along heavily traveled highways, and major thoroughfares. Because traffic conditions are poor throughout most of the Bay Area, and people travel long distances to work, a cumulative impact is considered to exist for vehicle miles traveled (VMT). However, other parts of the study area, including rural areas and recently developed areas where roadway infrastructure is adequate for current and projected demand, are not subject to cumulative VMT impacts.

As discussed in Section 3.17, *Transportation*, covered activities could require temporary closure of, or reduced access to, roads, bikeways, sidewalks, and bus routes while crews conduct maintenance and construction activities. Covered activities also could impede emergency access. These effects would be reduced through implementation of APM TRA-1, which would require implementation of transportation BMPs such as preparing traffic control plans, providing emergency access at all times, and regulating traffic, cyclists, and pedestrians to maintain a safe transportation corridor. Because of their wide geographic distribution and the short-term, intermittent nature of covered activities, covered activities would not result in a cumulatively considerable effect or a significant additive cumulative effect on VMT or other transportation methods in the study area.

5.2.2.18 Utilities and Service Systems

Cumulative impacts on utilities or service systems could result if multiple projects have a combined impact on local utility services or infrastructure. Covered activities are required to support the safe

and reliable supply of gas and electric service to customers in the Permit Area and would not result in significant impacts on gas and electric service delivery systems. Because of their short-term nature and because they require little water or wastewater disposal, covered activities would not require construction or expansion of water or wastewater treatment facilities and would have a negligible effect on the capacities of existing systems. PG&E would continue to conduct O&M activities as it has for decades, and so these activities and any effects would be part of baseline environmental conditions. PG&E would conduct minor new construction activities in compliance with federal and state regulations and permit conditions, which are intended to prevent deterioration of stormwater drainage facilities. As discussed in Section 3.18, *Utilities and Service Systems*, existing landfills serving the study area have an average of 63% of capacity remaining; covered activities would generate minimal amounts of solid waste. Therefore, covered activities would not result in a cumulatively considerable effect on utilities and service systems.

5.2.2.19 Wildfire

Cumulative impacts related to wildfire could result from covered activities in conjunction with other planned and proposed projects having an increased effect on public or worker safety. Increased exposure to fire could result. As identified in Table 3.9-2 in Section 3.9, *Hazards and Hazardous Materials*, large portions of the study area contain wildland urban interface, which is especially at risk from wildfire. In addition, large parts of the study area where covered activities will take place are located in areas with moderate, high, or very high fire hazard severity risk.

However, PG&E performs routine maintenance of its facilities to keep them in proper working condition and to minimize public health and safety risks. As a part of O&M activities, PG&E manages vegetation along electrical lines to maintain specific clearance distance and reduce fuel load in high-threat areas. New facilities replacing older facilities are generally less subject to fire risk. These O&M activities are ongoing and would not change following approval of the ITP. Fire risks from minor new construction are primarily construction-related, and PG&E would comply with existing laws and regulations, follow standard company requirements for reducing fire risk, and implement AMMs identified in PG&E's Bay Area O&M HCP to reduce risks from operating construction and utility equipment in fire prone areas. With these measures in place, project impacts from risk of wildfires would not be cumulatively considerable.

Covered activities could require temporary lane closures affecting emergency response or evacuation routes. Other construction projects could present similar impediments. However, considering the short-term nature of covered activities, it is very unlikely that they would impair emergency routes at the same time and in the same area as other projects. Additionally, APM TRA-1 would require PG&E to provide through access for emergency vehicles at all times, notify local fire and police departments to allow the design of alternative evacuation and emergency access routes, and make every effort to allow emergency service providers adequate lead time to ensure that emergency access and response times are maintained during PG&E work periods. Impacts on emergency response would not be cumulatively considerable.

5.3 Growth-Inducing Impacts

State CEQA Guidelines require the analysis of a project's potential to induce growth. Specifically, Section 15126.2(d) requires that environmental documents "discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional

housing, either directly or indirectly, in the surrounding environment.” Furthermore, Section 15126.2(d) states that “it must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.”

Because O&M activities are ongoing, the activities and any effects are part of baseline environmental conditions. Minor new construction activities would include construction of new gas pressure limiting stations, substation expansion and new lines to extend service to new commercial or residential customers. Extension of service to additional customers would directly serve new growth. However, growth in California is governed by local general plans and zoning ordinances, over which the project would have no effect.

Although providing essential services such as gas and electricity, which are needed for population growth, could be identified as “removing an obstacle to growth,” such services do not by themselves create growth. Moreover, PG&E is legally required to provide new or expanded service as needs are identified through the local jurisdiction planning process, and the company expands its facilities and constructs new ones only in response to specific, identified needs for service. In this sense, covered activities under the project are more properly considered growth accommodating rather than growth inducing. ITP covered activities would support (accommodate) growth in the Bay Area, consistent with the various city/county General Plans. It would not provide for any growth beyond that planned and evaluated by local agencies. In light of these considerations, the project’s potential to induce growth would not be cumulatively considerable.

5.4 Significant and Unavoidable Impacts

Based on the analysis in Chapter 3, no significant and unavoidable impacts would result from implementation of the covered activities in the ITP.

5.5 Significant Irreversible Environmental Changes

State CEQA Guidelines Section 15126.2(c) requires that an EIR discuss the significant irreversible environmental changes that would be caused by the project during construction and operation should it be implemented. The project would result in a minor irreversible commitment of fossil fuel resources for O&M of existing facilities, minor construction of new facilities, and implementation of conservation actions. However, the project would also result in long-term benefits with regard to species habitat protection. Overall, any negative impacts would be minimal and less than significant.

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6.1 ICF

- Brad Norton—Project Director, EIR preparation and review
- Danielle Wilson—Project Manager, EIR preparation and review
- Kelsey Cowin—Assistant Project Manager, *Executive Summary*
- Jennifer Ban—*Aesthetics*
- Lindsay Christensen—*Agriculture and Forestry Resources (Land Use review)*
- Elizabeth Foley—*Air Quality, Greenhouse Gas Emissions, and Noise; Transportation and Traffic review*
- Laura Yoon—*Air Quality and Greenhouse Gas Emissions review*
- Renee Richardson—*Biological Resources (Botany, Wildlife), Hydrology and Water Quality*
- Devin Jokerst— *Biological Resources (Botany)*
- Robert Preston—*Biological Resources (Botany review)*
- Rachel Gardiner—*Biological Resources (Wildlife)*
- John Howe—*Biological Resources (Wildlife review)*
- Robert Knutson—*Biological Resources, Hydrology and Water Quality*
- Christiaan Havelaar—*Cultural Resources (Architectural Resources)*
- Ellen Unsworth—*Paleontological Resources; Geology, Soils, and Mineral Resources review*
- Tom Stewart—*Geology, Soils, and Mineral Resources*
- Tiffany Michou—*Hazards and Hazardous Materials, Land Use, Population and Housing, Public Services, Recreation, Transportation and Traffic, and Utilities and Service Systems*
- Katrina Sukola—*Hydrology and Water Quality*
- James Alcorn—*Introduction, Energy, Wildfire, Alternatives, Other CEQA Considerations*
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Appendix A
Notice of Preparation



Notice of Preparation for an Environmental Document for the Bay Area Operations and Maintenance Activities Proposed by Pacific Gas and Electric

A. Introduction

Pacific Gas and Electric Company (PG&E) has filed an application for an Incidental Take Permit (ITP) under the California Endangered Species Act (CESA) Section 2081 with the California Department of Fish and Wildlife (CDFW). The ITP would cover PG&E's Bay Area Operations and Maintenance (O&M) Activities for natural gas pipelines and electric transmission and distribution lines (proposed project) and establish a comprehensive approach to avoid and minimize impacts to covered species, as well as mitigate for any impacts. A region-wide ITP provides an enhanced conservation strategy while eliminating the time and expense involved in processing individual ITPs. O&M activities are expected to be performed primarily within PG&E's existing rights-of-way (ROWs) over the course of the 30-year permit term. The CDFW will direct the preparation of an Environmental Document (ED) under its certified regulatory program to assess the environmental effects of the ITP Application. The long-term ITP would cover O&M activities, minor new construction activities, and habitat management and enhancement activities that could affect certain species. The species to be covered by the 2081 ITP are the California tiger salamander and Alameda whipsnake, which are listed under CESA as threatened, and the California freshwater shrimp, which is listed under CESA as endangered.

The CDFW is the lead agency under California law and will prepare a Draft and Final ED to comply with the California Environmental Quality Act (CEQA). As required by CEQA, this NOP is being sent to interested agencies and members of the public. The purpose of this NOP is to inform recipients that the CDFW is beginning preparation of an ED for the proposed project and to solicit information that will be helpful in the environmental review process. This notice includes a description of the proposed project, a summary of potential project impacts (including for resources that may not be addressed in detail in the ED), the times and locations of public scoping meetings, and information on how to provide comments. Two public meetings will be held during the scoping period (see detail in Section D). The scoping period will end on **January 24, 2018**. A Scoping Report will be prepared to summarize comments.

This NOP can be viewed on the CDFW web site at the following link:
<https://www.wildlife.ca.gov/notices>.

B. Project Description

CDFW is processing an Incidental Take Permit application to cover PG&E's Bay Area Operations and Maintenance (O&M) Activities for natural gas pipelines and electric transmission and distribution lines (proposed project) and establish a comprehensive approach to avoid and minimize impacts to covered species, as well as mitigate for any impacts. Most of PG&E's Bay Area electric and gas transmission and distribution infrastructure was installed between the 1950s and 1970s. Ongoing operations result in normal wear and tear, which trigger the need to periodically test, maintain and repair facilities. These activities ensure compliance with California Public Utilities Commission (CPUC) mandates concerning the siting, design, operation, and maintenance of public utilities in California, specifically CPUC General

Order 95 (overhead electrical line construction), General Order 112-E (construction, testing, operation, and maintenance of gas gathering, transmission, and distribution piping systems), and General Order 131-D (planning and construction of electrical generation, transmission/power/distribution line facilities and substations). As part of O&M, PG&E occasionally needs to install new or replacement structures to upgrade existing facilities or extend service to new residential or commercial customers. O&M activities or minor new construction fall within the CPUC's exclusive jurisdiction. If a resource may be potentially affected or other regulatory requirements apply, PG&E coordinates with the appropriate regulatory agency(ies) to secure any required permits or authorizations.

PG&E's proposed ITP will be a comprehensive 30-year plan that establishes avoidance and minimization measures and best management practices to reduce impacts to covered species, a framework for mitigating impacts, and incidental take coverage for the California tiger salamander, the Alameda whipsnake, and the California freshwater shrimp. The proposed ITP requires compensatory mitigation in advance of impacts and will foster regional, larger scale conservation efforts.

Description of Covered Activities

The ED will cover the activities covered under the ITP, including three categories of activities that would be conducted in accordance with CPUC requirements and for which PG&E is requesting incidental take authorization: operational activities, maintenance activities, and minor new construction, as described below.

- **Operational activities** typically include inspecting, monitoring, testing, cleaning and operating valves, enclosures, switches, insulators and other components. These activities involve utility personnel working at existing facilities in existing ROW; personnel typically use existing access roads.
- **Maintenance activities** include repairing and replacing facilities, structures, and access roads. This work includes reconductoring electrical transmission and distribution projects and gas pipeline replacement. This work also includes emergency repair and replacement and vegetation management, including tree pruning and removal. These activities primarily take place at existing facilities and within existing ROWs; hazard trees may occur adjacent to the ROW as PG&E is required by law to manage and remove them to ensure the safety of its facilities.
- **Minor new construction activities** include installing or replacing facilities to upgrade existing infrastructure or extending service to locally approved new residential or commercial customers. When conducted in natural vegetation that contain suitable habitat for sensitive species, covered linear activities are limited to 2 miles or less from an existing line. Line extensions exceeding 2 miles would not be an O&M activity covered by this ED. The size of a minor new construction project for purposes of this ED would be calculated as the total footprint, expressed in acres. New or replacement structures to upgrade existing infrastructure are limited to new gas pressure limiting stations with 1 acre or less of natural vegetation disturbance and electrical substation expansions with 3 acres or less of natural vegetation disturbance.

Approximate annual disturbance for these activities is anticipated as:

Table 1. O&M and New Construction Activities Approximate Disturbance*

Activities	Estimated Annual Temporary Disturbance	Estimated Annual Permanent Disturbance	Estimated Total Permanent Disturbance (for 30-yr permit term)
Natural Gas	68 acres	30 acres	907 acres

Electrical	261 acres	38 acres	1,130 acres
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*Note: This includes all types of disturbance, not just disturbance in natural vegetation.

Typical O&M activities would take between 4 hours and 2 days, with some larger activities taking up to 3 months. Minor new construction activities may take 3 days to 3 months for gas pipelines, 5 days to 3 months for transmission lines, and 5 to 10 days for distributions lines.

Proposed Project Location

O&M activities for the proposed project would occur in nine San Francisco Bay Area counties: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma, see below. All covered activities will occur within the following types of lands:

- PG&E gas and electrical transmission and distribution facilities, ROWs, or lands adjacent to existing facilities,
- the lands owned by PG&E or subject to PG&E easements to maintain these facilities,
- access routes associated with PG&E’s routine maintenance,
- a buffer around the ROW, and
- mitigation areas acquired to compensate for impacts resulting from covered activities.

The O&M activities would occur within the nine-county area, totaling approximately 402,440 acres (128,735 acres of which are in natural vegetation). O&M and minor new construction activities are expected to be performed throughout PG&E’s ROWs and in close proximity to the ROWs over the course of the 30-year permit term. Activities on mitigation land will also be analyzed by the CEQA document.

PG&E’s Natural Gas Transmission and Distribution System

PG&E’s natural gas system consists of a transmission system and a distribution system. The transmission system in the Bay Area includes 16 primary gas transmission lines totaling approximately 1,820 miles of pipeline. The gas transmission system transports natural gas in steel pipelines buried 3 to 4 feet deep (measured to the top of the pipe). Depending on the location and type of pipe, pipe diameter can vary from 8 to 42 inches. The Bay Area gas distribution system consists of approximately 19,350 miles of both steel and plastic lines, which are typically buried 2 to 4 feet deep.

The ROW width for the natural gas system varies from 5 to 150 feet. PG&E owns less than 1% of the linear ROWs in fee title; the remainder are in easements and franchise.

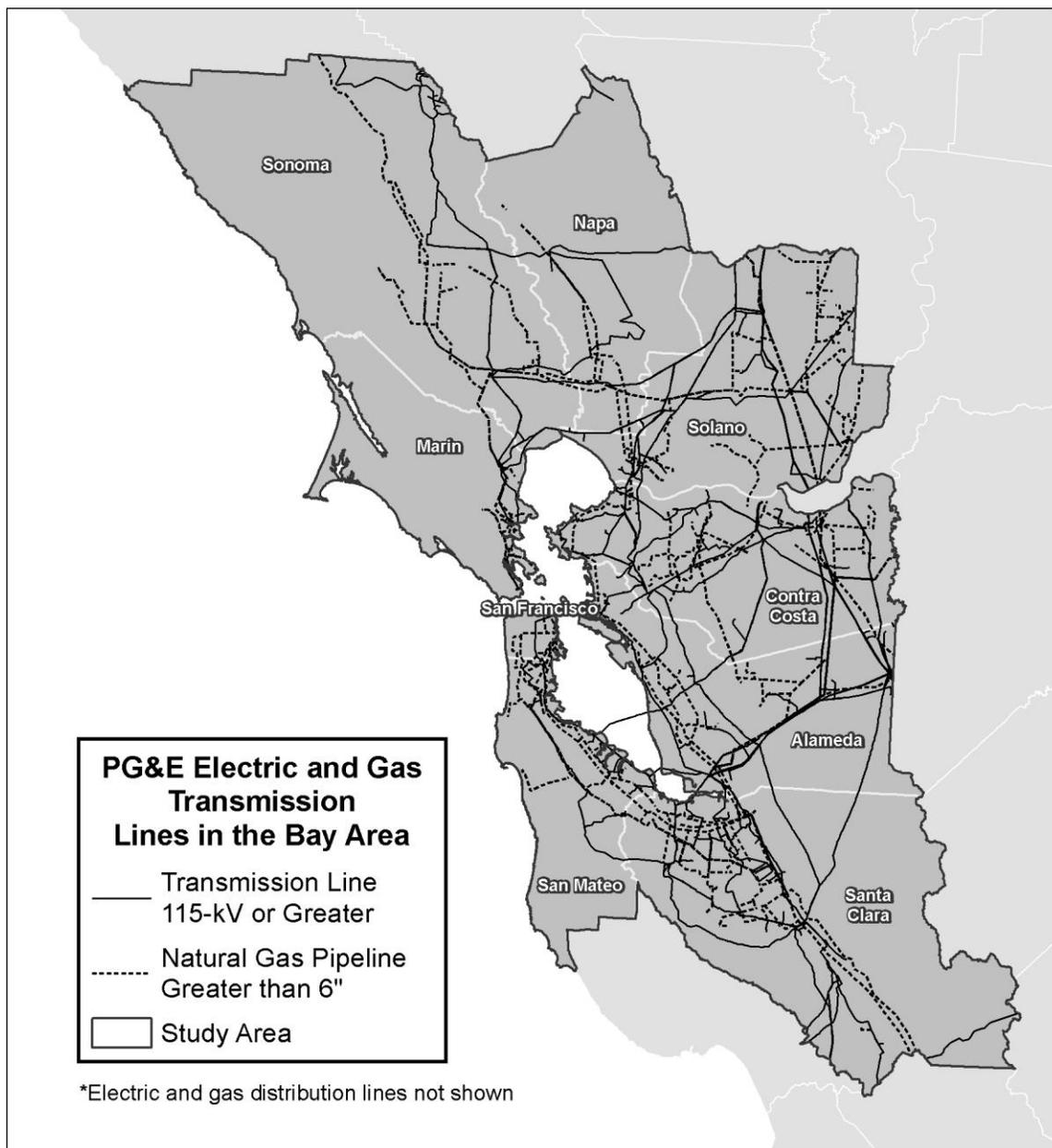
PG&E’s Electrical Transmission and Distribution System

PG&E’s electrical system consists of a transmission system and a distribution system. The electrical transmission system in the Bay Area consists of approximately 4,430 miles of transmission lines. Bulk transmission lines (230 kilovolt [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 (TSPs), and lattice towers are also used in certain areas. PG&E operates 207 transmission substations, and over 275 distribution substations in the Bay Area. Power from high-voltage transmission lines is transformed to lower voltage at these substations.

Transmission ROWs are of varying widths and generally are easements that are negotiated with private landowners or the holders of public lands. PG&E owns less than 1% of these ROWs in fee title; the rest

are in easements. The ROW widths depend on circuit or line voltage, the number of lines per ROW, terrain, and other factors.

PG&E's electrical distribution system provides links between most customers and the transmission system. Approximately 14,885 miles of overhead distribution lines extend through the Bay Area, and another 8,130 miles are underground. Wood or steel poles support the distribution conductors. The electrical distribution ROW widths vary according to the system voltage, terrain, and other factors.



PG&E's Conservation Strategy

PG&E's proposed ITP includes a compensatory mitigation plan to ensure that impacts to covered species are fully offset. The plan includes a strategy for mitigating both temporary and permanent impacts. The plan requires that mitigation be purchased in advance of impacts. Mitigation options include, but

are not limited to, the placement of conservation easements on land purchased in fee by PG&E or on lands owned by others, and the purchase of mitigation credits from approved banks. For the conservation easements, PG&E will fund endowments to provide for management in perpetuity. The plan will ensure that mitigation is achieved on a larger, regional scale. The mitigation sites may require restoration or enhancement work, which would be considered a covered activity under the ITP. Additionally, avoidance and minimization measures will be implemented to reduce impacts to covered species.

Project Purpose and Objectives

Following are the objectives of the Proposed Project as described by PG&E:

- Support continued long-term operation and maintenance of PG&E electrical and natural gas facilities to ensure delivery of reliable and safe energy to PG&E customers, in accordance with CPUC mandates and in compliance with CESA and other relevant state and federal laws through obtaining an incidental take authorization or other regulatory authorization as required.
- Complete necessary O&M activities in a manner that minimizes impact to and provides conservation of habitat for California tiger salamander, Alameda whipsnake, and California freshwater shrimp, as well as other species with similar habitat requirements, within approximately 402,440 acres of lands comprising the Plan Area within the nine counties in the San Francisco Bay Area.
- Mitigate for environmental impacts from O&M activities in a manner that contributes to the long-term survival of California tiger salamander, Alameda whipsnake, and California freshwater shrimp, as well as other species with similar habitat requirements, through protection and management of those species and their habitats in the study area by participating in the network of permanently protected and managed lands throughout the Bay Area that support populations of those species.

C. Analysis of Potential Environmental Effects

In accordance with CEQA guidelines and CDFW's certified regulatory program, the CDFW intends to prepare an ED to evaluate potential environmental effects of the proposed project, and to propose mitigation measures to reduce any significant effects identified. The ED will also study the environmental impacts of alternatives to the proposed project, and propose mitigation to reduce their effects.

Based on preliminary review of the proposed project and documents submitted by PG&E, completion of the proposed project may have potentially significant environmental effects, but some resource areas appear unlikely to experience significant environmental effects. Potential issues and impacts are listed in Attachment A. No determinations have yet been made as to the significance of these potential impacts, some resources may be eliminated from detailed analysis in the ED.

