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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 service extensions or electric transmission may continue to be the subject of separate CEQA analysis through the California Public Utilities Commission's General Order 131-D process, as is the case at present.

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.

Mitigation and Minimization Measures

The following mitigation and minimization measures will be required to reduce significant impacts on California freshwater shrimp, California tiger salamander, and Alameda whipsnake.

MM BIO-1: Acquire, preserve, and/or enhance suitable habitat for mitigation

- a. 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. Compensatory mitigation locations will be subject to review and approval of the CDFW. Habitat mitigation will be provided for covered species based on acreages of estimated and actual habitat losses consistent with jump start¹⁴ and stay ahead¹⁵ mitigation approaches. Mitigation for habitat disturbance from temporary and permanent impacts will be provided at the following ratios:

¹⁴ Jump start means land acquisition, preservation, and/or habitat enhancement efforts that are made in advance of permit issuance.

¹⁵ 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.

- 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.
- b. By June 1 of each year, PG&E will 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. In addition, the report will include survey and monitoring results of ITP-covered species in work areas, as required by APM BIO-2.

MM BIO-2: California freshwater shrimp minimization measures

- a. Seasonal Restriction. Covered activities in water in modeled habitat for California freshwater shrimp will be restricted to the period between July 1 (after females release eggs) and November 15 (before they move to the shallow margins of streams, seeking refuge from high water velocities associated with winter storm events) to the extent possible.
- b. California Freshwater Shrimp Relocation Plan. If covered activities in water in modeled habitat cannot be avoided, PG&E will prepare a California Freshwater Shrimp Relocation Plan for CDFW review and approval. The Relocation Plan will be developed as the standard template for future relocation plan needs and include, but not be limited to, resumes of individuals qualified to survey and monitor for California freshwater shrimp; survey, capture, and release methods; and location with suitable habitat for relocation. CDFW will make every effort to respond in a timely manner. Covered activities described in the Relocation Plan may proceed upon receipt of CDFW approval of the Relocation Plan. Only qualified biologists listed in the Relocation Plan are authorized to capture and handle California freshwater shrimp.
- c. CDFW Notification. PG&E's ITP Administrator will notify CDFW at least one week in advance of the date on which work will start in the stream.
- d. Personnel Training. Prior to the onset of work at a work site that may impact shrimp, a qualified biologist will conduct a training session for all construction personnel. The training

- will include a description of the shrimp and its habitat, the importance of the shrimp and its habitat, the measures that are being implemented to conserve the shrimp as they relate to the work site, and the work site boundaries where covered activities may occur. In addition to the ITP training that all construction personnel must attend, the biologist may prescribe activity-specific tailboard trainings reminding staff of the importance of following measures to minimize impacts on California freshwater shrimp as they relate to the work site.
- e. California Freshwater Shrimp Pre-Construction Survey. A qualified biologist will survey potential aquatic habitat for shrimp before allowing work to proceed. All undercut banks and submerged tree roots will be surveyed with a butterfly net or fish net. If freshwater shrimp are captured, they will be relocated from the work area according to the Relocation Plan.
 - f. Coordination with CDFW. Only qualified biologists will participate in the capture, handling, and monitoring of shrimp. PG&E will modify the capture/release strategy with CDFW staff input as needed to minimize impacts.
 - g. Reporting. PG&E will report annually on the extent of in-water work in modeled habitat and number of captures, releases, and injuries/mortality of California freshwater shrimp pursuant to MM BIO-1.

MM BIO-3: California tiger salamander minimization measures

- a. California Tiger Mortality Reduction and Relocation Plan. PG&E will prepare a standardized mortality reduction and relocation plan that includes, but will not be limited to, biologist qualifications; techniques to exclude salamanders from work areas; techniques to excavate burrows if recommended by a qualified biologist; and techniques to capture, handle, and relocate California tiger salamander safely if they are encountered in aquatic or upland habitats. The standardized relocation plan will also include information on materials to use, disease prevention, injuries, and nearby wildlife rehabilitation centers or veterinary facilities capable of evaluating or treating salamanders. The standard mortality reduction and relocation plan will incorporate measures from the Fieldwork Code of Practice developed by the Declining Amphibian Populations Task Force to prevent disease transmission when working directly in aquatic habitat. Annual reports will include a summary of the results of implementation of relocation efforts. Covered activities where California tiger salamander is likely to be present may not proceed until the standardized mortality reduction and relocation is approved in writing by CDFW. Only qualified biologists are authorized to handle or capture California tiger salamander. Any changes to the standardized mortality reduction and relocation plan, including temporary variances, will be approved in writing by CDFW.
- b. California Tiger Salamander Pre-Activity Surveys. When covered activities in potential aquatic breeding habitat for California tiger salamander cannot be avoided, PG&E shall perform pre-activity surveys. If PG&E encounters California tiger salamander in any life stage or development (adult, metamorph, larval, eggs, etc.), the qualified biologist will implement the standardized mortality reduction and relocation plan. For covered activities E9a (Reconductoring), G9 (Pipeline Lowering), G11 (Pipeline Replacement), and E14 (Minor Substation Expansion) in modeled habitat, PG&E will conduct pre-activity surveys. No more than 30 calendar days prior to starting covered activities, a qualified biologist will survey

- the work area located within suitable modeled habitat for California tiger salamander. These surveys will provide 100 percent visual coverage of the work area and a 50-foot buffer zone.
- i. Flag Burrows. The qualified biologist will flag all potential small mammal burrows within the work area and a 50-foot buffer zone to alert biological and work crews to their presence. Where feasible, an avoidance buffer of 50 feet or greater around active small mammal burrows will be maintained.
 - ii. Relocate Salamanders. If any California tiger salamander are found within the work area or 50-foot buffer zone, the qualified biologist will relocate them from the work area or buffer zone(s) in accordance with the standardized relocation plan.
- c. Small Mammal Burrow Excavation. If California tiger salamander are encountered in the course of conducting ground disturbing activities (>0.1 acres in size) in CTS Hot Zones, burrows will be excavated to minimize impacts. The qualified biologist may recommend burrow excavation to minimize impacts for other covered activities as appropriate. The qualified biologist will relocate any live California tiger salamander discovered during burrow excavation in accordance with the mortality reduction and relocation plan required in MM BIO-3a above.
- d. Personnel Training. All personnel (contractors and employees) that work within the administrative area of the ITP must