Scoping comments are welcome on the range of environmental resources being considered for analysis in the ED. The ED will also evaluate the cumulative impacts of the project in combination with other present and planned projects in the area.

Mitigation Measures. PG&E has developed a set of standard resource protection measures, standard operating procedures, and best management practices that could reduce or eliminate potential impacts of the proposed project. The effectiveness of these measures will be evaluated in the ED, and additional measures ("mitigation measures") will be developed to further reduce impacts, if required. When the CDFW makes the final decision on the proposed project, it will define the mitigation measures to be adopted as a condition of project approval.

Alternatives. As required by CEQA, the ED will evaluate alternatives to the proposed project that could potentially reduce, eliminate, or avoid impacts of the project. In compliance with CEQA, a Draft ED must describe a reasonable range of alternatives to the project or project location that could meet the project's purpose and need, feasibly attain most of the basic project objectives, and avoid or lessen any of the significant environmental impacts of the proposed project. The No Project Alternative will also be analyzed in the Draft ED to describe the situation that would likely occur in the absence of proposed project implementation. The ED will evaluate the comparative merits of the alternatives.

D. Public Scoping Meetings

The CDFW will initially conduct 2 public Scoping Meetings as shown in Table 2. The purpose of the scoping meetings is to present information about the proposed project and the CDFW's decision-making processes, and to listen to the views of the public on the range of issues relevant to the scope and content of the ED.

Table 2. Public Scoping Meetings

Location	Burlingame Recreation Center	Mill Valley Community Center, Terrace Lounge
Day & Date	January 8, 2018	January 9, 2018
Time(s)	4:00 to 6:00 p.m.	4:30 to 6:30 p.m.
Address	850 Burlingame Ave. Burlingame, CA 94010	180 Camino Alto Mill Valley, CA 94941

E. Scoping Comments

The CDFW is soliciting information regarding the topics and alternatives that should be included in the ED. **All comments for the scoping period must be received by January 24, 2018.**

All Scoping Comments: You may submit comments in a variety of ways: (1) by U.S. mail, (2) by electronic mail, or (3) submitting comments at a Public Scoping Meeting (see times and locations in Table 2 above).

All comments will be considered public unless otherwise requested.

By Mail: If you send comments by U.S. mail, please use first-class mail and be sure to include your name and a return address. Please send written comments on the scope and content of the ED to:

Craig Weightman (CDFW Project Manager)
California Department of Fish and Wildlife
c/o Aspen Environmental Group
235 Montgomery Street, Suite 935
San Francisco, CA 94104-3002

By Electronic Mail: Email communications are encouraged; please remember to include your name and return address in the email message. Email messages should be sent to bayareaitp@aspeneq.com.

A **Scoping Report** will be prepared, summarizing all comments received (including oral comments made at the Scoping Meetings). This report will be posted on the CDFW website and copies will be placed in local document repository sites listed in Table 2 below.

F. For Additional Project Information

Internet Website – Information about this application and the environmental review process will be posted on the CDFW website. This site will be used to post all public documents during the environmental review process and to announce upcoming public meetings. In addition, a copy of the Draft ED will be posted at the site after it is published.

Document Repositories – Documents related to the Project and the ED will be made available at the sites listed in Table 3.

Table 3. Project Document Repository Sites

Library Sites		
Central Santa Rosa Library	211 E Street, Santa Rosa, CA 95404	(707) 545-0831
Napa Main Library	580 Coombs Street, Napa, CA 94559	(707) 253-4241
Civic Center Library	3501 Civic Center Drive, San Rafael, CA 94903	(415) 473-6057
Fairfield Civic Center Library	1150 Kentucky Street, Fairfield, CA 94533	(866) 572-7587
Martinez Library	740 Court Street, Martinez, CA 94553	(925) 646-9900
Oakland Main Library	125 14th Street, Oakland, CA 94612	(510) 238-3134
King Library	150 E. San Fernando St., San Jose, CA 95112	(408) 808-2000
San Carlos Public Library	610 Elm Street, San Carlos, CA 94070	(650) 522-7800
San Francisco Main Library	100 Larkin St., San Francisco, CA 94102	(415) 557-4400
California Department of Fish and Wildlife Office		
Bay Delta Region (Region 3)	7329 Silverado Trail, Napa, CA 94558	(707) 944-5500

Attachment A: Summary of Environmental Impacts

Potential issues and impacts are listed below. No determinations have yet been made as to the significance of these potential impacts, some resources may be eliminated from detailed analysis in the ED. CDFW welcomes comments as to whether certain resources should be eliminated from detailed analysis.

Ongoing O&M activities would occur in a similar manner to existing activities with a similar level of impacts. Minor new construction activities as well as management of compensatory mitigation lands, including restoration and enhancement activities as well as other minor activities associated with ITP avoidance and minimization measures, could have additional impacts on resources. Thus, the impacts listed in the table could occur from project activities.

Attachment A – Summary of Potential Impacts of PG&E's Bay Area O&M and Minor New Construction Activities

Environmental Issue Area / Potential Issues or Impacts

- **AESTHETICS / VISUAL** For ongoing O&M activities, visual impacts from maintenance would continue to be short-term and temporary and occur along already existing infrastructure. Such activities are part of the environmental baseline and, while occasionally noticeable, would not degrade the visual character of the surrounding area.
- Long-term visual impacts to scenic vistas from minor new construction would be generally limited to areas within or immediately adjacent to a PG&E ROW, and above ground structures would generally have small footprints. New overhead distribution lines generally follow existing roadways and are common visual features similar to street lights and traffic controls that do not create a significant impact.
- Some more substantial visual impacts could occur when minor new construction includes up to 2 miles of new overhead transmission lines in undeveloped areas.
- Implementation of the ITP would have minimal aesthetic impacts resulting from the management of compensatory mitigation lands, including restoration or enhancement activities, as well as other minor activities associated with ITP avoidance and minimization measures.

AGRICULTURAL RESOURCES

- Ongoing O&M activities could potentially disrupt the use of farmlands that are classified as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland. These impacts would be temporary and short term because they primarily involve repairs or maintenance of existing gas and electric infrastructure. PG&E would continue to coordinate restoration in accordance with easement documents. Future O&M activities are anticipated to be similar to current impacts from ongoing activities, without any anticipated increase.
 - There is some potential for temporary and permanent conversion of farmland to nonagricultural uses relating to PG&E's facilities upgrades and expansions, and construction of minor new facilities. Permanent conversions are unlikely to be greater than 3 acres and PG&E estimates that permanent conversion of agriculture land would occur at an average of approximately 1 acre per year, which would be minimal and is unlikely to have a measurable impact on area farming operations.
 - Compensation lands could be identified on lands under Williamson Act contract, such that either the Purchase of Habitat Compensation Lands option or the Enhancement as Compensation option could result in the limited withdrawal of lands from Williamson Act protection. PG&E has stated that it would generally seek compensation land that is not under a Williamson Act contract. In any event, any such
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Attachment A – Summary of Potential Impacts of PG&E's Bay Area O&M and Minor New Construction Activities

Environmental Issue Area / Potential Issues or Impacts

conversions would be small in size and would not significantly affect area farming operations. Because gas and electric facilities are considered a compatible use in agricultural preserves under Section 51238 of the California Government Code, PG&E's O&M work on such existing facilities would not normally affect any Williamson Act contracts in place. While PG&E's construction of minor new facilities could require taking small acreages of land out of existing Williamson Act contracts, the balance of the existing contract would generally not be affected under applicable law.

- The Plan Area includes few areas zoned for forest land, timberland, or Timberland Production Zone so any impacts to these areas would be minimal and there would be limited or no loss or conversion of forest land.
 - Implementation of the ITP would have the potential for temporary and permanent conversion of farmland to nonagricultural uses resulting from the management of compensatory mitigation lands, including restoration or enhancement activities. However, the agricultural acreage acquired as part of the conservation strategy would likely be small and such activities would have a minimal effect on existing farming operations.
 - Other than as addressed above, the proposed project would not involve other changes that could result in the conversion of farmland to non-agricultural use.
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AIR QUALITY

- Impacts during ongoing O&M will continue to occur as a result of airborne dust and heavy equipment, helicopters, support vehicles, and other equipment powered by internal combustion engines that generate exhaust containing: carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NOx), sulfur oxides (SOx), and particulate matter (PM10 and PM2.5). These impacts related to ongoing O&M are part of the existing baseline, and will be temporary and short-term. PG&E's ongoing O&M activities would also be part of any existing non-attainment conditions. PG&E will continue to implement Best Management Practices for its ongoing operations.
 - Implementation of the ITP could facilitate minor new construction activities that are similar or additional to those performed historically, which could have additional impacts as a result of airborne dust and heavy equipment, helicopters, support vehicles, and other equipment powered by internal combustion engines that generate exhaust containing criteria air pollutants.
 - Implementation of the ITP, directly through habitat creation and related activities, or indirectly through PG&E's minor new construction, could create potential impacts to human and environmental health by contributing to existing non-attainment conditions with respect to the EPA's National Ambient Air Quality Standards (NAAQS) and California standards for particulate matter and ozone.
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Attachment A – Summary of Potential Impacts of PG&E's Bay Area O&M and Minor New Construction Activities

Environmental Issue Area / Potential Issues or Impacts

BIOLOGICAL RESOURCES

- Potential temporary and permanent impacts to sensitive vegetation communities from activities such as restoration or enhancement of mitigation lands, fencing maintenance, pipeline replacement, ROW vegetation management, tower repair or replacement, and minor new construction activities.
 - Impacts from an increase in non-native weed establishment and recruitment, particularly at ground disturbance sites.
 - Potential temporary and permanent impacts to sensitive plant species.
 - Potential temporary and permanent impacts to federal or state jurisdictional wetland or non-wetland drainages through vegetation removal, placement of fill, erosion, sedimentation, and degradation of water quality.
 - Potential direct, permanent impacts to wildlife, which may be accidentally run over by vehicles.
 - Potential direct and indirect impacts to wildlife species listed in the California Natural Diversity Database (CNDDDB).
 - Potential direct and indirect, temporary and permanent impacts to sensitive wildlife species, including the California tiger salamander, Alameda whipsnake, and California freshwater shrimp.
 - Potential direct, permanent impacts to burrowing wildlife species, which may be inadvertently killed when burrows are collapsed by heavy machinery.
 - Potential direct and indirect impacts to bird species listed in the CNDDDB.
 - Potential direct, permanent impacts to birds nesting in structures, equipment, shrubs, trees, or on the ground, if their nests are disturbed or destroyed.
 - Potential impacts to nesting bird species from helicopter rotor wash, noise, dust, and vibrations.
 - Beneficial impacts resulting from acquisition of lands as part of the conservation strategy that would result in permanent protection in perpetuity.
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CULTURAL RESOURCES

- Potential impacts to known and unknown archaeological sites during restoration or enhancement of compensatory mitigation lands or ground disturbance activities associated with operations and maintenance activities and minor new construction.
 - Potential impacts to Traditional Cultural Properties (TCPs) or potential TCPs from the restoration or enhancement of compensatory mitigation lands, and minor new construction of utility facilities.
 - Potential impacts to historic-era sites that are potentially eligible for listing on the NRHP.
 - Potential impacts to paleontological resources in particular in areas of high or undetermined areas of paleontological sensitivity.
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GEOLOGY AND SOILS

- Impacts from existing O&M and minor new construction activities in this area could include potential impacts from: rupture of active faults or strong seismic groundshaking, landslides, mudslides, or other related ground failures from seismic activity, localized soil erosion, slope failure, and expansive soils. Standard measures to address geological and soils issues are incorporated in all utility design work to reduce potential impacts.
 - Implementation of the ITP could have impacts on geology and soils resulting from the management of compensatory mitigation lands, including restoration or enhancement activities, as well as other minor activities associated with ITP avoidance and minimization measures.
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Attachment A – Summary of Potential Impacts of PG&E's Bay Area O&M and Minor New Construction Activities

Environmental Issue Area / Potential Issues or Impacts

GREENHOUSE GAS EMISSIONS

- Minor new construction activities are similar or additional to those performed historically by PG&E. These activities are not likely to generate substantial greenhouse gas (GHG) emissions because most GHG emissions would be associated with construction equipment and vehicles, which are used on an ongoing basis and represent baseline conditions. Greenhouse gases would also result from purging natural gas pipelines if needed during maintenance activities. Construction associated with compensatory mitigation lands and minor new construction activities would be temporary and short term, and GHG emissions would be amortized over 30 years under guidance followed by the CPUC. Additional operational emissions would be limited to minimal carbon dioxide (CO₂) emissions from vehicle use, accidental leaks of sulphur hexafluoride (SF₆) (used in new breakers) and gas compressor emissions.
 - Impacts during ongoing O&M would continue to occur from time to time from use of heavy equipment, helicopters, support vehicles, and other equipment powered by internal combustion engines that generate greenhouse gas emissions. These ongoing maintenance activities are existing activities that are anticipated to continue with the same intensity as they have historically and are currently.
 - Implementation of the ITP would have minor greenhouse gas emissions resulting from the management of compensatory mitigation lands, including restoration or enhancement activities, as well as other minor activities associated with ITP avoidance and minimization measures. Impacts from implementation of the ITP are highly unlikely to be significant.
 - Implementation of the project is unlikely to conflict with an applicable plan, policy or regulation adopted to reduce greenhouse gas emissions. Moreover, as directed by the CPUC, PG&E includes GHG mitigation measures in its standard construction practices as feasible, even though GHG impacts are often less than significant.
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HAZARDS AND HAZARDOUS MATERIALS

- Potential impacts from the improper storage or handling of hazardous materials and/or hazardous wastes during management of compensatory mitigation lands O&M activities or minor new construction activities.
 - Potential impacts from the leaking or spilling of petroleum or hydraulic fluids from management of compensatory mitigation lands or construction equipment or other vehicles during project lifetime.
 - Potential impacts from the inadvertent uncovering of hazardous materials during excavation activities, causing toxic releases to the environment.
 - Potential impacts from handling hazardous materials within one-quarter mile of an existing or proposed school.
 - Potential impacts from being located within an airport land use plan or within a private airstrip.
 - Potential impacts from loss, injury, or death involving wildland fires in particular for work that involves flame, arcing, or sparking equipment such as welding
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Attachment A – Summary of Potential Impacts of PG&E's Bay Area O&M and Minor New Construction Activities

Environmental Issue Area / Potential Issues or Impacts

HYDROLOGY AND WATER QUALITY

- Possible impacts from increased surface water runoff, erosion, siltation, and sedimentation above baseline conditions.
 - Possible impacts to streams or washes from violation of water quality standards or waste discharge requirements.
 - Possible impacts on the existing drainage pattern including through alteration of a stream or river that could result in erosion or siltation. Removal or replacement of pipelines could require work in channel banks or within streams.
 - Project is unlikely to substantially deplete groundwater supplies or interfere substantially with groundwater recharge due to the limited use of water for management of compensatory mitigation lands and limited minor new construction.
 - Project would not place housing within a 100-year flood hazard area nor would it impede or redirect flood flows through a 100-year flood hazards area.
 - Although portions of the Plan Area are near levees or dams and in areas subject to seiche, tsunami or mudflow, the management of compensatory mitigation lands and minor new construction activities would result in minimal increased risk of exposure of people or structures to significant risk or inundation.
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LAND USE

- Project is unlikely to conflict with applicable land use plans, policies, or regulations adopted to avoid or mitigate an environmental effect.
 - Effects to landowners, businesses, and public and community facilities or other sensitive receptors depending on location of project activities.
 - Potential to conflict with applicable Habitat Conservation Plan or Natural Community Conservation Plan requirements.
 - Project activities would not have the potential to physically divide an established community.
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MINERAL RESOURCES

- Project activities may occur in areas classified as mineral resource zones but would include a small amount of ground disturbance and are unlikely to impact recovery of the resource outside of the limited project footprint.
 - Compensatory mitigation lands or minor new construction activities are unlikely to cross a locally important mineral resource recovery site. Compensatory mitigation sites would generally not be established in such locations, or would be designed to minimize impacts to the mineral resource. Minor new construction activities serving development in urban centers would not likely occur in locally important mineral recovery sites. In more rural areas, PG&E would site minor new construction activities to avoid or minimize potential conflicts with mineral resources.
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Attachment A – Summary of Potential Impacts of PG&E's Bay Area O&M and Minor New Construction Activities

Environmental Issue Area / Potential Issues or Impacts

NOISE

- For ongoing O&M activities, noise impacts from maintenance would continue to be short-term and temporary, and occur along already existing utility infrastructure. Such activities would continue to be consistent with the hourly requirements in local noise ordinances except in exigent circumstances. Construction noise would be generated by equipment operation including potential helicopter use.
 - Additional noise impacts could occur with minor new construction.
 - Minor new construction could also have some limited operational noise, such as the noise from the operation of new transmission lines or gas pressure limiting stations, which could increase ambient noise levels surrounding these facilities. However, these noise impacts are not likely to be significant for small construction projects.
 - Implementation of the ITP would have minor, temporary construction noise impacts resulting from the management of compensatory mitigation lands, including restoration or enhancement activities, as well as other minor activities associated with ITP avoidance and minimization measures. Implementation of the ITP could also facilitate minor new utility construction activities that are similar or additional to those performed historically.
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POPULATION/HOUSING

- PG&E's ongoing O&M activities would continue to be part of the environmental baseline, and would not provide infrastructure that could directly or indirectly induce population growth, or displace housing or people because these activities would be conducted on existing electrical and gas facilities, primarily located within existing PG&E rights-of-way (ROW).
 - Minor new construction activities are specifically intended to support development patterns identified in approved general plans, and would not directly or indirectly induce population growth. Sufficient temporary housing exists in the area for the fraction of the construction workforce that would require lodging.
 - No housing would be displaced for minor new construction activities, which are generally required to support development patterns identified in approved general plans. Temporary construction easements and new ROW to support extension of existing infrastructure and expansion of existing facilities may be required, but the facilities will be sited to avoid displacement of existing housing.
 - No people will be displaced due to minor new construction activities, which are intended to support development patterns identified in approved general plans and would be sited to avoid displacement of people.
 - Implementation of the ITP would not directly or indirectly induce population growth, displace housing or displace people. Implementation of the ITP could facilitate minor new construction but, as detailed below, those activities would have no impact on population and housing.
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PUBLIC SERVICES

- Fire and Police Protection: The activities that would be conducted in the Plan Area involve the management of compensatory mitigation lands, minor new construction, and O&M activities for existing electrical and gas facilities, which are part of the existing environmental baseline and anticipated to continue at current levels. While fire or police services may be required during these activities due to an accident, such an event is unlikely to occur and would not trigger the need for new fire or police protection services. Any fire or police protection services required for these activities could be handled by existing facilities. To reduce the potential impacts to response times, PG&E would coordinate lane and road closures with the local jurisdiction through the encroachment permit process prior to construction.
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Attachment A – Summary of Potential Impacts of PG&E's Bay Area O&M and Minor New Construction Activities

Environmental Issue Area / Potential Issues or Impacts

- Schools: Compensatory mitigation lands, O&M activities and minor new construction could extend beyond existing ROWs for construction access/staging activities. O&M and minor new construction activities would tend to be located within previously disturbed areas or adjacent to existing ROW and would avoid impacts to schools. None of these activities would result in an increase in population in the Plan Area, so no new schools would be required.
 - Parks: O&M activities, minor new construction, and habitat mitigation activities would not cause an increase in population in the Plan Area and no new or altered parks and recreation facilities would be required.
 - Other Public Facilities: The activities occurring in the Plan Area involve minor new construction, and O&M activities for existing electrical and gas facilities, which are part of the existing environmental baseline, and the management of compensatory mitigation lands. Some activities could occur adjacent to existing public facilities (e.g., libraries and hospitals); these activities would be short-term in nature. PG&E would continue to coordinate lane and road closures with the local jurisdiction through the encroachment permit process prior to construction. Any aboveground facilities (e.g., gas pressure-limiting stations, minor substation expansions, new electrical distribution/transmission lines) would be no more than 1 acre for a gas pressure-limiting station, 3 acres for minor substation expansion, and 2 miles for new electrical distribution/transmission lines in natural habitats and would not result in the need for expanded or added public facilities. Project activities would not increase the local population or otherwise result in a change that would require alteration or expansion of existing public facilities.
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RECREATION

- Existing ROW for gas and electric transmission or distribution infrastructure may be located within or adjacent to existing recreational facilities. Project activities may be necessary in, or adjacent to, existing recreational facilities, potentially resulting in temporary impacts to recreational activities. PG&E would implement its land use planning process and avoidance and minimization measure to identify preferred timeframes for O&M and minor new construction and to minimize disruption of recreational activities. PG&E would provide notification to the appropriate agency in advance of any temporary access restrictions required within these recreational facilities. Windows for certain minor new construction activities may be constrained by operational restrictions or by best management practice (BMP) restrictions. Emergency repairs made to PG&E infrastructure would be completed as quickly as possible to ensure public safety and continuity of service; such repairs typically cannot be deferred. Although PG&E would minimize impacts on recreation, temporary closure or limitation of access to existing recreational facilities could occur. However, these activities are highly unlikely to increase the use of alternative neighborhood or regional parks to the degree that it would result in the substantial physical deterioration of these park facilities due to the number of recreation available in the Plan Area and the duration of the work. Recreational uses would be restored as quickly as possible following the completion of maintenance, repair, or minor new construction activities, and no substantial long-term disruption of recreation is expected.
 - Minor new construction activities would not include changes to existing recreational facilities within the Plan Area. As described previously, minor new construction activities would not increase the use of existing facilities; therefore, the program will not require the construction or expansion of recreational facilities.
 - Some mitigation lands acquired as compensation might accommodate very limited, passive recreational uses, but the need for new infrastructure would be minimal, consistent with the primary land use purpose of habitat conservation. Additionally, lands targeted to fulfill the conservation strategy generally do not support recreational activities.
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Attachment A – Summary of Potential Impacts of PG&E's Bay Area O&M and Minor New Construction Activities

Environmental Issue Area / Potential Issues or Impacts

TRANSPORTATION/TRAFFIC

- Ongoing O&M activities would involve a varying number of personnel driving to and from work areas throughout the day but is not anticipated to change from existing conditions. Personnel would typically drive to the work site at the beginning of the day and leave at the end of the day, with fewer people traveling to and from the work site throughout the day. Activities associated with this ongoing O&M work are not expected to alter roadway level of service or conflict with congestion management programs in the Plan Area.
- Some ongoing O&M activities will include work areas that extend beyond the ROW established for the program area, which is part of the existing environmental baseline. Such O&M activities conducted within public ROWs could temporarily impede vehicle, bicycle, and pedestrian traffic, consistent with existing conditions. Caution signs and/or flaggers will continue to be used to regulate traffic, cyclists, and pedestrians to maintain a safe transportation corridor. If temporary lane closures are required for O&M activities, PG&E will continue to coordinate with local jurisdictional agencies to obtain the necessary encroachment permits and perform the work according to the relevant permit requirements.
- For ongoing gas pipeline patrols and associated facilities, PG&E conducts aerial patrols on a quarterly-basis using fixed-wing aircraft that fly at an elevation of 500 feet or helicopters. Annual patrols of electrical transmission lines, distribution lines, and associated facilities are conducted with helicopters. These inspections and patrols generally take 1 day to complete. PG&E will continue to notify the Federal Aviation Administration (FAA), as appropriate, prior to conducting fixed-wing aircraft and helicopter inspection activities. Based on the limited frequency and duration of fixed-wing air craft and helicopter usage, as well as the coordination with the FAA, ongoing O&M activities will continue as usual as part of baseline environmental conditions, and will not disrupt air traffic patterns or levels.
- Project activities may result in temporary road blockages; caution signs and/or flaggers would be used to regulate traffic where necessary in accordance with encroachment permits and the associated approved Traffic Control Plans. While temporary traffic delays could occur, the delays would be short term and isolated, and emergency vehicles would be provided access. PG&E would coordinate with local jurisdictional agencies to obtain the necessary traffic control permits and inform emergency responders of potential lane closures in accordance with the relevant permit requirements.
- Though some project activities could intermittently reduce, disrupt, or temporarily eliminate access to portions of adjacent bus routes, bicycle paths, and public sidewalks, PG&E would implement applicable encroachment permit conditions and the associated approved Traffic Control Plans to minimize these disruptions and ensure adequate alternative access. Partial lane closures would be short-term and isolated. Project activities in the program area would not conflict with adopted plans, policies, or programs associated with public transit, bicycle, and pedestrian facilities.
- Any new transmission lines would need to comply with FAA requirements that limit the height of structures around airports and hazard marking.
- Implementation of the ITP would have minor, temporary construction traffic impacts resulting from the management of compensatory mitigation lands, including restoration or enhancement activities, as well as other minor activities associated with ITP avoidance and minimization measures. Implementation of the ITP could also facilitate minor new construction activities that are similar or additional to those performed historically.

UTILITIES/SERVICE SYSTEMS

- Wastewater Treatment Requirement Exceedances: Project activities would not result in an exceedance of various Regional Water Quality Control Board wastewater treatment requirements.
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Attachment A – Summary of Potential Impacts of PG&E's Bay Area O&M and Minor New Construction Activities

Environmental Issue Area / Potential Issues or Impacts

- PG&E's O&M activities will not change with implementation of the ITP and are anticipated to continue on at existing levels. Except for hydrostatic testing activities and vault dewatering, O&M activities utilize and discharge water primarily for dust control purposes and would not result in the generation of new wastewater. Water discharged during dust control activities is distributed over the work areas and evaporates or infiltrates into the ground. Wastewater resulting from hydrostatic testing or trench dewatering will continue to be discharged in accordance with applicable federal, state, and local regulations to ensure that the discharge does not violate water quality standards. Prior to discharge, applicable permits will continue to be obtained and standard best management practices will continue to be implemented. PG&E anticipates it will continue to be able to discharge water to baker tanks or existing sewer systems. If baker tanks or sewer systems are not feasible when working in natural vegetation areas, crews will lay temporary plastic or rubber pipe to discharge the test water to less sensitive natural areas or agricultural land. PG&E discharges only clean water, and the water is not released under pressure. Vault dewatering is conducted in compliance with State Water Resources Control Board permit WQ 2014-0174-DWQ, using a pump to remove water that is then run through a filter sock.
 - Water and Wastewater Treatment Plant Expansion and Wastewater Treatment Capacity: project activities conducted in the Plan Area are not expected to require or result in the permanent construction of new water or wastewater treatment facilities. Water utilized during project activities would generally be transported to the Plan Area in a water truck. However, construction activities (e.g., dewatering and hydrostatic testing) may require the use of an available water source, as well as the discharge of wastewater as described above.
 - Stormwater Drainage Facility Expansion: For some project activities, alteration or replacement of culverts may be required during ROW or access road repair. Erosion control techniques implemented during project activities may require the construction of new storm water drainage facilities (e.g., diversion channels and terraces), the installation of ditch plugs, and the implementation of additional soil stabilization practices. Project activities involving the creation or alteration of storm water drainage facilities will be conducted in accordance with applicable BMPs to minimize impacts associated with storm water runoff. PG&E would minimize disturbance areas, properly dispose of waste and spilled materials, remove materials and equipment upon the completion of an activity, and train employees on the implementation of BMPs. If the alteration or replacement of a culvert or minor expansion of an electrical substation is proposed within jurisdictional waters, PG&E would obtain the necessary resource permits prior to the disturbance in jurisdictional areas.
 - Water Supply Availability: The project activities associated with the Plan Area are limited in both size and scope. Water would either be transported to work areas or supplied by local public utility districts. Water requirements during construction would not exceed the available supply in the Plan Area.
 - Landfill Capacity: Solid waste materials generated project activities would include trash from consumables; pipe bandings and spacers; spent welding rods; timber skids; and cleared vegetation, stumps, and rocks. Non-hazardous construction debris would also include empty bags, plastic wrapping, cardboard boxes, and shipping containers. When feasible, materials (e.g., cardboard and metal) would be recycled, and the overall amount of waste generated would be minimized. Therefore, construction activities would not be expected to result in greater amounts of waste than could be accommodated by existing landfills in the program area. Waste generated during project activities would be disposed of at Class III landfill sites, which are designated for disposal of non-hazardous wastes. Several landfills in the Plan Area are available for use to accommodate disposal needs of project activities. Based on the frequency and duration of project activities in the Plan Area, it is expected that existing landfill capacity levels would be sufficient to accommodate the program.
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Attachment A – Summary of Potential Impacts of PG&E's Bay Area O&M and Minor New Construction Activities

Environmental Issue Area / Potential Issues or Impacts

- Solid Waste Statutes and Regulations: PG&E would dispose of waste in accordance with federal, state, or local statutes and regulations related to solid waste.
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OTHER ISSUES

- Cumulative Impacts.
 - Growth-Inducing Effects.
 - Consideration of a reasonable range of alternatives.
 - Enforceable and effective mitigation measures.
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Appendix B

Plant Species Impact Evaluation

Summary of Plant Analysis

Scientific Name	Common Name	Fed Status	State Status	CRPR	Potential Impacts	Extent/Duration of Covered Activities	Occurrences Screened	Number of Occurrences in Study Area	Number of Occurrence Intersecting Plan Area	Number of Occurrences Intersecting Plan Area with Accuracy Classes 1 - 5	Number of Occurrences Intersecting Plan Area with Accuracy Classes 6 - 10
<i>Abronia umbellata</i> subsp. <i>breviflora</i>	Pink sand-verbena			1B.1	Evaluated at a programmatic basis			16	3	1	2
<i>Acanthomintha duttonii</i>	San Mateo thornmint	E	E	1B.1	Electric distribution lines cross 2 occurrences, gas transmission line crosses 1 occurrence	Gas pipeline repair/replacement could have long term effects	5	5	3	2	1
<i>Acanthomintha lanceolata</i>	Santa Clara thorn mint			4.2	Evaluated at a programmatic basis						
<i>Agrostis blasdalei</i> var. <i>blasdalei</i>	Blasdale's bent grass			1B.2	Evaluated at a programmatic basis			35	16	12	4
<i>Agrostis hendersonii</i>	Henderson's bent grass			3.2	Evaluated at a programmatic basis			1			
<i>Allium fimbriatum</i> var. <i>purdyi</i>	Purdy's onion			4.3	Evaluated at a programmatic basis						
<i>Allium howellii</i> var. <i>howellii</i>	Howell's onion			4.3	Evaluated at a programmatic basis						
<i>Allium peninsulare</i> var. <i>franciscanum</i>	Franciscan onion			1B.2	Evaluated at a programmatic basis			24	13	6	7
<i>Allium sharsmithae</i>	Sharsmith's onion			1B.3	Evaluated at a programmatic basis			7			
<i>Alopecurus aequalis</i> var. <i>sonomensis</i>	Sonoma alopecurus	E		1B.1	Electric distribution lines cross 3 occurrences, gas distribution line crosses 1 occurrence	Gas pipeline repair/replacement could have long term effects	21	21	18	14	4
<i>Amorpha californica</i> var. <i>napensis</i>	Napa false indigo			1B.2	Evaluated at a programmatic basis			68	36	25	11
<i>Amsinckia grandiflora</i>	Large flowered fiddleneck	E	E	1B.1	Facility corridors cross 2 known occurrences, but no impacts identified		2	5	2	1	1
<i>Amsinckia lunaris</i>	Bent-flowered fiddleneck			1B.2	Evaluated at a programmatic basis			48	21	12	9
<i>Androsace elongata</i> subsp. <i>acuta</i>	California androsace			4.2	Evaluated at a programmatic basis						
<i>Anomobryum julaceum</i>	slender silver moss			4.2	Evaluated at a programmatic basis			2	2	1	1
<i>Antirrhinum virga</i>	Tall snapdragon			4.3	Evaluated at a programmatic basis						
<i>Aphyllon validum</i> subsp. <i>howellii</i>	Howell's broomrape			4.3	Evaluated at a programmatic basis						
<i>Arabis blepharophylla</i>	Coast rock cress			4.3	Evaluated at a programmatic basis						
<i>Arabis modesta</i>	Modest rock cress			4.3	Evaluated at a programmatic basis						
<i>Arabis oregana</i>	Oregon rock cress			4.3	Evaluated at a programmatic basis						
<i>Arctostaphylos andersonii</i>	Santa Cruz manzanita			1B.2	Evaluated at a programmatic basis			23	8	8	
<i>Arctostaphylos auriculata</i>	Mt. Diablo manzanita			1B.3	Evaluated at a programmatic basis			17	8	7	1
<i>Arctostaphylos bakeri</i> subsp. <i>bakeri</i>	Baker's manzanita		R	1B.1	Electric distribution lines cross 5 occurrences	Vegetation management could have long term effects	8	3	3	3	
<i>Arctostaphylos bakeri</i> subsp. <i>sublaevis</i>	The Cedars manzanita		R	1B.2	No facility corridors cross known occurrences, no impacts identified		4	4			
<i>Arctostaphylos densiflora</i>	Vine Hill manzanita		E	1B.1	No facility corridors cross known occurrences, no impacts identified		2	2	2	2	
<i>Arctostaphylos franciscana</i>	Franciscan manzanita			1B.1	Evaluated at a programmatic basis			4	4	4	
<i>Arctostaphylos hispidula</i>	Howell's manzanita			4.2	Evaluated at a programmatic basis						
<i>Arctostaphylos imbricata</i>	San Bruno Mountain manzanita		E	1B.1	Electric distribution line crosses 1 occurrence, electric transmission line crosses 1 occurrence	Vegetation management could have long term effects	3	2	2	2	
<i>Arctostaphylos manzanita</i> subsp. <i>elegans</i>	Konocti manzanita			1B.3	Evaluated at a programmatic basis			5	3	3	
<i>Arctostaphylos manzanita</i> subsp. <i>laevigata</i>	Contra Costa manzanita			1B.2	Evaluated at a programmatic basis			10	6	3	3
<i>Arctostaphylos montana</i> subsp. <i>montana</i>	Mt. Tamalpais manzanita			1B.3	Evaluated at a programmatic basis			15	6	4	2
<i>Arctostaphylos montana</i> subsp. <i>ravenii</i>	Presidio manzanita	E	E	1B.1	No facility corridors cross known occurrences, no impacts identified		1	7	5	5	
<i>Arctostaphylos montaraensis</i>	Montara manzanita			1B.2	Evaluated at a programmatic basis			4	2	2	
<i>Arctostaphylos pacifica</i>	Pacific manzanita		E	1B.1	No facility corridors cross known occurrences, no impacts identified		1	1	1	1	
<i>Arctostaphylos pallida</i>	Pallid manzanita	T	E	1B.1	Electric distribution lines cross 3 occurrences, electric transmission line crosses 1 occurrence, gas distribution lines crosses 2 occurrences	Vegetation management and gas pipeline repair/replacement could have long term effects	9	9	7	7	
<i>Arctostaphylos regismontana</i>	King's Mountain manzanita			1B.2	Evaluated at a programmatic basis			16	12	8	4
<i>Arctostaphylos stanfordiana</i> subsp. <i>decumbens</i>	Rincon manzanita			1B.1	Evaluated at a programmatic basis			12	9	8	1
<i>Arctostaphylos virgata</i>	Marin manzanita			1B.2	Evaluated at a programmatic basis			32	9	5	4
<i>Arenaria paludicola</i>	Marsh sandwort	E	E	1B.1	No facility corridors cross known occurrences, no impacts identified		1	1	1		1
<i>Asclepias solanoana</i>	Serpentine milkweed			4.2	Evaluated at a programmatic basis						
<i>Aspidotis carlotta-halliae</i>	Carlotta Hall's lace fern			4.2	Evaluated at a programmatic basis						
<i>Astragalus breweri</i>	Brewer's milk-vetch			4.2	Evaluated at a programmatic basis						
<i>Astragalus clarianus</i>	Clara Hunt's milk-vetch	E	T	1B.1	Electric transmission line crosses 1 occurrence	Highly localized, temporary	1	6	3	2	1
<i>Astragalus clevelandii</i>	Cleveland's milk-vetch			4.3	Evaluated at a programmatic basis						
<i>Astragalus nuttallii</i> var. <i>nuttallii</i>	Nuttall's milk-vetch			4.2	Evaluated at a programmatic basis						

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<i>Astragalus pycnostachyus</i> var. <i>pycnostachyus</i>	Coastal marsh milk-vetch			1B.2	Evaluated at a programmatic basis			21	6	2	4
<i>Astragalus rattanii</i> var. <i>jepsonianus</i>	Jepson's milk-vetch			1B.2	Evaluated at a programmatic basis			7	3	1	2
<i>Astragalus rattanii</i> var. <i>rattanii</i>	Rattan's milk-vetch			4.3	Evaluated at a programmatic basis						
<i>Astragalus tener</i> var. <i>ferrisiae</i>	Ferris's milk-vetch			1B.1	Evaluated at a programmatic basis			2	2	1	1
<i>Astragalus tener</i> var. <i>tener</i>	Alkali milk-vetch			1B.2	Evaluated at a programmatic basis			44	31	16	15
<i>Atriplex cordulata</i> var. <i>cordulata</i>	Heartscale			1B.2	Evaluated at a programmatic basis			15	9	8	1
<i>Atriplex coronata</i> var. <i>coronata</i>	Crownscale			4.2	Evaluated at a programmatic basis						
<i>Atriplex depressa</i>	Brittlescale			1B.2	Evaluated at a programmatic basis			26	16	14	2
<i>Atriplex minuscula</i>	Lesser saltscale			1B.1	Evaluated at a programmatic basis			4	3	3	
<i>Atriplex persistens</i>	Vernal pool saltbush = Vernal pool smallscale			1B.2	Evaluated at a programmatic basis			4	2	2	
<i>Azolla microphylla</i>	Mexican mosquito fern			4.2	Evaluated at a programmatic basis						
<i>Balsamorhiza macrolepis</i>	Big-scale balsamroot			1B.2	Evaluated at a programmatic basis			16	3	2	1
<i>Blennosperma bakeri</i>	Sonoma sunshine	E	E	1B.1	Electric distribution lines cross 2 occurrences	Highly localized, temporary	22	24	18	18	
<i>Blennosperma nanum</i> var. <i>robustum</i>	Point Reyes stickyseed		R	1B.2	Electric distribution line crosses 1 occurrence	Highly localized, temporary	2	12	3	2	1
<i>Blepharizonia plumosa</i>	Big tarplant			1B.1	Evaluated at a programmatic basis			35	18	9	9
<i>Boechera rubicundula</i>	Mt. Day rockcress			1B.1	Evaluated at a programmatic basis			1			
<i>Brodiaea leptandra</i>	Narrow-anthered California brodiaea			1B.2	Evaluated at a programmatic basis			39	24	12	12
<i>Bryoria spiralis</i>	Twisted horsehair lichen			1B.1	Evaluated at a programmatic basis						
<i>Calamagrostis bolanderi</i>	Bolander's reed grass			4.2	Evaluated at a programmatic basis						
<i>Calamagrostis crassiglumis</i>	Thurber's reed grass			2B.1	Evaluated at a programmatic basis			9	2	1	1
<i>Calamagrostis ophitidis</i>	Serpentine reed grass			4.3	Evaluated at a programmatic basis						
<i>Calandrinia breweri</i>	Brewer's calandrinia			4.2	Evaluated at a programmatic basis						
<i>Calochortus pulchellus</i>	Mt. Diablo fairy lantern			1B.2	Evaluated at a programmatic basis			52	13	8	5
<i>Calochortus raichei</i>	The Cedars globe-lily			1B.2	Evaluated at a programmatic basis			9			
<i>Calochortus tiburonensis</i>	Tiburon mariposa lily	T	T	1B.1	No facility corridors cross known occurrences, no impacts identified		1	1	1	1	
<i>Calochortus umbellatus</i>	Oakland star-tulip			4.2	Evaluated at a programmatic basis						
<i>Calochortus uniflorus</i>	large-flowered mariposa lily			4.2	Evaluated at a programmatic basis						
<i>Calycadenia micrantha</i>	small-flowered calycadenia			1B.2	Evaluated at a programmatic basis						
<i>Calyptridium parryi</i> var. <i>hesseae</i>	Santa Cruz Mountain pussypaws			1B.1	Electric distribution lines cross 2 occurrences	Highly localized, temporary	10	3	2		2
<i>Calyptridium quadripetalum</i>	Four-petaled pussypaws			4.3	Evaluated at a programmatic basis						
<i>Calystegia collina</i> subsp. <i>oxyphylla</i>	Mt. Saint Helena morning-glory			4.2	Evaluated at a programmatic basis			6	2	1	1
<i>Calystegia collina</i> subsp. <i>venusta</i>	South Coast Range morning-glory			4.3	Evaluated at a programmatic basis						
<i>Calystegia purpurata</i> subsp. <i>saxicola</i>	Coastal bluff morning-glory			1B.2	Evaluated at a programmatic basis			30	12	10	2
<i>Campanula californica</i>	Swamp harebell			1B.2	Evaluated at a programmatic basis			62	25	22	3
<i>Campanula exigua</i>	Chaparral harebell			1B.2	Evaluated at a programmatic basis			17	8	4	4
<i>Campanula sharsmithiae</i>	Mt. Hamilton harebell			1B.2	Evaluated at a programmatic basis			1			
<i>Cardamine angulata</i>	seaside bittercress			2B.2	Evaluated at a programmatic basis			1	1		1
<i>Carex albida</i>	White sedge	E	E	1B.1	Electric distribution line crosses 1 occurrence	Highly localized, temporary	4				
<i>Carex buxbaumii</i>	Buxbaum's sedge			4.2	Evaluated at a programmatic basis						
<i>Carex comosa</i>	Bristly sedge			2B.1	Evaluated at a programmatic basis			4	3		3
<i>Carex leptalea</i>	Flaccid sedge			2B.2	Evaluated at a programmatic basis			1	1		1
<i>Carex lyngbyei</i>	Lyngbye's sedge			2B.2	Evaluated at a programmatic basis			5	4	2	2
<i>Carex praticola</i>	Mountain meadow sedge			2B.2	Evaluated at a programmatic basis			1	1	1	
<i>Carex saliniformis</i>	Deceiving sedge			1B.2	Evaluated at a programmatic basis			3	3	2	1
<i>Castilleja affinis</i> subsp. <i>neglecta</i>	Tiburon paintbrush	E	T	1B.2	Electric distribution lines cross 2 occurrences, electric transmission line crosses 1 occurrence	Highly localized, temporary	6	7	4	4	
<i>Castilleja ambigua</i> subsp. <i>ambigua</i>	Salt marsh owl's-clover			4.2	Evaluated at a programmatic basis						
<i>Castilleja ambigua</i> subsp. <i>humboldtensis</i>	Humboldt Bay owl's-clover			1B.2	Evaluated at a programmatic basis			4			
<i>Castilleja ambigua</i> subsp. <i>meadii</i>	Mead's owl's-clover			1B.1	Evaluated at a programmatic basis			3	1	1	
<i>Castilleja leschkeana</i>	Point Reyes paintbrush			1A	Evaluated at a programmatic basis			2	2		2
<i>Castilleja mendocinensis</i>	Mendocino Coast paintbrush			1B.2	Evaluated at a programmatic basis			1	1		1
<i>Castilleja rubicundula</i> subsp. <i>rubicundula</i>	Pink creamsacs			1B.2	Evaluated at a programmatic basis			4	2	1	1
<i>Castilleja uliginosa</i>	Pitkin Marsh Indian paintbrush		E	1A	No facility corridors cross known occurrences, no impacts identified		1	2			
<i>Caulanthus lemmonii</i>	Lemmon's jewelflower			1B.2	Evaluated at a programmatic basis			2	1		1
<i>Ceanothus confusus</i>	Rincon Ridge ceanothus			1B.1	Evaluated at a programmatic basis			28	12	7	5
<i>Ceanothus decornutus</i>	Nicasio ceanothus			1B.2	Evaluated at a programmatic basis			2	1	1	
<i>Ceanothus divergens</i>	Callistoga ceanothus			1B.2	Evaluated at a programmatic basis			22	12	10	2

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<i>Ceanothus ferrisae</i>	Coyote ceanothus	E		1B.1	Electric distribution lines cross 3 occurrences, electric transmission line crosses 1 occurrence, gas distribution line cross 1 occurrence	Vegetation management and gas pipeline repair/replacement could have long term effects	3	4	3	2	1
<i>Ceanothus foliosus var. vineatus</i>	Vine Hill ceanothus			1B.1	Evaluated at a programmatic basis			4	4	2	2
<i>Ceanothus gloriosus var. exaltatus</i>	Glory brush			4.3	Evaluated at a programmatic basis						
<i>Ceanothus gloriosus var. gloriosus</i>	Point Reyes ceanothus			4.3	Evaluated at a programmatic basis						
<i>Ceanothus gloriosus var. porrectus</i>	Mt. Vision ceanothus			1B.3	Evaluated at a programmatic basis			18	5	5	
<i>Ceanothus masonii</i>	Mason's ceanothus			1B.2	Electric distribution line crosses 1 occurrence	Vegetation management could have long term effects	1	8	2	2	
<i>Ceanothus purpureus</i>	Holly-leaved ceanothus			1B.2	Evaluated at a programmatic basis			43	17	14	3
<i>Ceanothus rigidus</i>	Monterey ceanothus			4.2	Evaluated at a programmatic basis						
<i>Ceanothus sonomensis</i>	Sonoma ceanothus			1B.2	Evaluated at a programmatic basis			29	15	12	3
<i>Centromadia parryi subsp. congdonii</i>	Congdon's tarplant			1B.2	Evaluated at a programmatic basis			51	39	35	4
<i>Centromadia parryi subsp. parryi</i>	pappose tarplant			1B.2	Evaluated at a programmatic basis			28	22	16	6
<i>Centromadia parryi subsp. rudis</i>	Parry's red tarplant			4.2	Evaluated at a programmatic basis						
<i>Chlorogalum pomeridianum var minus</i>	Dwarf soaproot			1B.2	Evaluated at a programmatic basis			4	3		3
<i>Chloropyron maritimum subsp. palustre</i>	North Coast bird's-beak= Pt Reyes bird's-beak			1B.2	Evaluated at a programmatic basis			51	18	9	9
<i>Chloropyron molle subsp. hispidum</i>	Hispid bird's-beak			1B.1	Evaluated at a programmatic basis			2	2	2	
<i>Chloropyron molle subsp. molle</i>	Soft bird's-beak	E	R	1B.2	Electric distribution lines cross 2 occurrences	Highly localized, temporary	3	26	7	4	3
<i>Chloropyron palmatum</i>	Palmate-bracted bird's-beak	E	E	1B.1	Gas distribution line crosses 1 occurrence but no impacts expected		1	1	1	1	
<i>Chorizanthe cuspidata var. cuspidata</i>	San Francisco Bay spineflower			1B.2	Evaluated at a programmatic basis			17	15	8	7
<i>Chorizanthe cuspidata var. villosa</i>	Woolly-headed spineflower			1B.2	Evaluated at a programmatic basis			17	8	6	2
<i>Chorizanthe robusta subsp. robusta</i>	Robust spineflower	E		1B.1	Electric distribution line crosses 1 occurrence, but has been plowed, no potential impact		1	5	5		5
<i>Chorizanthe valida</i>	Sonoma spineflower	E	E	1B.1	Electric distribution line crosses 3 occurrences, but no habitat, no potential impact		3	6	6	3	3
<i>Cicuta maculata var. bolanderi</i>	Bolander's water-hemlock			2B.1	Evaluated at a programmatic basis			15	7	1	6
<i>Cirsium andrewsii</i>	Franciscan thistle			1B.2	Evaluated at a programmatic basis			31	14	7	7
<i>Cirsium fontinale var. campylon</i>	Mt. Hamilton thistle			1B.2	Evaluated at a programmatic basis			33	15	14	1
<i>Cirsium fontinale var. fontinale</i>	Fountain thistle	E	E	1B.1	Electric distribution & transmission and gas transmission lines cross 3 occurrences	Gas pipeline repair/replacement could have long term effects	5	5	3	3	
<i>Cirsium hydrophilum var. hydrophilum</i>	Suisun thistle	E		1B.1	No facility corridors cross known occurrences, no impacts identified		1	4			
<i>Cirsium hydrophilum var. vaseyi</i>	Mt. Tamalpais thistle			1B.2	Evaluated at a programmatic basis			14	2	1	1
<i>Cirsium occidentale var. compactum</i>	Compact cobwebby thistle			1B.2	Evaluated at a programmatic basis			1	1		1
<i>Cirsium praeteriens</i>	Lost thistle			1A	Evaluated at a programmatic basis			1	1		1
<i>Clarkia breweri</i>	Brewer's clarkia			4.2	Evaluated at a programmatic basis						
<i>Clarkia concinna subsp. automixa</i>	South Bay clarkia = Santa Clara red-ribbons			4.3	Evaluated at a programmatic basis			20	15	5	10
<i>Clarkia concinna subsp. raichei</i>	Tomales clarkia = Raiche's red ribbon			1B.1	Evaluated at a programmatic basis			1	1	1	
<i>Clarkia franciscana</i>	Presidio clarkia	E	E	1B.1	Electric distribution line crosses 1 occurrence, gas distribution line cross 1 occurrence	Gas pipeline repair/replacement could have long term effects	4	4	3	3	
<i>Clarkia gracilis subsp. tracyi</i>	Tracy's clarkia			4.2	Evaluated at a programmatic basis						
<i>Clarkia imbricata</i>	Vine Hill clarkia	E	E	1B.1	No facility corridors cross known occurrences, no impacts identified		2	3	2	2	
<i>Collinsia corymbosa</i>	Round-headed Chinese houses			1B.2	Evaluated at a programmatic basis			4	4		4
<i>Collinsia multicolor</i>	San Francisco collinsia			1B.2	Evaluated at a programmatic basis			24	17	7	10
<i>Collomia diversifolia</i>	Serpentine collomia			4.3	Evaluated at a programmatic basis						
<i>Convolvulus simulans</i>	Small-flowered morning-glory			4.2	Evaluated at a programmatic basis						
<i>Cordylanthus nidularis</i>	Mt. Diablo bird's-beak		R	1B.1	Evaluated at a programmatic basis		2	2			
<i>Cordylanthus tenuis subsp. brunneus</i>	Serpentine bird's-beak			4.3	Evaluated at a programmatic basis						
<i>Cordylanthus tenuis subsp. capillaris</i>	Pennell's bird's-beak	E	R	1B.2	Electric distribution lines cross 3 occurrences	Highly localized, temporary	4	4	2	2	
<i>Corethrogyne leucophylla</i>	Branching beach aster			3.2	Evaluated at a programmatic basis						
<i>Cryptantha dissita</i>	Serpentine cryptantha			1B.1	Evaluated at a programmatic basis			2	2	1	1
<i>Cryptantha hooveri</i>	Hoover's cryptantha			1A	Evaluated at a programmatic basis			1	1		1
<i>Cuscuta obtusiflora var. glandulosa</i>	Puruvian dodder			2B.2	Evaluated at a programmatic basis			1	1	1	
<i>Cuscuta pacifica var. papillata</i>	Mendocino dodder			1B.2	Evaluated at a programmatic basis			1	1	1	

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<i>Cypripedium californicum</i>	California lady's-slipper			4.2	Evaluated at a programmatic basis						
<i>Cypripedium fasciculatum</i>	Clustered lady's-slipper			4.2	Evaluated at a programmatic basis						
<i>Cypripedium montanum</i>	Mountain lady's-slipper			4.2	Evaluated at a programmatic basis						
<i>Deinandra bacigalupii</i>	Livermore tarplant		E	1B.2	Evaluated at a programmatic basis			4	3	3	
<i>Delphinium bakeri</i>	Baker's larkspur	E	R	1B.1	Occurrence location too vague to evaluate effects		1	6	4		4
<i>Delphinium californicum subsp. interius</i>	Interior California larkspur=Hospital Canyon larkspur			1B.2	Evaluated at a programmatic basis			22	5	2	3
<i>Delphinium luteum</i>	Yellow larkspur	E	R	1B.1	Facility corridors cross known occurrences, but no impacts identified		8	11	5	2	3
<i>Delphinium recurvatum</i>	Recurved larkspur			1B.2	Evaluated at a programmatic basis			5	4	4	
<i>Delphinium uliginosum</i>	Swamp larkspur			4.2	Evaluated at a programmatic basis						
<i>Dichondra occidentalis</i>	Western dichondra			4.2	Evaluated at a programmatic basis						
<i>Dirca occidentalis</i>	Western leatherwood			1B.2	Evaluated at a programmatic basis			71	35	28	7
<i>Downingia pusilla</i>	Dwarf downingia			2B.2	Evaluated at a programmatic basis			47	21	17	4
<i>Dudleya abramsii subsp. setchellii</i>	Santa Clara Valley dudleya	E		1B.1	Electric distribution lines cross 5 occurrences, electric transmission lines cross 7 occurrence, gas transmission lines cross 4 occurrence	Gas pipeline repair/replacement could have long term effects	48	58	23	23	
<i>Eleocharis parvula</i>	Small spikerush			4.3	Evaluated at a programmatic basis						
<i>Elymus californicus</i>	California bottle-brush grass			4.3	Evaluated at a programmatic basis						
<i>Entosthodon kochii</i>	Koch's cord moss			1B.3	Evaluated at a programmatic basis			1	1	1	
<i>Equisetum palustre</i>	Marsh horsetail			3	Evaluated at a programmatic basis						
<i>Eriastrum erterae</i>	Lime Ridge woollystar			1B.1	Evaluated at a programmatic basis			2	1	1	
<i>Eriastrum tracyi</i>	Tracy's eriastrum		R	1B.2	No facility corridors cross known occurrences, no impacts identified		3	4			
<i>Erigeron biolettii</i>	Streamside daisy			3	Evaluated at a programmatic basis						
<i>Erigeron greenei</i>	Greene's narrow-leaved daisy			1B.2	Evaluated at a programmatic basis			16	9	5	4
<i>Erigeron serpentinus</i>	Serpentine daisy			1B.3	Evaluated at a programmatic basis			6	2	2	
<i>Erigeron supplex</i>	Supple daisy			1B.2	Evaluated at a programmatic basis			8	6	5	1
<i>Eriogonum argillosum</i>	Clay-loving buckwheat			4.3	Evaluated at a programmatic basis						
<i>Eriogonum cedrorum</i>	The Cedars buckwheat			1B.3	Evaluated at a programmatic basis			3			
<i>Eriogonum luteolum var. caninum</i>	Tiburon buckwheat			1B.2	Evaluated at a programmatic basis			26	15	13	2
<i>Eriogonum nervulosum</i>	Snow Mountain buckwheat			1B.2	Evaluated at a programmatic basis			3	2	2	
<i>Eriogonum nudum var. decurrens</i>	Ben Lomond buckwheat			1B.1	Evaluated at a programmatic basis						
<i>Eriogonum nudum var. psychicola</i>	Antioch Dunes buckwheat			1B.1	Evaluated at a programmatic basis			1	1	1	
<i>Eriogonum ternatum</i>	Ternate buckwheat			4.3	Evaluated at a programmatic basis						
<i>Eriogonum tripodum</i>	Tripod buckwheat			4.2	Evaluated at a programmatic basis						
<i>Eriogonum truncatum</i>	Mt. Diablo buckwheat			1B.1	Evaluated at a programmatic basis			7	7	2	5
<i>Eriogonum umbellatum var. bahiiforme</i>	Bay buckwheat			4.2	Evaluated at a programmatic basis						
<i>Eriophorum gracile</i>	slender cottongrass			4.3	Evaluated at a programmatic basis						
<i>Eriophyllum jepsonii</i>	Jepson's woolly sunflower			4.3	Evaluated at a programmatic basis						
<i>Eriophyllum latilobum</i>	San Mateo woolly sunflower	E	E	1B.1	Electric distribution & transmission lines cross 1 occurrence	Highly localized, temporary	4	5	2	1	1
<i>Eryngium aristulatum var. hooveri</i>	Hoover's button-celery			1B.1	Evaluated at a programmatic basis			9	7	2	5
<i>Eryngium constancei</i>	Loch Lomond coyote-thistle	E	E	1B.1	No facility corridors cross known occurrences, no impacts identified		1	1			
<i>Eryngium jepsonii</i>	Jepson's coyote-thistle			1B.2	Evaluated at a programmatic basis			17	9	5	4
<i>Eryngium racemosum</i>	Delta coyote-thistle		E	1B.1	No facility corridors cross known occurrences, no impacts identified		1	1			
<i>Eryngium spinosepalum</i>	Spiny-sepaled button-celery			1B.2	Evaluated at a programmatic basis			1	1	1	1
<i>Erysimum ammophilum</i>	Coast wallflower			1B.2	Evaluated at a programmatic basis			1	1	1	1
<i>Erysimum capitatum subsp. angustatum</i>	Contra Costa wallflower	E	E	1B.1	Electric transmission line crosses 1 occurrence	Highly localized, temporary	4	4	2	2	
<i>Erysimum concinnum</i>				1B.2	Evaluated at a programmatic basis			13	5	1	7
<i>Erysimum franciscanum</i>	San Francisco wallflower			4.2	Evaluated at a programmatic basis						
<i>Erythranthe nudata</i>	Bare monkeyflower			4.3	Evaluated at a programmatic basis						
<i>Erythronium helenae</i>	St. Helena fawn lily			4.2	Evaluated at a programmatic basis						
<i>Erythronium revolutum</i>	Coast fawn lily			2B.2	Evaluated at a programmatic basis						
<i>Eschscholtzia rhombipetala</i>	Diamond-petaled California poppy			1B.1	Evaluated at a programmatic basis			5	2	1	1
<i>Extriplex joaquiniana</i>	San Joaquin spearscale =San Joaquin saltbush			1B.2	Evaluated at a programmatic basis			81	47	37	10
<i>Fissidens pauperculus</i>	Fissidens moss = Minute pocket-moss			1B.2	Evaluated at a programmatic basis			7	6	5	1
<i>Fritillaria agrestis</i>	Stinkbells			4.2	Evaluated at a programmatic basis			11	5	5	
<i>Fritillaria biflora var. ineziana</i>	Hillsborough chocolate lily			1B.1	Evaluated at a programmatic basis			2	2	1	1

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<i>Fritillaria falcata</i>	Talus fritillary			1B.2	Evaluated at a programmatic basis			8	1		1
<i>Fritillaria lanceolata var. tristulifolia</i>	Marin checker lily			1B.1	Evaluated at a programmatic basis			32	11	7	4
<i>Fritillaria liliacea</i>	Fragrant fritillary			1B.2	Evaluated at a programmatic basis			75	41	24	17
<i>Fritillaria pluriflora</i>	Adobe lily			1B.2	Evaluated at a programmatic basis			15	3		3
<i>Fritillaria purdyi</i>	Purdy's fritillary			4.3	Evaluated at a programmatic basis						
<i>Fritillaria roderickii</i>	Roderick's fritillary			1B.1	Evaluated at a programmatic basis			1			
<i>Galium andrewsii subsp. gatense</i>	Serpentine bedstraw			4.2	Evaluated at a programmatic basis						
<i>Gilia capitata subsp. chamissonis</i>	San Francisco gilia = Dune gilia			1B.1	Evaluated at a programmatic basis			37	19	12	7
<i>Gilia capitata subsp. pacifica</i>	Pacific gilia			1B.2	Evaluated at a programmatic basis			4	1		1
<i>Gilia capitata subsp. tomentosa</i>	Woolly-headed gilia			1B.1	Evaluated at a programmatic basis			11	6	4	2
<i>Gilia millefoliata</i>	Dark-eyed gilia			1B.2	Evaluated at a programmatic basis			21	10	5	5
<i>Gratiola heterosepala</i>	Boggs Lake hedge-hyssop		E	1B.2	No facility corridors cross known occurrences, no impacts identified		1	7	1	1	
<i>Grimmia torenii</i>	Toren's grimmia			1B.3	Evaluated at a programmatic basis			3	1		
<i>Grindelia hirsutula var. maritima</i>	San Francisco gumplant			1B.2	Evaluated at a programmatic basis			15	15	13	2
<i>Harmonia hallii</i>	Hall's harmonia			1B.2	Evaluated at a programmatic basis			7	2	2	
<i>Harmonia nutans</i>	Nodding harmonia			4.3	Evaluated at a programmatic basis						
<i>Helianthella castanea</i>	Diablo helianthella			1B.2	Evaluated at a programmatic basis			107	32	28	4
<i>Helianthus exilis</i>	Serpentine sunflower			4.2	Evaluated at a programmatic basis						
<i>Hemizonia congesta subsp. congesta</i>	seaside tarplant			1B.2	Evaluated at a programmatic basis			50	40	26	14
<i>Hesperovavx caulescens</i>	Hogwallow starfish			4.2	Evaluated at a programmatic basis						
<i>Hesperovavx sparsiflora var. brevifolia</i>	Short-leaved evax			1B.2	Evaluated at a programmatic basis			23	8	5	3
<i>Hesperocyparis abramsiana var. butano</i>	Butano Ridge cypress			1B.2	Evaluated at a programmatic basis			1			
<i>Hesperocyparis pygmaea</i>	Mendocino cypress			1B.2	Evaluated at a programmatic basis			2	1		1
<i>Hesperolinon bicarpellatum</i>	Two-carpeled dwarf-flax = Two-carpellate western flax			1B.2	Evaluated at a programmatic basis			4	2	1	1
<i>Hesperolinon breweri</i>	Brewer's dwarf flax = Brewer's western flax			1B.2	Evaluated at a programmatic basis			25	8	4	4
<i>Hesperolinon congestum</i>	Marin dwarf-flax	T	T	1B.1	Electric distribution lines cross 4 occurrences, electric transmission lines cross 2 occurrences	Gas pipeline repair/replacement could have long term effects	27	27	14	13	1
<i>Hesperolinon drymarioides</i>	Drymaria dwarf-flax = Drymaria-like western flax			1B.2	Evaluated at a programmatic basis			3			
<i>Hesperolinon sharsmithiae</i>	Sharsmith's western flax			1B.2	Evaluated at a programmatic basis			29	9	7	2
<i>Heteranthera dubia</i>	water star-grass			2B.2	Evaluated at a programmatic basis			2	2		2
<i>Hibiscus lasiocarpus var. occidentalis</i>	Rose-mallow			1B.2	Evaluated at a programmatic basis			39	9	9	
<i>Hoita strobilina</i>	Loma prieta hoita			1B.1	Evaluated at a programmatic basis			34	11	8	3
<i>Holocarpha macradenia</i>	Santa Cruz tarplant	T	E	1B.1	No facility corridors cross known occurrences, no impacts identified		2	18	9	5	4
<i>Hordeum intercedens</i>	Vernal barley			3.2	Evaluated at a programmatic basis						
<i>Horkelia cuneata subsp. sericea</i>	Kellogg's horkelia			1B.1	Evaluated at a programmatic basis			10	8	2	6
<i>Horkelia marinensis</i>	Point Reyes horkelia			1B.2	Evaluated at a programmatic basis			15	6	4	2
<i>Horkelia tenuiloba</i>	Thin-lobbed horkelia			1B.2	Evaluated at a programmatic basis			16	5	4	1
<i>Hosackia gracilis</i>	harlequin lotus			4.2	Evaluated at a programmatic basis						
<i>Iris longipetala</i>	Coast iris			4.2	Evaluated at a programmatic basis						
<i>Isocoma arguta</i>	Carquinez goldenbush			1B.1	Evaluated at a programmatic basis			14	10	8	2
<i>Isocoma menziesii var. diabolica</i>	Satan's goldenbush			4.2	Evaluated at a programmatic basis						
<i>Juglans hindsii</i>	Northern California black walnut			1B.1	Evaluated at a programmatic basis			4	4	4	
<i>Juncus luciensis</i>	Santa Lucia dwarf rush			1B.2	Evaluated at a programmatic basis			1			
<i>Kopsiopsis hookeri</i>	Small groundcone			2B.3	Evaluated at a programmatic basis			5	3	2	1
<i>Lasthenia burkei</i>	Burke's goldfields	E	E	1B.1	Electric distribution lines cross 10 occurrences, electric transmission line crosses 1 occurrence, gas transmission lines cross 2 occurrences, gas distribution lines cross 2 occurrences	Gas pipeline repair/replacement could have long term effects	26	28	20	19	1
<i>Lasthenia californica subsp. bakeri</i>	Baker's goldfields			1B.2	Evaluated at a programmatic basis			9	8	4	4
<i>Lasthenia californica subsp. macrantha</i>	Perennial goldfields			1B.2	Evaluated at a programmatic basis			35	17	12	5
<i>Lasthenia conjugens</i>	Contra Costa goldfields	E		1B.1	Electric distribution lines cross 8 occurrences, electric transmission lines cross 3 occurrences, gas transmission lines cross 2 occurrences, gas distribution lines cross 2 occurrences	Gas pipeline repair/replacement could have long term effects	28	28	20	14	6
<i>Lasthenia ferrisiae</i>	Ferris's goldfields			4.2	Evaluated at a programmatic basis						
<i>Lathyrus jepsonii var. jepsonii</i>	Delta tule pea			1B.2	Evaluated at a programmatic basis			95	27	27	
<i>Lathyrus palustris</i>	Marsh pea			2B.2	Evaluated at a programmatic basis			2	1		1

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<i>Layia carnosa</i>	Beach layia	E	E	1B.1	No facility corridors cross known occurrences, no impacts identified		6	7	1		1
<i>Layia septentrionalis</i>	Colusa layia			1B.2	Evaluated at a programmatic basis			18	7	4	3
<i>Legenere limosa</i>	Legenere			1B.1	Evaluated at a programmatic basis			18	7	5	2
<i>Lepidium latipes</i> var. <i>heckardii</i>	Heckard's pepper-grass			1B.2	Evaluated at a programmatic basis			2	1	1	
<i>Leptosiphon acicularis</i>	Bristly linanthus			4.2	Evaluated at a programmatic basis						
<i>Leptosiphon ambiguus</i>	Serpentine linanthus			4.2	Evaluated at a programmatic basis						
<i>Leptosiphon croceus</i>	Coast yellow linanthus			1B.1	No facility corridors cross known occurrences, no impacts identified		4	1			
<i>Leptosiphon grandiflorus</i>	Large-flowered linanthus			4.2	Evaluated at a programmatic basis						
<i>Leptosiphon jepsonii</i>	Jepson's linanthus			1B.2	Evaluated at a programmatic basis			37	18	10	8
<i>Leptosiphon latisectus</i>	Broad-lobed linanthus			4.3	Evaluated at a programmatic basis						
<i>Leptosiphon rosaceus</i>	Rose linanthus			1B.1	Evaluated at a programmatic basis			31	8	5	3
<i>Leptosyne hamiltonii</i>	Mt. Hamilton coreopsis			1B.2	Evaluated at a programmatic basis			19	2	1	1
<i>Lessingia arachnoidea</i>	Crystal Springs lessingia			1B.2	Evaluated at a programmatic basis			11	6	6	
<i>Lessingia germanorum</i>	San Francisco lessingia	E	E	1B.1	Electric distribution lines cross 2 occurrences	Highly localized, temporary	5	5	4	3	1
<i>Lessingia hololeuca</i>	Woolly-headed lessingia			3	Evaluated at a programmatic basis						
<i>Lessingia micradenia</i> var. <i>glabrata</i>	Smooth lessingia			1B.2	Evaluated at a programmatic basis			41	21	19	2
<i>Lessingia micradenia</i> var. <i>micradenia</i>	Tamalpais lessingia			1B.2	Evaluated at a programmatic basis			9	8	5	3
<i>Lessingia tenuis</i>	Spring lessingia			4.3	Evaluated at a programmatic basis						
<i>Liliaeopsis masonii</i>	Mason's liliaeopsis		R	1B.1	Electric distribution lines cross 5 occurrences, electric transmission lines cross 2 occurrences, gas transmission lines cross 5 occurrences, gas distribution line crosses 1 occurrence	Gas pipeline repair/replacement could have long term effects	17	123	29	29	
<i>Lilium maritimum</i>	Coast lily			1B.1	Evaluated at a programmatic basis			12	7	5	2
<i>Lilium pardalinum</i> subsp. <i>pitkinense</i>	Pitkin Marsh lily	E	E	1B.1	Facility corridors cross known occurrences, but no impacts identified		4	4	4	3	1
<i>Lilium rubescens</i>	Redwood lily			4.2	Evaluated at a programmatic basis						
<i>Limnanthes douglasii</i> ssp. <i>ornduffii</i>	Ornduff's meadowfoam			1B.1	Evaluated at a programmatic basis			2	1	1	
<i>Limnanthes douglasii</i> subsp. <i>sulphurea</i>	Point Reyes meadowfoam		E	1B.2	Electric distribution lines cross 7 occurrences	Highly localized, temporary	7	12	7	7	
<i>Limnanthes floccosa</i> subsp. <i>floccosa</i>	Woolly meadowfoam			4.2	Evaluated at a programmatic basis			1			
<i>Limnanthes vinculans</i>	Sebastopol meadowfoam	E	E	1B.1	Electric distribution lines cross 9 occurrences, electric transmission lines cross 2 occurrences, gas distribution line crosses 1 occurrence	Gas pipeline repair/replacement could have long term effects	42	45	23	22	1
<i>Limosella australis</i>	Delta mudwort			2B.1	Evaluated at a programmatic basis			25	3	3	
<i>Lomatium hooveri</i>	Hoover's lomatium			4.3	Evaluated at a programmatic basis						
<i>Lomatium observatorium</i>	Mt. Hamilton lomatium			1B.2	Evaluated at a programmatic basis			3	1	1	
<i>Lomatium repostum</i>	Napa lomatium			4.3	Evaluated at a programmatic basis						
<i>Lupinus arboreus</i> var. <i>eximius</i>	San Mateo tree lupine			3.2	Evaluated at a programmatic basis						
<i>Lupinus sericatus</i>	Cobb Mountain lupine			1B.2	Evaluated at a programmatic basis			37	12	9	3
<i>Lupinus tidestromii</i>	Tidestrom's lupine	E	E	1B.1	Electric distribution line crosses 1 occurrence	Highly localized, temporary	2	14	2	1	1
<i>Lycopodium clavatum</i>	Running-pine			4.1	Evaluated at a programmatic basis			1			
<i>Madia radiata</i>	Showy madia			1B.1	Evaluated at a programmatic basis			2	2	2	
<i>Malacothamnus aboriginum</i>	Indian Valley bush mallow			1B.2	Evaluated at a programmatic basis						
<i>Malacothamnus arcuatus</i>	Arcuate bush mallow			1B.2	Evaluated at a programmatic basis			29	17	9	8
<i>Malacothamnus davidsonii</i>	Davidson's bush mallow			1B.2	Evaluated at a programmatic basis						
<i>Malacothamnus hallii</i>	Hall's bush mallow			1B.2	Evaluated at a programmatic basis			30	17	11	6
<i>Malacothamnus helleri</i>	Heller's bush mallow			4.3	Evaluated at a programmatic basis						
<i>Malacothrix phaeocarpa</i>	Dusky-fruited malacothrix			4.3	Evaluated at a programmatic basis						
<i>Meconella oregona</i>	Oregon meconella			1B.1	No facility corridors cross known occurrences, no impacts identified		5	5	1	1	
<i>Micropus amphibolus</i>	Mt. Diablo cottonweed			3.2	Evaluated at a programmatic basis						
<i>Microseris paludosa</i>	Marsh microseris			1B.2	Evaluated at a programmatic basis			22	12	5	7
<i>Microseris sylvatica</i>	Sylvan microseris			4.2	Evaluated at a programmatic basis						
<i>Mielichhoferia elongata</i>	elongate copper moss			2B.2	Evaluated at a programmatic basis			1	1	1	
<i>Monardella antonina</i> subsp. <i>antonina</i>	San Antonio Hills monardella			3	Evaluated at a programmatic basis						
<i>Monardella sinuata</i> subsp. <i>nigrescens</i>	Northern curly-leaved monardella			1B.2	Evaluated at a programmatic basis			13	3	2	1
<i>Monardella viridis</i> subsp. <i>viridis</i>	Green monardella			4.3	Evaluated at a programmatic basis						
<i>Monolopia gracilens</i>	woodland woollythreads			1B.2	Evaluated at a programmatic basis			41	30	16	14
<i>Myosurus minimus</i> subsp. <i>apus</i>	Little mousetails			3.1	Evaluated at a programmatic basis						
<i>Navarretia cotulifolia</i>	Cotula navarretia			4.2	Evaluated at a programmatic basis						

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<i>Navarretia gowenii</i>	Lime Ridge navarretia			1B.1	Electric distribution line may cross one occurrence, gas transmission line may cross one occurrence	Gas pipeline repair/replacement could have long term effects	2	2	2	2	
<i>Navarretia heterandra</i>	Tehama navarretia			4.3	Evaluated at a programmatic basis						
<i>Navarretia jepsonii</i>	Jepson's navarretia			4.3	Evaluated at a programmatic basis						
<i>Navarretia leucocephala subsp. bakeri</i>	Baker's navarretia			1B.1	Evaluated at a programmatic basis			34	23	16	7
<i>Navarretia leucocephala subsp. pauciflora</i>	Few-flowered navarretia	E	T	1B.1	No facility corridors cross known occurrences, no impacts identified		0	2			
<i>Navarretia leucocephala subsp. plieantha</i>	Many-flowered navarretia	E	E	1B.2	Electric distribution line crosses 1 occurrence	Highly localized, temporary	2	2	2	2	
<i>Navarretia linearifolia subsp. pinnatisecta</i>	pinnate-leaved navarretia			4.3	Evaluated at a programmatic basis						
<i>Navarretia nigelliformis subsp. nigelliformis</i>	adobe navarretia			4.2	Evaluated at a programmatic basis						
<i>Navarretia nigelliformis subsp. radians</i>	Shiny navarretia			1B.2	Evaluated at a programmatic basis			4			
<i>Navarretia paradoxinota</i>	Porter's navarretia			1B.3	Evaluated at a programmatic basis			3	1	1	
<i>Navarretia prostrata</i>	Prostrate navarretia			1B.1	No facility corridors cross known occurrences, no impacts identified		3	3	1	1	
<i>Navarretia rosulata</i>	Marin County navarretia			1B.2	Evaluated at a programmatic basis			15	4	4	
<i>Navarretia subuligera</i>	Awl-leaved navarretia			4.3	Evaluated at a programmatic basis						
<i>Neostaphia colusana</i>	Colusa grass	T	E	1B.1	No facility corridors cross known occurrences, no impacts identified		0	4	1	1	
<i>Oenothera deltoides subsp. howellii</i>	Antioch dunes evening primrose	E	E	1B.1	Electric & gas transmission lines cross 1 occurrence	Gas pipeline repair/replacement could have long term effects	9	9	5	3	2
<i>Orcuttia inaequalis</i>	San Joaquin Orcutt grass	T	E	1B.1	No facility corridors cross known occurrences, no impacts identified		0	1	1	1	
<i>Orthotrichum kellmanii</i>	Kellman's bristle moss			1B.2	Evaluated at a programmatic basis			1			
<i>Panicum acuminatum var. thermale</i>	Geysers panicum		E	1B.1	Electric distribution lines cross 3 occurrences	Highly localized, temporary	3	5			
<i>Pedicularis dudleyi</i>	Dudley's lousewort		R	1B.2	Electric distribution lines cross 2 occurrences	Highly localized, temporary	2	1	1	1	
<i>Penstemon newberryi var. sonomensis</i>	Sonoma beardongue			1B.3	Evaluated at a programmatic basis			10	5	3	2
<i>Penstemon rattanii var. kleei</i>	Santa Cruz Mts. Beardtongue			1B.2	Evaluated at a programmatic basis			2	2	2	
<i>Pentachaeta bellidiflora</i>	White-rayed pentachaeta	E	E	1B.1	Electric distribution & transmission lines and gas transmission lines cross 2 occurrences	Gas pipeline repair/replacement could have long term effects	10	10	9	5	4
<i>Pentachaeta exilis subsp. aeolica</i>	San Benito pentachaeta			1B.2	Evaluated at a programmatic basis			6	3	1	2
<i>Perideridia gairdneri subsp. gairdneri</i>	Gairdner's yampah			4.2	Evaluated at a programmatic basis						
<i>Phacelia insularis var. continentis</i>	North Coast phacelia			1B.2	Evaluated at a programmatic basis			6	2	1	1
<i>Phacelia phacelioides</i>	Mt. Diablo phacelia			1B.2	Evaluated at a programmatic basis			12	8	4	4
<i>Pinus radiata</i>	Monterey pine			1B.1	Evaluated at a programmatic basis			1	1	1	
<i>Piperia candida</i>	White-flowered rein orchid			4.2	Evaluated at a programmatic basis			6	4	2	2
<i>Piperia elegans subsp. decurtata</i>	Pt. Reyes rein orchid			1B.1	Evaluated at a programmatic basis			3	2	2	
<i>Piperia leptopetala</i>	Narrow-petaled rein orchid			4.3	Evaluated at a programmatic basis						
<i>Piperia michaelii</i>	Michael's rein orchid			4.2	Evaluated at a programmatic basis						
<i>Pityopus californicus</i>	California pinefoot			4.2	Evaluated at a programmatic basis						
<i>Plagiobothrys chorisianus var. chorisianus</i>	Choris's popcorn-flower			1B.2	Evaluated at a programmatic basis			32	14	7	7
<i>Plagiobothrys chorisianus var. hickmanii</i>	Hickman's popcorn-flower			4.2	Evaluated at a programmatic basis						
<i>Plagiobothrys diffusus</i>	San Francisco popcorn-flower		E	1B.1	Facility corridors cross known occurrences, but occurrences extirpated or likely extirpated		2	3	2	2	
<i>Plagiobothrys glaber</i>	Hairless allocarya= Hairless popcorn-flower			1A	Evaluated at a programmatic basis			8	8		8
<i>Plagiobothrys hystriculus</i>	Bearded allocarya			1B.1	Evaluated at a programmatic basis			13	10	8	2
<i>Plagiobothrys mollis var. vestitus</i>	Petaluma popcorn-flower			1A	Evaluated at a programmatic basis			1	1		1
<i>Plagiobothrys strictus</i>	Calistoga popcorn-flower	E	T	1B.1	Electric & gas distribution lines cross 1 occurrence	Gas pipeline repair/replacement could have long term effects	3	3	3	2	1
<i>Plagiobothrys uncinatus</i>	Salinas Valley popcorn-flower			1B.2	Evaluated at a programmatic basis						
<i>Plagiobothrys verrucosus</i>	Warty popcornflower			2B.1	Evaluated at a programmatic basis			4	3	1	2
<i>Pleuropogon hooverianus</i>	North Coast semaphore grass		T	1B.1	Electric distribution lines cross 2 occurrences	Highly localized, temporary	1	7	5	2	3
<i>Pleuropogon refractus</i>	Nodding semaphore grass			4.2	Evaluated at a programmatic basis						
<i>Poa napensis</i>	Napa bluegrass	E	E	1B.1	Electric distribution line crosses 1 occurrence	Highly localized, temporary	2	2	1	1	
<i>Polemonium carneum</i>	Oregon polemonium			2B.2	Evaluated at a programmatic basis			6	5	2	3
<i>Polygonum marinense</i>	Marin knotweed			3.1	Evaluated at a programmatic basis			32	8	4	4
<i>Potamogeton zosteriformis</i>	Eel-grass pondweed			2B.2	Evaluated at a programmatic basis			1	1	1	

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<i>Potentilla hickmanii</i>	Hickman's cinquefoil	E	E	1B.1	Electric distribution lines cross 2 occurrences, gas distribution line crosses 1 occurrence	Highly localized, temporary	2	2	1		1
<i>Potentilla uliginosa</i>	Cunningham Marsh cinquefoil			1A	Electric distribution and gas distribution lines cross 1 occurrence	Gas pipeline repair/replacment could have long term effects	1	1	1		1
<i>Psilocarphus brevissimus</i> var. <i>multiflorus</i>	Delta wooly-marbles			4.2	Evaluated at a programmatic basis						
<i>Puccinellia simplex</i>	California alkali grass			1B.2	Evaluated at a programmatic basis			14	11	4	7
<i>Quercus parvula</i> var. <i>tamalpaisensis</i>	Tamalpais oak			1B.3	Evaluated at a programmatic basis			9	3	1	2
<i>Ramalina thaustra</i>	Angel's-hair lichen			2B.1	Evaluated at a programmatic basis			1	1	1	
<i>Ranunculus lobbii</i>	Lobb's aquatic buttercup			4.2	Evaluated at a programmatic basis						
<i>Rhynchospora alba</i>	White beaked-rush			2B.2	Evaluated at a programmatic basis			1			
<i>Rhynchospora californica</i>	California beaked-rush			1B.1	Evaluated at a programmatic basis			5	3	1	2
<i>Rhynchospora capitellata</i>	Brownish beaked-rush			2B.2	Evaluated at a programmatic basis			2	2	2	
<i>Rhynchospora globularis</i>	Round-headed beaked-rush			2B.1	Evaluated at a programmatic basis			2	1	1	
<i>Ribes victoris</i>	Victor's gooseberry			4.3	Evaluated at a programmatic basis						
<i>Sagittaria sanfordii</i>	Sanford's arrowhead			1B.2	Evaluated at a programmatic basis			7	1	1	
<i>Sanicula hoffmannii</i>	Hoffmann's sanicle			4.3	Evaluated at a programmatic basis						
<i>Sanicula maritima</i>	Adobe sanicle		R	1B.1	No facility corridors cross known occurrences, no impacts identified		2	2	2		2
<i>Sanicula saxatilis</i>	Rock sanicle		R	1B.2	Electric distribution lines cross 2 occurrences	Highly localized, temporary	7	7	1	1	
<i>Scutellaria galericulata</i>	Marsh skullcap			2B.2	Evaluated at a programmatic basis			1			
<i>Senecio aphanactis</i>	Chaparral ragwort			2B.2	Evaluated at a programmatic basis			9	7		7
<i>Senecio clevelandii</i> var. <i>clevelandii</i>	Cleveland's ragwort			4.3	Evaluated at a programmatic basis						
<i>Sidalcea calycosa</i> subsp. <i>rhizomata</i>	Point Reyes checkerbloom			1B.2	Evaluated at a programmatic basis			28	13	9	4
<i>Sidalcea hickmanii</i> subsp. <i>napensis</i>	Napa checkerbloom			1B.1	Electric distribution lines cross 2 occurrences	Highly localized, temporary	2	2	1	1	
<i>Sidalcea hickmanii</i> subsp. <i>viridis</i>	Marin checkerbloom			1B.3	Evaluated at a programmatic basis			4	4		4
<i>Sidalcea keckii</i>	Keck's checkerbloom	E		1B.1	Evaluated at a programmatic basis			7	3		3
<i>Sidalcea malachroides</i>	Maple-leaved checkerbloom			4.2	Evaluated at a programmatic basis			7	5	4	1
<i>Sidalcea malviflora</i> subsp. <i>purpurea</i>	Purple -stemmed checkerbloom			1B.2	Evaluated at a programmatic basis			13	10	5	5
<i>Sidalcea oregana</i> subsp. <i>hydrophila</i>	Water-loving checkerbloom = marsh checkerbloom			1B.2	Evaluated at a programmatic basis			1	1		1
<i>Sidalcea oregana</i> subsp. <i>valida</i>	Kenwood Marsh checkerbloom	E	E	1B.1	Electric distribution line crosses 1 occurrence	Highly localized, temporary	2	2	1	1	
<i>Silene verecunda</i> subsp. <i>verecunda</i>	Misson Dolores campion = San Francisco campion			1B.2	Evaluated at a programmatic basis			7	5	4	1
<i>Spergularia macrotheca</i> var. <i>longistyla</i>	Long-styled sand-spurry			1B.2	Evaluated at a programmatic basis			22	18	8	10
<i>Stebbinsoseris decipiens</i>	Santa Cruz silverpuffs = Santa Cruz microsaris			1B.2	Evaluated at a programmatic basis			6	2	1	1
<i>Stellaria littoralis</i>	Seashore starwort = Beach starwort			4.2	Evaluated at a programmatic basis						
<i>Streptanthus albidus</i> subsp. <i>albidus</i>	Metcalf Canyon jewelflower	E		1B.1	Electric distribution lines cross 7 occurrences, electric transmission lines cross 4 occurrences, gas transmission line crosses 1 occurrence	Gas pipeline repair/replacment could have long term effects	12	13	5	5	
<i>Streptanthus albidus</i> subsp. <i>peramoenus</i>	Most beautiful jewel-flower			1B.2	Evaluated at a programmatic basis			66	27	23	4
<i>Streptanthus barbiger</i>	Bearded jewel-flower			4.2	Evaluated at a programmatic basis						
<i>Streptanthus batrachopus</i>	Tamalpais streptanthus = Tamalpais jewel-flower			1B.3	Evaluated at a programmatic basis			8	2		2
<i>Streptanthus brachiatus</i> subsp. <i>hoffmanii</i>	Freed's jewel-flower			1B.2	Evaluated at a programmatic basis			5	2	2	
<i>Streptanthus brachiatus</i> subsp. <i>brachiatus</i>	Contact Mine jewelflower = Socrates Mine jewel-flower			1B.2	Evaluated at a programmatic basis			10	3	3	
<i>Streptanthus callistus</i>	Mt. Hamilton jewel-flower			1B.3	Evaluated at a programmatic basis			4			
<i>Streptanthus glandulosus</i> subsp. <i>hoffmanii</i>	Secund jewel-flower			1B.3	Evaluated at a programmatic basis			7	3	2	1
<i>Streptanthus glandulosus</i> subsp. <i>niger</i>	Tiburon jewel-flower	E	E	1B.1	Facility corridors cross known occurrence, but no impacts identified		1	2	1	1	
<i>Streptanthus glandulosus</i> subsp. <i>puichellus</i>	Mount Tamalpais jewel-flower			1B.2	Evaluated at a programmatic basis			24	4	2	2
<i>Streptanthus hesperidis</i>	Green jewel-flower			1B.2	Evaluated at a programmatic basis			13	7	5	2
<i>Streptanthus hispidus</i>	Mt. Diablo jewel-flower			1B.3	Evaluated at a programmatic basis			8	1	1	
<i>Streptanthus morrisonii</i> subsp. <i>elatus</i>	Three Peaks jewel-flower			1B.2	Evaluated at a programmatic basis			7	1	1	
<i>Streptanthus morrisonii</i> subsp. <i>hirtiflorus</i>	Dorr's Cabin jewel-flower			1B.2	Evaluated at a programmatic basis			1			
<i>Streptanthus morrisonii</i> subsp. <i>kruckebergii</i>	Kruckeberg's jewel-flower			1B.2	Evaluated at a programmatic basis			3			
<i>Streptanthus morrisonii</i> subsp. <i>morrisonii</i>	Morrison's jewel-flower			1B.2	Evaluated at a programmatic basis			5			
<i>Stuckenia filiformis</i> subsp. <i>alpina</i>	Slender-leaved pondweed			2B.2	Evaluated at a programmatic basis			7	6	1	5

Scientific Name	Common Name	Fed Status	State Status	CRPR	Potential Impacts	Extent/Duration of Covered Activities	Ocurrences Screened	Number of Occurrences in Study Area	Number of Occurrence Intersecting Plan Area	Number of Occurrences Intersecting Plan Area with Accuracy Classes 1 - 5	Number of Occurrences Intersecting Plan Area with Accuracy Classes 6 - 10
<i>Suaeda californica</i>	California seablight	E		1B.1	Electric transmission line crosses 1 occurrence, gasa distribution line crosses 1 occurrence	Gas pipeline repair/replacment could have long term effects	3	10	7	2	5
<i>Symphotrichum lentum</i>	Suisun Marsh aster			1B.2	Evaluated at a programmatic basis			107	30	28	2
<i>Thamnotia vermicularis</i>	Whiteworm lichen			2B.1	Evaluated at a programmatic basis			1			
<i>Thelypodium brachycarpum</i>	Short-podded thelypodium			4.2	Evaluated at a programmatic basis						
<i>Toxicoscordion fontanum</i>	Marsh zigadenus			4.2	Evaluated at a programmatic basis						
<i>Tracyina rostrata</i>	Beaked tracyina			1B.2	Evaluated at a programmatic basis			1			
<i>Trichostema ruygtii</i>	Napa bluecurls			1B.2	Evaluated at a programmatic basis			18	9	8	1
<i>Trifolium amoenum</i>	Showy rancheria clover	E		1B.1	Electric distribution lines cross 4 occurrences, electric transmission line crosses 1 occurrence	Highly localized, temporary	15	26	24	8	16
<i>Trifolium buckwestiorum</i>	Santa Cruz clover			1B.1	Evaluated at a programmatic basis			6	4		4
<i>Trifolium hydrophilum</i>	Saline clover			1B.2	Evaluated at a programmatic basis			32	28	13	15
<i>Triphysaria floribunda</i>	San Francisco owl's-clover			1B.2	Evaluated at a programmatic basis			50	25	11	14
<i>Triquetrella californica</i>	California triquetrella moss			1B.2	Evaluated at a programmatic basis			10	9	6	3
<i>Triteleia lugens</i>	Dark-mouthed triteleia			4.3	Evaluated at a programmatic basis						
<i>Tropidocarpum capparideum</i>	Caper-fruited tropidocarpum			1B.1	Evaluated at a programmatic basis			7	7	3	4
<i>Tuctoria mucronata</i>	Solano grass	E	E	1B.1	No facility corridors cross known occurrences, no impacts identified		0	2			
<i>Usnea longissima</i>	Methusaleh's beard lichen			4.2	Evaluated at a programmatic basis			17	10	8	2
<i>Veratrum fimbriatum</i>	Fringed false-hellebore			4.3	Evaluated at a programmatic basis						
<i>Viburnum ellipticum</i>	Oval-leaved viburnum			2B.3	Evaluated at a programmatic basis			17	12	4	8

Appendix C
Avian Protection Plan



Avian Protection Plan

***PG&E'S PROGRAM TO ADDRESS AVIAN ELECTROCUTIONS,
COLLISIONS, AND NESTING BIRDS***

**Public Version
Updated February 2018**



Avian Protection Plan

PG&E'S PROGRAM TO ADDRESS AVIAN ELECTROCUTIONS, COLLISIONS, AND NESTING BIRDS

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Updated February 2018

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Acronyms and Abbreviations

AMM	Avoidance and Minimization Measures
APLIC	Avian Power Line Interaction Committee
APP	Avian Protection Plan
BGEPA	Bald and Golden Eagle Protection Act
CCCS	California Condor Conservation Strategy
CDFW	California Department of Fish and Wildlife
ECP	Eagle Conservation Plan
GIS	Geographic Information System
GPS	Global Positioning System
kV	kilovolt
MBTA	Migratory Bird Treaty Act
MOU	Memorandum of Understanding
NBMP	Nesting Bird Management Plan
PG&E	Pacific Gas and Electric Company
RCZ	Raptor Concentration Zone
USFWS	U.S. Fish and Wildlife Service

1.1 Introduction and Corporate Policy

PG&E is committed to being an environmental leader. Our environmental policy reflects our environmental commitment and challenges us to find ways to produce, deliver, and use energy as safely and sustainably as possible. It is our policy to:

- Comply fully with the letter and spirit of all applicable environmental laws and regulations;
- Maintain an environmental management system that (1) fosters environmental excellence and innovation, (2) ensures that regular independent reviews of all environmental aspects of our business are conducted through a risk-informed process, (3) trains all employees on applicable environmental requirements and the importance of environmental leadership to achieving our vision, and (4) strives for continuous improvement;
- Lead by example and reduce our impact on the environment by delivering clean energy, building more sustainable and climate-resilient facilities, and serving as responsible stewards of land, wildlife and cultural resources;
- Proactively engage with our customers to help them use less energy and better manage their energy footprint;
- Advocate for public policies that create greater environmental benefits while balancing the needs of our customers, communities and shareholders;
- Partner with our stakeholders as we strive to meet our environmental commitment; and
- Publicly communicate our progress and performance.

As one component of PG&E's environmental commitment, PG&E has developed this Avian Protection Plan (APP) to address key issues surrounding impact avoidance, management, and conservation of avian species as related to PG&E's operations and maintenance activities.

1.2 Document Organization

This Avian Protection Plan (APP) is organized as follows:

- Chapter 1, *Introduction*, provides background information for the development, implementation, and the goals of the APP.
- Chapter 2, *Risk Assessment and Risk Reduction*, provides an overview of the risk assessment approach, as well as a summary of the proactive and reactive steps taken to prevent avian electrocutions and collisions.
- Chapter 3, *Training, Permits, Quality Control and Reporting*, provides an overview of the training conducted for PG&E employees and contractors, permits held by PG&E, the quality control process to ensure that the APP is effective, and a summary of reporting requirements.

- Chapter 4, *Avian Enhancement, Outreach, and Research Programs*, provides an overview of the programs and partnerships PG&E engages in and funds to support habitat restoration or other enhancements for birds. It also describes efforts to promote avian protection and conservation, including support of bird research.
- Chapter 5, *References Cited*, provides a list of sources used in preparing this plan.
- Appendix A, *Public Awareness Program*, contains a publicly distributed brochure explaining PG&E's *Avian Protection Plan* and links to information on PG&E's website.
- Appendix B¹, *Utility Standards and Procedures*, provides the technical standards and procedures to address electrocutions and collisions.
- Appendix C, *Engineering Standards and Design Criteria*, provides key information relating to facility design and raptor risk areas.
- Appendix D, *Retrofit Data*, provides information on annual power pole retrofits.
- Appendix E, *Other Avian Conservation and Management Efforts*, contains a final report of PG&E's survey of substations for burrowing owl and other information regarding PG&E's avian conservation efforts.

1.3 Background and Purpose

Birds may be affected by a variety of activities, including activities associated with the construction, operation, and maintenance of electric distribution and transmission facilities. PG&E's service territory stretches from Eureka in the north to Bakersfield in the south and from the Pacific Ocean in the west to the Sierra Nevada in the east. The service area spans more than 74,000 square miles in 48 of California's 58 counties and is home to many wildlife species and important natural communities. The service area contains habitat for more than 300 species of migratory birds that live in northern and central California either permanently or seasonally, and for millions of waterfowl that migrate in the Pacific Flyway corridor.

Birds often use utility poles, transmission towers, and power lines for perching, hunting, and nesting because these features are often the highest and most prominent points in the landscape. Birds that come in direct contact with electric current while also touching a grounded element of a facility may be electrocuted, resulting in injuries or death (Figure 1). These electrocutions, in turn, may result in electric outages and fires. Bird collisions with facilities include strikes with wires (transmission and distribution lines), with most collisions occurring with the smallest diameter wires and typically mid-span of the line. These wires are typically the shield wire located above the phase conductors on transmission lines or the phase conductor and neutral wires on distribution lines. Avian impacts may also occur from other operational work, including work on gas and hydropower facilities. If issues arise, the APP program manager, in conjunction with company biologists, investigates the situation, assesses the methods to deter and prevent future occurrences, and prescribes the measures needed to avoid and minimize impacts. Ongoing PG&E maintenance activities, including vegetation management activities, may also affect birds. Nest abandonment can result directly or indirectly from nearby disturbances, depending on the timing, duration, and extent of the work.

¹ Appendices B-E are considered proprietary and confidential and are not for public dissemination.

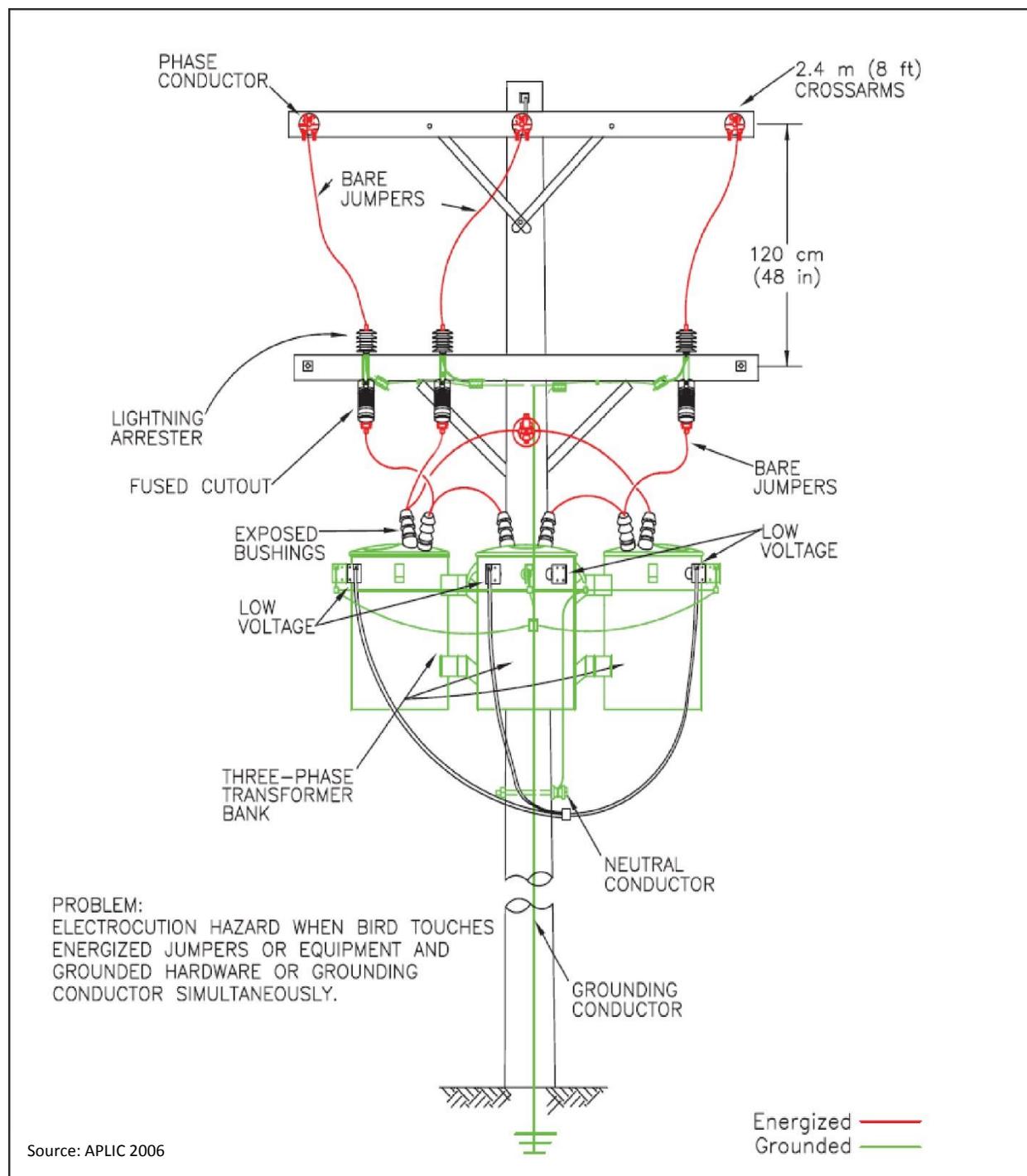


Figure 1. Schematic of a Problem Pole

This plan is intended to describe PG&E's efforts to avoid and reduce electrocutions and collisions of birds with electric facilities, and to avoid and minimize impacts on nesting birds from PG&E's maintenance activities. PG&E's APP has evolved over many years and some of the key dates related to program are described in Table 1.

Table 1. Summary of Key Events Related to Avian Protection Plan Development and Implementation

Year	Key Event
1989	Avian Power Line Interaction Committee (APLIC) established; PG&E is a cofounder.
1994	PG&E and U.S Fish and Wildlife Service (USFWS) enter into a settlement agreement regarding raptor fatalities and retrofitting.
1995	PG&E responds to requirements of 1994 settlement agreement.
2002	PG&E develops Raptor Concentration Zone (RCZ) maps and begins implementing retrofit program.
2003-2004	PG&E works with APLIC to develop APP guidelines.
2005	APLIC and USFWS provide guidelines to all utilities on APP development.
2006	APLIC issues <i>Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006</i> .
2007	PG&E adopts comprehensive APP as a <i>Utility Standard</i> . Settlement agreement with USFWS expires and PG&E continues implementation of retrofitting program.
2008	PG&E revises and expands RCZ maps. PG&E initiates condor conservation strategy.
2011	Bald eagle delisted.
2012	USFWS releases <i>2012 Final Land Based Wind Energy Guidelines</i> and proposed Eagle Rule. PG&E begins developing Eagle Conservation Plan (ECP). PG&E develops its <i>Nesting Bird Management Plan</i> . APLIC issues <i>Reducing Avian Collisions with Power Lines: State of the Art in 2012</i> .
2013	PG&E updates standards and procedures including its <i>Raptor Safe and Wildlife Protection</i> standards. Eagle Rule revised.
2015	PG&E updates its APP.
2016	Eagle Rule revisions.
2018	PG&E updates its APP.

PG&E finalized its APP in 2007 to better protect migratory, threatened, and endangered birds while improving safety and reliability for its customers. As policies and science evolve, and as PG&E monitors the plan's effectiveness, PG&E will continue to improve the plan to address current issues and trends.

In conjunction with the electric transmission standards team, the APP program manager is responsible for providing oversight, implementing an effective quality assurance program to assess compliance with the APP, establishing the overall program approach and annual work plan, procuring necessary funding, identifying training needs, establishing reporting criteria and structure, and serving as the central point of contact with resource agencies involved in avian protection.

The primary objective of this APP is to provide a description of all approaches, based on accepted practices of wildlife management to 1) reduce avian electrocutions and collisions with electric facilities and 2) to avoid and minimize impacts of PG&E activities on nesting birds. Implementation of this plan allows for consistent application of avoidance and minimization measures (AMMs) for birds across PG&E's service area and for compliance with state and federal laws and regulations protecting birds.

According to the Avian Power Line Interaction Committee (APLIC), an APP is a utility-specific program designed to reduce the operational and avian risks that result from avian interactions with electric utility facilities. Although each utility's APP may vary, the overall goal of any APP should be to reduce avian mortality. In 2005, APLIC and the U.S. Fish and Wildlife Service (USFWS) jointly released Avian Protection Plan Guidelines. The guidelines provide a framework along with principles and examples to aid utilities in APP development. Although not all APP elements may be included in every APP because of specific utility circumstances or geographical area, these guidelines represent an overview of elements that should be considered for inclusion in an APP. PG&E's APP follows these guidelines. An APP should be a "living document" that is evaluated and modified over time to improve its effectiveness.



Avian Power Line Interaction Committee

The Avian Power Line Interaction Committee (APLIC) leads the electric utility industry in protecting avian resources while enhancing reliable energy delivery. APLIC works in partnership with utilities, resources agencies and the public to:

- Develop and provide educational resources
- Identify and fund research
- Develop and provide cost-effective management options, and
- Serve as the focal point for avian interaction utility issues

The following components are encouraged by APLIC to be included in an APP, all of which are included in PG&E's APP:

- **Corporate Policy** identifying the company's commitment to work cooperatively toward the protection of migratory birds.
- **Training** for all appropriate utility personnel on company APP policies and procedures.
- **Permits**, both federal and state, that may be required for nest management, incidental take, or listed species recovery or management.
- **Construction Design Standards** for avian protection that meet or exceed APLIC recommendations.
- **Nest Management Procedures** for nests that may pose fire or safety risks, as well as methods for installing nest platforms.
- **Avian Reporting System** to track bird mortalities, remedial actions, and nest management.
- **Risk Assessment Methodologies** to aid in the identification of avian mortality risk areas.

- **Mortality Reduction Measures** that can be implemented to minimize bird electrocution and collision risks.
- **Avian Enhancement Options** to benefit bird populations or habitat.
- **Quality Control Methods** to monitor and improve APP effectiveness and efficiency.
- **Public Awareness Efforts** to educate the public about avian/power line issues and solutions.
- **Key Resources**, both internal and external, that is integral to successful APP implementation.

1.4 Objectives of the APP

The APP is intended to ensure compliance with legal and regulatory requirements while improving system reliability and reducing overall avian mortality. PG&E employees are responsible for managing bird interactions with power lines and are committed to reducing the detrimental effects of these interactions. To fulfill this commitment, the APP is designed to do the following:

1. Ensure that all actions comply with applicable laws, regulations, permits, and PG&E procedures.
2. Ensure that all actions follow APLIC recommendations and guidance.
3. Work cooperatively and collaboratively with state and federal wildlife agencies.
4. Provide annual training to targeted staff and contractors on how to implement the APP.
5. Document avian mortalities, high-risk poles and lines, and nests with risk to nesting pairs or infrastructure operations.
6. Construct all new or rebuilt facilities in Raptor Concentration Zones to current avian-safe standards.
7. Retrofit or modify power poles reactively where a raptor has been injured or killed.
8. Participate with public and private organizations in programs and research to reduce the detrimental effects of avian interactions with power lines.
9. Prepare an annual plan summarizing the yearly strategy to fulfill the key APP components.
10. Ensure that procedures describing a proactive retrofit program for utility poles are implemented with the goal of reducing avian electrocutions and collisions. This retrofit program includes annual evaluations and retrofits of high-risk poles throughout the service area using multiple variables described in Chapter 2, *Risk Assessment and Risk Reduction*.
11. Ensure that nest protection measures, including seasonal restrictions (i.e., limited operating periods) and exclusion buffers, are implemented in areas where PG&E undertakes projects and other maintenance activities near bird nests.

1.5 Avian Task Force

1.5.1 Overview

PG&E has an avian task force to coordinate the protection, mitigation, and conservation of birds in relation to PG&E's facilities, activities and lands. A primary goal of the task force is to oversee and guide implementation of the APP. Other goals include prioritizing future management actions, addressing other areas of risk, and supporting regional avian conservation efforts. The task force includes the APP program manager, management and staff from environmental management (i.e., principals and wildlife biologists that represent the different lines of business), Law and the transmission and distribution lines of business. This diverse team helps ensure that biological, legal, and structural issues are addressed when implementing the APP. This task force is responsible for reviewing the APP and ensuring the governance structure is in place and budget is secured to implement the APP.



Ferruginous Hawk

1.5.2 Program Manager

The APP program manager is responsible for implementation of the APP.

In addition, the program manager is in charge of ensuring PG&E adheres to the guidelines and conditions of the U.S. Fish and Wildlife Special Purpose—Utility Permit MB057942-2, administered by the USFWS Office of Migratory Birds. The APP program manager is accountable for reporting, as required by the Special Purpose Utility Permit, to the USFWS Office of Law Enforcement. As part of the APP, the program manager is responsible for the following programs:

- **Training and Education.** The APP requires that the appropriate identified employees are trained on the permit conditions and other key elements of the program. Online training is provided for approximately 5,500 employees and contractors annually.
- **Avian Reporting System and Corrective Actions.** All birds found killed or injured as a result of electrocutions or collisions with PG&E facilities are required to be reported via a web-based reporting system. In the case of raptors, the incident pole and adjacent pole(s) will be retrofitted within 90 days. Other poles are also retrofitted for reliability and for concerns with high-profile species. The program manager is responsible for securing work funding and also ensures that work is completed in compliance with the APP. Managing funding includes establishing unit cost, geographic area division targets, and determining which area divisions will participate in the annual retrofit plans.
- **Avian-Safe Construction Design Standards.** The program manager works closely with the engineering and standards group to design facilities that meet industry guidelines for avian protection (068181). This also includes development of new standards as necessary. In

addition, any new ancillary equipment or facilities attached to power poles are evaluated for potential risks.

- **Risk Assessment Methodology and Retrofit Program.** The program manager is in charge of identifying, planning, and working with the area divisions and reliability group to target 2,000 proactive retrofit poles annually. As required for reliability and/or threatened or endangered species, annual retrofit work also targets high-risk transmission structures and substations.
- **Nest Management and Permit Compliance.** Nest management is a key element of the assigned duties of the program manager. The program manager, in conjunction with PG&E biologists, is involved in developing project-specific measures to address nesting bird issues for various types of projects (gas, electric, facility, renewable). The program manager also takes the lead in discussions with the California Department of Fish and Wildlife (CDFW) and USFWS to discuss nesting bird issues.
- **Quality Control.** The program manager performs periodic division audits to assess compliance with the related standards, work procedures, and overhead construction techniques. Quality control also ensures the program manager that all bird incidents are reported to overseeing regulatory agencies as required. This exercise is completed by verifying electrical distribution and transmission outage data and cross-checking with bird incident reports on a monthly basis.
- **Avian Enhancement.** Certain species of birds may benefit from using utility structures. The program manager works closely with USFWS on protection projects to reduce bird mortality. This can be accomplished by installing bird flight diverters, or more commonly through installing bird nesting structures. The program manager also works to partner with environmental and conservation organizations as well as identify charitable contribution opportunities to nonprofit groups.

The APP program manager also responds to unusual situations that arise regarding birds. For example, the APP program manager maintains relationships with not-for-profit wildlife rehabilitation groups that may care for injured birds or wildlife that are affected by electric facilities. PG&E works with the following groups to provide care for injured and orphaned wildlife resulting from encounters with PG&E facilities: Injured and Orphaned Wildlife, International Bird Rescue, WildCare, Lindsey Wildlife, U.C. Davis Raptor Center, and Wildlife Center of Silicon Valley. Costs to care and rehabilitate injured wildlife are covered by PG&E.

1.5.3 Environmental Staff

As part of the avian task force, environmental management staff provides direction to the program based on state and federal laws, regulations, and policies and direction from senior management. Environmental management staff participates in strategy and program development for the APP. Environmental management staff also participates in APLIC meetings and works to share the latest information with PG&E staff.



Killdeer

1.5.4 Biological Staff

Biological staff provides technical biological input for non-routine avian issues, such as study design, proposal development and review, data analysis and interpretation. Biological staff advises on technical biological issues affecting bird species, and participates in agency consultations as needed.

1.5.5 Line of Business Staff

The avian task force includes staff members from engineering, transmission and distribution lines of business. Engineering staff provides input on the effectiveness of the APP as it relates to asset engineering design, maintenance, and operations. The staff updates engineering documents, work procedures, and other materials to support implementation. They also approve new methods and materials for use on the electric and transmission system. Transmission and distribution representatives implement the APP and provide guidance on what is working in the field.

1.5.6 Legal Staff

PG&E Law Department staff provides legal advice and counsel to the avian task force on various legal and regulatory matters. The attorney reviews implementation of the APP and regulations affecting bird species, including compliance with state and federal laws and PG&E's special purpose utility permit.

1.6 Avian Reporting System

PG&E trains field staff to identify and report avian issues. Staff is directed to contact the APP program manager when there is a nesting bird, electrocution, collision, or other avian issue. The APP program manager maintains a comprehensive database of reported bird incidents, and uses this information to help direct PG&E's avian risk reduction efforts. When a dead or injured bird is found, PG&E collects information on the date, location, type of bird, type of injury, where the bird was found in relation to PG&E facilities, photos (if possible), the equipment involved, and need for repairs. This data is used to plan retrofits and to identify and evaluate risk over time.



Swainson's Hawk

The APP program manager responds to incidents from the public when calls are received directly or through PG&E's general service hotline. PG&E has developed systems to standardize the reporting of avian fatalities including a detailed phone log, a script outlining responses and procedures based on the type of incident or issue experienced by the public, and an automatic notification process to ensure the APP program manager is aware of pressing issues related to avian management as reported by the public.

Chapter 2

Risk Assessment and Risk Reduction

The APP is intended to ensure compliance with legal and regulatory requirements while improving system reliability and reducing overall avian mortality. Its primary components are risk assessment and risk reduction.

2.1 Retrofits

Avian-safe power pole retrofits reduce the potential for mortality from electrocution by reducing or eliminating the risk when raptors and other birds come into contact with energized components when landing on power poles. PG&E's Raptor-Safe Construction and Wildlife Protection guidelines specify construction methods and special materials used by PG&E to ensure retrofits are safe for birds and other wildlife. For example, protective coverings or guards are constructed such that birds, squirrels, and other wildlife cannot make contact with energized conductors. In addition, all power pole retrofits are done in accordance with APLIC guidance (Avian Power Line Interaction Committee 2006).

As part of the proactive retrofitting process, careful attention is paid to high-risk poles, lines, and structures, including the following:

- Older and non-retrofitted equipment
- Riser, tap, and corner poles
- Locations where raptors are known to perch or nest
- Lines that traverse open fields, farmlands, orchards, or rolling hills with signs of ground squirrels (i.e., a high prey base) or that are near a body of water
- Poles or structures that are higher than the surrounding terrain, providing a vantage point from which raptors may perch

Reactive retrofits are made to poles or equipment that has electrocuted a raptor or other migratory bird. Avian electrocution also triggers a risk assessment of the five adjacent poles (or 1,000 feet of power line for 60- or 70-kilovolt [kV] wood transmission poles) in all directions away from the incident pole. Adjacent pole evaluations assess bird use, pole type, and habitat in the vicinity of the incident pole. On average, about five adjacent poles are retrofitted for every incident pole. Repairs to facilities with high risk to raptors and other birds are completed within 30 days of an electrocution, with lower-risk repairs being conducted within 90 days.

2.2 Risk Assessment – Proactive Retrofits

PG&E is committed to reducing avian mortality in a cost-effective manner by focusing efforts on the areas that pose the greatest risk to birds. PG&E considers areas with the most avian use, established flyways, adjacent wetlands, and other information (e.g. electric equipment type and configuration, perceived risk of electrocution for larger birds) when assessing risk. Biological assessments, outage investigations, and anecdotal evidence are also helpful in determining where potential incidents are most likely to occur.

PG&E's risk assessment for prioritizing proactive retrofits considers historical mortality data, facility nesting data, wildfire risk, and effectiveness of existing risk reduction efforts. To aid in visualizing where at-risk facilities are located, PG&E developed a detailed Raptor Concentration Zone (RCZ) map (Figure 2) that identifies areas where raptors are most likely to occur. The RCZ map is based on raptor mortality data, presence of poles as preferred perch locations, proximity to water and wetlands, and the history of outages resulting from raptor collisions. The RCZ map is used as a planning tool to prioritize proactive retrofit efforts throughout the service territory. When old poles in the RCZs reach their maximum service life, they are replaced with poles that are automatically built to raptor-safe standards. The RCZ is reviewed periodically to assess if it needs to be modified based on bird-caused outages and mortalities.

The risk assessment process requires consistent reporting, analyzing, and tracking of corrective work. These duties are performed by the APP program manager and the local area compliance employees. Unusual situations regarding birds may arise, including nesting birds in parking areas, powerhouses, and service garages. These issues are brought to the attention of the APP program manager, who then investigates these issues and works with local staff and other experts to develop solutions to prevent reoccurrence.

2.2.1 Existing Facility Repairs

When existing facilities are repaired, PG&E will often make other avian-safe repairs, including relocating exposed jumper wires, reconductoring with insulated conductors, or adding other bird protection devices. PG&E makes hundreds to thousands of repairs each year that reduce risk to raptors and other bird species.

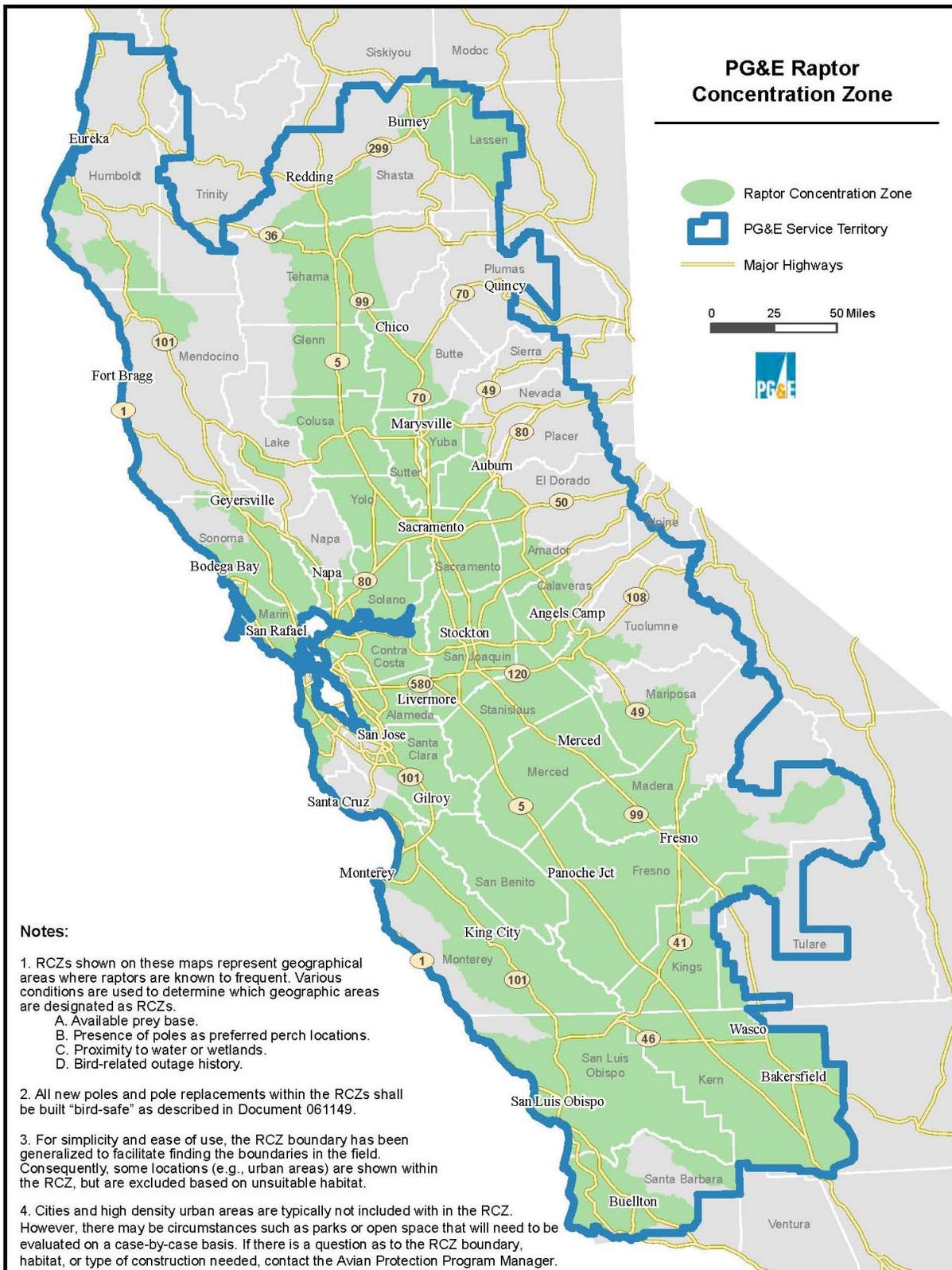


Figure 2. Raptor Concentration Zone

2.3 Risk Reduction

Risk reduction is achieved by constructing new facilities to the current avian-safe standards, assessing existing facilities that pose the greatest risks, repairing facilities, and retrofitting facilities. PG&E also implements risk reduction techniques for nesting birds, California condor, bald and golden eagles, and other birds as described below.

2.3.1 New Construction

PG&E's construction design standards are state-of-the-art and are based on APLIC's *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (Avian Power Line Interaction Committee 2006).² PG&E has developed additional avian-safe construction details, clearance distance requirements for new construction, equipment prescriptions, and construction methods based on the APLIC practices. Avian-safe construction is based on two principles:



Peregrine falcon

- Provide birds with a safe place to land
- Prevent incidental contact with energized conductors

Avian-safe construction is typically implemented by leaving 60 inches of separation (phase to phase) between energized components, and leaving 60 inches of separation (phase to ground) between an energized component and a grounded component. Where separation is not practical, PG&E insulates equipment and conductors to guard against bird electrocutions. Avian-safe construction includes the following measures, depending on pole and equipment configurations:

- Installation of bushing covers
- Interruption of ground links (floating grounds)
- Increased phase separation (reframing)
- Installation of perch deterrents and conductor covers
- Installation of bird flight diverters
- Siting and routing of new facilities away from high-risk areas to minimize impacts (e.g., waterways, wildlife refuges, and foraging habitat).

Examples of some of these retrofits are illustrated in Figure 3. PG&E maintains a catalogue of bird protection devices, material, and equipment approved for use in PG&E operations, maintenance, and construction. Durability and effectiveness of these items are continually monitored as part of facility inspections and maintenance. Whenever new bird protection equipment, devices or materials are

² Even though APLIC has 2012 standards, the 2006 standards are the latest standards for electric distribution infrastructure.

introduced by any manufacturer, PG&E must rigorously test this equipment to ensure it doesn't pose a safety or other risks to facilities and the public before deploying it in the field.



Figure 3. Important Avian Protection Hardware on Electric Facilities

2.3.2 Nesting Bird Management

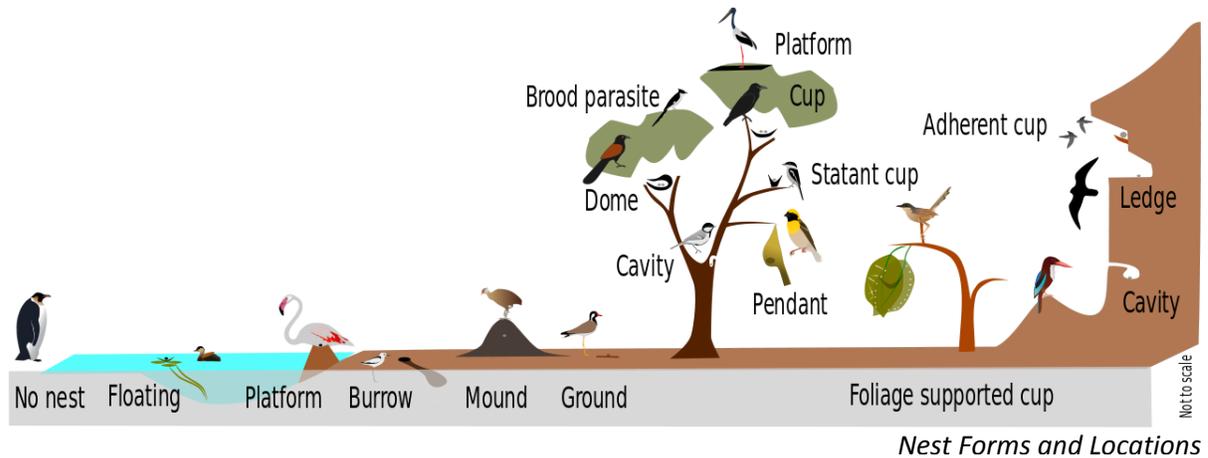
PG&E is focused on reducing potential impacts from all of its operations and maintenance activities on nesting birds. To address these impacts, and to maintain compliance with the MBTA and state statute, PG&E has developed a comprehensive plan to avoid and minimize impacts on nesting birds: PG&E's *Nesting Bird Management Plan* (NBMP). The NBMP is intended to do the following:

- Maintain compliance with applicable federal and state bird protection regulations.
- Avoid and minimize disturbance to nesting birds within PG&E's service area.
- Standardize PG&E's approach to managing nesting bird conflicts using accepted wildlife management practices.



Hummingbird nest

The NBMP is implemented by biologists working on PG&E activities near active bird nests. The NBMP defines an active nest as one containing eggs or young. PG&E is required to comply with federal and state laws and regulations that prohibit take of birds, including eggs or young, in active nests or for special-status protected species.



Implementation of the NBMP allows for consistent application of avoidance and minimization measures for nesting birds across PG&E activities, provides structured and standardized decision making, and allows PG&E to comply with federal and state regulations applicable to nesting birds.

A step-wise compliance approach guides implementation of the NBMP:

- **Step 1: Conduct desktop review** as part of the environmental review and planning process prior to initiating activities in locations that provide suitable habitat for nesting birds. A qualified biologist determines if there is potential for the activity to impact nesting birds.
- **Step 2: Conduct preconstruction nesting bird surveys**, if there is potential to impact active nests in or near construction areas. Pre-construction surveys can detect recent or established nests and identify the need to implement or adjust standard exclusion buffers.
- **Step 3: Assign nest exclusion buffers** or other applicable AMMs around active nests. These nest exclusion buffers are species-specific, may be standard or reduced and may include periodic nest monitoring.
- **Step 4: Confer** with the USFWS and/or CDFW as necessary. PG&E may confer with USFWS and/or CDFW when the standard buffer cannot be observed for a nesting threatened, endangered or fully protected species.

PG&E also created EarlyBird, a mobile application and website, to improve data collection and communication around nesting bird surveys. Every year, PG&E surveys for and monitors hundreds of active bird nests. Communicating the results of these survey efforts is a critical aspect of managing work near nests and retaining survey information is an important part of the PG&E Nesting Bird Management Plan. EarlyBird offers PG&E biologists a way to standardize the information they collect, streamline reporting, and save data for future projects and research.

In addition, PG&E has implemented measures to manage and protect burrowing owls found at and near PG&E facilities.

2.3.3 California Condor Risk Reduction

Portions of PG&E's electric service area fall within the current and historic range of the California condor (*Gymnogyps californianus*). PG&E works with condor managers to identify potential areas of electrocution and collision risk for condors in California. As areas of risk are identified, PG&E develops action plans to reduce these risks by making power lines more visible to condors (reduce collisions), covering the wire with insulation (reduce electrocutions), and, in special cases, undergrounding the power line altogether (reduce collisions and electrocutions). In addition, company biologists are working with condor partners to develop a predictive risk model to identify and prioritize future areas for additional proactive work.

PG&E is in the process of developing a California Condor Conservation Strategy (CCCS) for the express purpose of providing a clear and predictable program for avoiding and minimizing hazards to California condors that is associated with the design, construction, operation, and maintenance of electric facilities. The CCCS achieves the following objectives:

- Reviews and summarizes the current status of California condors in relation to utility facilities, including movement patterns and range, general ecology and status, management practices, recovery efforts, and power line interactions.
- Maps and evaluates California condor movements and determine condor density zones based on available satellite GPS (Global Positioning System) tracking data through partnerships with agencies and condor management teams.
- Overlays available satellite telemetry data with PG&E electric facilities to establish a repeatable process for evaluating tracking data for periodic assessment within the range of PG&E facilities.
- Complete a risk assessment to provide new tools for evaluating available condor data to better understand and define areas of risk.
- Develop a long-term strategy to identify, plan, and prioritize retrofits for facilities that have the greatest potential to reduce the risk of California condor electrocutions and collisions.

As described in Chapter 4, *Avian Enhancement, Outreach, and Research Programs*, PG&E also contributes to the Ventana Wildlife Society to help with the condor release program including training young condors to avoid perching on electric poles (also known as aversion training).

2.3.4 Bald and Golden Eagle Risk Reduction

For years PG&E has worked closely with USFWS and other federal land managers to address bald and golden eagle management issues on its hydro power facilities and throughout its service area. In 2013, PG&E developed an Eagle Conservation Plan (ECP) to address bald and golden eagle mortalities, both of which are protected under the BGEPA. The ECP evaluates effects at the landscape level, estimates mortalities on a yearly basis, and identifies minimization and mitigation measures. In 2013, PG&E submitted the ECP to the USFWS in 2013 in support of obtaining a long-term



Bald Eagle

incidental take permit for bald and golden eagles and is working closely with the USFWS on the ECP. Issuance of this permit is expected in 2019. The ECP addresses the take of bald and golden eagles associated with above-ground transmission and distribution lines and facilities and emergency eagle nest disturbance.

The incidental take is the result of infrastructure that has, in most cases, existed for many decades, and, consequently, is part of the baseline mortality for eagles in the ECP area. Issuance of the requested permit would not increase mortality in the ECP area. Rather, PG&E's avoidance and mitigation measures will continue to significantly reduce take relative to baseline levels, resulting in a net benefit to bald and golden eagles. For example, avian-safe power pole retrofits will continue to reduce the potential for mortality from electrocution by eliminating the risk that eagles and other raptors would come into contact with energized components when landing on power poles. The Raptor-Safe Construction and Wildlife Protection guidelines specify construction methods and materials to ensure that retrofits are safe for birds and other wildlife.

Pole Retrofits for Wind Developers

USFWS's Eagle Conservation Plan Guidance for wind developers details current guidelines regarding minimizing impacts on eagles. Eagle take permits issued by the USFWS require compensatory mitigation to offset eagle take. Actions to retrofit, reframe, or rebuild power poles to avian-safe designs have been identified by USFWS as an option for offsetting eagle take occurring at wind facilities. PG&E is working with USFWS, the National Fish and Wildlife Foundation, and specific wind developers to facilitate retrofits on PG&E facilities to meet compensatory mitigation requirements for these third-party entities. In order to provide mitigation options to third party wind developers, PG&E identifies areas with suitable poles for modification, provides the USFWS and the third party entity with a cost estimate and schedule to conduct the appropriate retrofits, and, once an agreement is reached between the parties, executes the work plan. This work is in addition to PG&E's reactive and proactive power pole retrofitting work.

2.3.5 Other Bird Species Risk Reduction

As needed, the APP program manager assists PG&E staff with other risk reduction issues. This includes consulting with staff on the timing of work activities, the installation of materials and equipment to avoid and minimize the potential impact on birds of work activities, and the rescue and relocation of birds. The APP program manager has assisted with wild turkeys, nesting cormorants, nesting sparrows, among other species.

Training, Permits, Quality Control and Reporting

3.1 Training

PG&E delivers biannual training on the APP to more than 5,000 operations and management staff members to ensure employees and contractors are aware of their obligations to report incidents and protect active nests or special-status species. Managers, supervisors, line crews, engineers, dispatch, and design personnel receive biannual training as well. The training covers the need for an APP, the methods by which employees should report an avian mortality or injury, and protocols to follow to avoid and minimize impacts on nests. Three APP trainings are offered: APP Overview, APP Comprehensive Review, and APP for Vegetation Management. All trainings are available for delivery to staff in-person or via the web. Descriptions and target audience of each training course are as follows:

Code: ENVR-0400

Name: Avian Protection Plan Overview

Type: Mandated

Description: This course provides an overview of PG&E's Avian Protection Plan (APP) (Standard S2321).

Objectives: Overview level of the following subjects: The twelve components of the APP – Employees' roles and responsibilities to comply with the APP – How birds interact with electric distribution and transmission facilities – Laws that protect migratory birds and threatened and endangered birds and their nests – Reporting procedure for bird incidents – Selection of incident and adjacent poles – Pole risk assessment and retrofit program – Raptor Concentration Zone (RCZ) – Avian safe construction – Nest management – Avian enhancement – Public awareness – Working safely – How to obtain additional information about the program.

Target Audience: Senior Management, Control Center Ops, etc.

Duration: 15 minutes plus discussion

Repeat Interval: 24 months

Code: ENVR-0401

Name: Avian Protection Plan Comprehensive Review

Type: Mandated

Description: This course provides a comprehensive presentation of PG&E's Avian Protection Plan (APP) (Standard S2321).

Objectives: Overview and detailed information for the following subjects: The twelve components of the APP – Employees' roles and responsibilities to comply with the APP – How birds interact with electric distribution and transmission facilities – Laws that protect migratory birds and threatened and endangered birds and their nests – Reporting procedure for bird incidents – Selection of incident and adjacent poles – Pole risk assessment and retrofit program – Raptor Concentration Zone – Avian safe construction – Nest management – Avian enhancement – Public awareness – Working safely – How to obtain additional information about the program.

Target audience: M&C Field Employees, Supervisors, Quality Assurance, etc.

Duration: 40 minutes plus discussion

Repeat Interval: 24 months

Code: ENVR-0402

Name: Avian Protection Plan for Vegetation Management

Type: Mandated

Description: This course provides an overview of PG&E's Avian Protection Plan (APP) (Standard S2321) as well as detailed information about managing nests encountered by Vegetation Management activities.

Objectives: Overview information for the following subjects: The twelve components of the APP – Employees' and responsibilities to comply with the APP – How birds interact with electric distribution and transmission facilities – Laws that protect migratory birds and threatened and endangered birds and their nests – Reporting procedure for bird incidents – Selection of incident and adjacent poles – Pole risk assessment and retrofit program – Raptor Concentration Zone – Avian safe construction – Nest management – Avian enhancement – Public Awareness – Working safely – How to obtain additional information about the program – Details information is provided about managing nests encountered by Vegetation Management activities.

Target Audience: Foresters, Vegetation Management Program Managers, VM Specialists, etc.

Duration: 20 minutes plus discussion

Repeat Interval: 24 months

PG&E distributes *A Field Guide to PG&E's Avian Protection Plan* to its employees, who use it as a quick reference to this APP. The field guide contains information on how to report bird incidents identifies additional actions required for raptors, contains photos and brief descriptions of some of the common bird species typically encountered in the field, specifies methods for managing nests, and provides common examples of raptor-safe construction techniques.

PG&E distributes educational materials to the public. Appendix A, *Public Awareness Program*, provides an example of these materials.

3.2 Permits

PG&E maintains a Special Purpose Utility Permit with the USFWS. The permit authorizes PG&E to collect, transport, and temporarily possess migratory birds found injured or deceased on utility property, structures, and rights-of-way for avian mortality monitoring or disposal purposes; in certain emergency conditions the permit also allows PG&E to remove active nests. The permit requires that PG&E maintain records of mortalities and injuries, and that the results be reported annually to the USFWS. This permit enhances PG&E's ability to accurately monitor migratory bird mortalities and enables PG&E to retain specimens to confirm identification. Collecting and reporting data to the USFWS contributes to collective knowledge and understanding of the impacts of utilities on migratory birds. PG&E also obtains other project-specific permits as needed. This has included permits for moving and removing raptor nests. PG&E's San Joaquin Valley operation and maintenance (O&M) Habitat Conservation Plan (HCP) also serves as a special purpose permit for non-ESA listed birds covered in the HCP.

3.3 Quality Control

PG&E evaluates the progress and effectiveness of the APP annually. The APP program manager ensures that project engineers use the guidance required to design facilities, and that crews know how to respond when deceased birds or active nests are discovered in the field. The APP program manager is involved in all major decisions, reviews key incidents, and evaluates and plans for PG&E's annual avian protection needs. Where information on incident forms is incomplete or illegible, the APP program manager contacts staff to complete and clarify the information reported. Based on the annual review of the program, PG&E's avian task force discusses, modifies, expands, and provides recommendations to improve the APP to address issues that arise.

3.4 Reporting

PG&E maintains detailed records of each year's avian incidents. PG&E reports this information, consistent with its Special Purpose Utility Permit, to USFWS. The annual report provides an opportunity for PG&E to review the previous year's data, summarize incidents, and evaluate further needs.



Common Raven and Nest

Avian Enhancement, Outreach, and Research Programs

4.1 Avian Enhancement Programs and Partnerships

PG&E implements a series of efforts that are designed to enhance avian habitat and benefit migratory birds. These efforts include providing ongoing wildlife habitat grant funding, obtaining wildlife habitat certification at several of our properties, installing nesting platforms for osprey, and making habitat acquisitions to benefit many species. PG&E has worked for over 15 years with Audubon California, local Audubon chapters, Ducks Unlimited, San Francisco Bay and Central Valley Joint Ventures, Santa Cruz Predatory Bird Research Group, Migratory Bird Partnership (Audubon California, The Nature Conservancy, and Point Blue Conservation Science), Ventana Wildlife Society, WildCare, and other organizations to promote the protection of avian species and further the conservation of birds. PG&E will continue to support and fund avian enhancement programs to advance the protection and conservation of avian species.

4.1.1.1 Migratory Bird Conservation Partnership

PG&E supports the Migratory Bird Conservation Partnership, a collaboration of Audubon California, Point Blue Conservation Science, and The Nature Conservancy that is addressing the loss of wetland habitat in California's Central Valley and its impact on bird populations. The projects PG&E has supported in 2015–2017 clear barriers to providing additional water on the landscape and are complementary in nature—building off previous work supported by PG&E and leveraging the expertise and engagement of each partnership organization. The projects complement each other by creating additional tools and data for land managers to use in their efforts to most effectively and efficiently manage wetlands for migratory birds and other wildlife.

4.1.1.2 Migratory Bird Joint Ventures

PG&E has been an active member of the Management Boards for both the San Francisco Bay Joint Venture and the Central Valley Joint Venture—part of the National Migratory Bird Joint Ventures across the country that work collaboratively with federal, state and local regulatory agencies, environmental nonprofit organizations, businesses, and landowners to conserve and restore habitat for migratory birds. PG&E works with partners to develop restoration plans and ensure that electric utility infrastructure is integrated into the final design.



Migratory Bird Joint Ventures are cooperative, regional partnerships that work to conserve habitat for the benefit of birds, other wildlife, and people. There are twenty-two habitat-based Joint Ventures, each addressing the bird habitat conservation issues found within their geographic area.

4.1.1.3 Tricolored Blackbird Memorandum of Understanding

PG&E was an original signatory to the multi-agency and environmental group Memorandum of Understanding (MOU) in 2007 that was developed to promote voluntary conservation measures to save this species. PG&E continues to be an active member of the Tricolored Blackbird Working Group to encourage and support actions by all stakeholders to safeguard the long-term welfare of tricolored blackbirds (*Agelaius tricolor*) by supporting secure breeding, foraging, and wintering

populations and their associated habitat in California. The Working Group has developed and is implementing a Conservation Plan and Research and Monitoring Programs. Signatories to the MOU include Audubon California, California Association of Resource Conservation Districts, California Farm Bureau, California Cattlemen's Association, CDFW, California Department of Food and Agriculture, Central Valley Bird Club, Central Valley Joint Venture, Natural Resources Conservation Service, PG&E, Point Blue Conservation Science, Sonoran Joint Venture, Sustainable Conservation, U.C. Berkeley Agriculture and Natural Resources, USFWS, and Western United Dairymen.

4.1.1.4 Peregrine Falcon Nest Box

Since the late 1980s, PG&E has partnered with U.C. Santa Cruz Predatory Bird Research Group to provide safe nesting habitat on the roof of the company's headquarters in downtown San Francisco. The scientists at U.C. Santa Cruz Predatory Bird Research Group knew that peregrine falcons (*Falco peregrinus*) were attempting to nest on the Bay Bridge and other bridges with poor results. They identified a good location to install a nest box on the roof of 77 Beale Street that would provide a safe location and one that could be easily monitored. A webcam was installed to allow interested employees and the public to view progressive peregrine pair nesting activities including egg incubation and fledging of nestlings. PG&E has also supported the U.C. Santa Cruz Predatory Bird Research Group education and outreach efforts in local schools.

4.1.1.5 Osprey Nest Platforms

Native osprey (*Pandion haliaetus carolinensis*) populations are expanding in Northern California and often favor building their large nests on PG&E's power poles. PG&E developed a program to install osprey nest platforms to move osprey nests out of harm's way and to prevent fires from nests initiated on live power poles. Hundreds of osprey nest platforms have been installed throughout PG&E's service area.



Installation of Osprey Nesting Platform

4.1.1.6 Owl Nest Boxes

PG&E has partnered with Central Coast Vineyards and the Lodi Wine Grape Commission to aid grape growers in the Central Coast and Central Valley to maintain sustainable pest control and also keep birds safe around power lines. PG&E's charitable grants funded the purchase of owl nest boxes for grape growers to install with the goal of attracting barn owls, a natural predator of rodents. The nest boxes are intended to provide a safe home for the owls and replace the boxes that growers often attach to power poles that can create unintended problems such as electrocution of the birds, outages, and potential fires.



Barn Owl Nest Boxes

4.1.1.7 California Condor Recovery Efforts

Since 2003, PG&E has continued to promote protection and recovery of California condor populations. PG&E helped form an external Condor Recovery Plan Powerline Subcommittee, comprising multiple California utilities, resource agencies, and other condor recovery stakeholders, to determine the risk of power structures to California condors in California and to develop and implement plans to minimize that risk. In 2016, PG&E signed an MOU with multiple condor recovery partners (USFWS, National Park Service, Yurok Tribe, CDFW, Bureau of Land Management, Redwood National Park, U.S. Forest Service, and Ventana Wildlife Society) focused on condor reintroduction efforts in Redwood National Park. In addition to providing insight on PG&E facilities that could pose a risk to the condors, PG&E donated \$200,000 over a 3-year period to the National Parks Foundation for condor reintroduction and recovery, which directly supports the Redwood Condor Reintroduction Project.

PG&E continues to actively support the Ventana Wildlife Society to help with the reintroduction of condors on the Central Coast of California, including efforts such as developing joint educational displays, hosting fundraising events and technical meetings, developing risk mitigation strategies, and has served on the Board of Directors.

Since 2002, PG&E and the PG&E Corporate Foundation have contributed more than \$7.5 million to programs that benefit migratory birds. Table 2 lists the organizations that have received PG&E contributions.

Table 2. Summary of Partner Organizations That Have Received Charitable Contributions

California Wine Education Foundation
Center for Land-Based Learning
Central Coast Vineyard Team
Ducks Unlimited
Friends of the Swainson's Hawk, Inc.
Golden Gate Audubon Society
Injured & Orphaned Wildlife
Lodi Sandhill Crane Association
National Audubon Society
National Fish and Wildlife Foundation
National Park Foundation (Washington office)
Redwood National Park
U.C. Santa Cruz Foundation
Ventana Wildlife Society

4.1.1.8 Supporting National, State and Local Chapters of the Audubon Society

PG&E has had a long-standing relationship with the National Audubon Society, California Audubon, and local Audubon chapters throughout our service area. PG&E employees volunteer, are members, and are in leadership positions in these organizations.

4.1.1.9 Avian Power Line Interaction Committee

In the mid-1980s, PG&E was an original founder of APLIC, which was formed to address bird electrocutions and collisions with power lines. APLIC develops guidelines for utility companies to minimize risk to birds from infrastructure and develops education and outreach to others. PG&E has supported APLIC by serving as the Chair and on the Executive Committee, assisting with the development of utility standards and guidelines, supporting and attending educational workshops, supporting and developing research grant efforts, and implementing APLIC's recommendations.

4.2 Research

PG&E has contributed to multiple research efforts. Some of these key efforts are:

- Identifying Electric Distribution Poles for Priority Retrofitting to Reduce Bird Mortality. California Energy Commission. PIER Final Project Report. December 2007. P500-04-052.
- Testing the Effectiveness of an Avian Flight Diverter for Reducing Avian Collisions with Distribution Power Lines in the Sacramento Valley, California. PIER Final Project Report. January 2008. CEC-5000-2007-122.
- Evaluating Diverter Effectiveness in Reducing Avian Collision with Distribution Lines at San Luis National Wildlife Refuge Complex, Merced County, California. PIER Final Project Report. August 2009. CEC-500-2009-078.

This research has informed PG&E's maintenance and retrofitting practices.

5.1 Printed References

Avian Power Line Interaction Committee (APLIC). 2006. *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D.C. and Sacramento, CA.

Appendix A
Public Awareness Program

**Avian Protection Plan—Helping Protect California’s
Birds and Keep Customer Service Flying High**

Going beyond compliance and building “best practices” for our industry.

PG&E has a long history of protecting habitat and species, including bird populations. For example, we were a founding member of the Avian Power Line Interaction Committee, a collaboration between utilities and the U.S. Fish and Wildlife Service that began nearly 20 years ago.

In 2002, PG&E and the U.S. Fish and Wildlife Service entered into an agreement that required PG&E to implement various measures to protect migratory, threatened, and endangered birds. When this agreement expired in 2007, PG&E voluntarily adopted a proactive Avian Protection Plan that expands PG&E’s commitments in public outreach, collaborative research, and “bird safe” technology demonstration projects. This plan has set the standard for our industry and is one of the most comprehensive in the nation.

BIRD PROTECTION PROGRAM (BIRD-SAFE RETROFITS)

	2002	2003	2004	2005	2006	2007
Poles Planned	2,000	2,011	2,000	2,050	2,075	2000
Poles Completed	1,930	2,089	2,023	2,073	2,117	2000
% Poles Completed	97%	103%	101%	101%	102%	100%

Since 2002, in compliance with the agreement, PG&E has retrofitted more than 12,230 existing utility poles and towers with “bird-safe” equipment (see chart above). We have also retrofitted more than 11,100 poles in high-risk areas where bird injuries or fatalities have occurred previously, or where there have been bird-related power outages. All new poles and replacement poles in “Raptor Concentration Zones” are also built “bird-safe.”




Many bird species build nests on power poles and structures; unfortunately, this behavior increases risks for both the birds and our electric system. PG&E’s Avian Protection Plan minimizes these risks by protecting birds and their nests, while improving safety and reliability for our customers.

SOME OF OUR PARTNERS:

- Ventana Wildlife Society
- Avian Power Line Interaction Committee (APLIC)
- Wildcare
- Audubon California
- UC Santa Cruz Predatory Bird Research Group



Since 2003, PG&E has contributed over \$500,000 to support bird conservation organizations.



In 2008, PG&E earned Audubon California’s Corporate Achievement Award for protecting California’s birds and important habitat.

AVIAN PROTECTION PLAN

Helping protect California’s birds and keep customer service flying high.

For more information, visit www.pge.com/environment



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Breeding bald eagles in California have increased from a low of only about 30 pairs in the early 1980s to more than 200 pairs today due to a variety of federal, state, and private protection efforts.

Together, we can make a difference to Californians on the ground—and in the air.

Targeted species enhancement programs:

For the past 25 years, PG&E has led various bird species conservation initiatives.

- **Bald Eagle:** PG&E has put in place tailored plans to protect bald eagles at our facilities as part of a long-term, statewide effort to monitor our national symbol. PG&E has surveyed more than 50 bald eagle nesting territories and provided scientific research and data to the U.S. Fish and Wildlife Service. Today, PG&E's hydroelectric watershed lands support about one-quarter of the state's entire breeding population of bald eagles.

"PG&E's avian protection efforts give us hope for the California Condor's recovery in Big Sur and elsewhere," said Kelly Sorenson, executive director of the Ventana Wildlife Society.

- **California Condor:** Endangered California Condors have a risk of colliding with PG&E's power lines in remote Big Sur locations. Inadequate scientific data on Condors makes it difficult to resolve this challenge. Yet, PG&E has taken a number of steps, including developing a cutting-edge long-lining helicopter technique to install special "bird flight diverters" along these area power lines. In 2007, PG&E partnered with Monterey County, the Ventana Wildlife Society, California State Parks, the U.S. Forest Service, and the U.S. Fish and Wildlife Service on one of the largest installations of these innovative devices.

- **Peregrine Falcon:** PG&E's support of peregrine falcon conservation efforts reached new heights in 2005 by funding the UC Santa Cruz Predatory Bird Research Group (SCPBRG) "nest cam" to broadcast the daily routine of a pair of peregrines and their young perched high on the company's headquarters building in San Francisco. In 2007, the famous peregrines laid new eggs on the central anchorage of the San Francisco-Bay Bridge, requiring a dramatic rescue by the SCPBRG scientists with financial support from PG&E. Our continued financial support also funds the group's educational outreach to hundreds of high schools and middle schools throughout California.



A golden eagle soars above a PG&E transmission tower near San Juan Bautista. Innovative new products, such as the red transmission line covers pictured (at left), protect eagles and greatly increase service reliability.

A plan designed to take wing.

PG&E's Avian Protection Plan consists of several key components:

- **Employee training and compliance:** We educate our employees to ensure we comply with all federal and state bird protection laws. PG&E has developed training in "bird-safe" construction practices and in the proper reporting and tracking of all avian electrocutions or collisions.
- **Making our poles "bird-safe":** Since 2002, we have proactively retrofitted a growing number of our utility poles. Each year, we identify high-risk poles based on the type of electric equipment, risk of electrocution, local biology, geography, and regional conservation initiatives. When needed, we also install platforms above or near our equipment to give birds a safe place to build a nest.
- **Public education and partnerships:** We promote the need for migratory bird and habitat conservation in cooperation with federal and state agencies and non-profit organizations. We also partner with a variety of bird conservation organizations to raise awareness about sensitive bird species, such as the Purple Martin in Lake County or the Tricolored Blackbird in Tulare County.



A PG&E crew installs a nest platform near Clear Lake. Nest platforms reduce outages and are preferred by large birds, such as ospreys.



In 2007, PG&E crews rescued a barn owl, entangled in a kite string, in Anderson, California.

"Thank you PG&E for helping us save the owl. We definitely couldn't have done it without your help."

Karlene Stoker, PR Coordinator,
Shasta Wildlife Rescue & Rehabilitation, Inc.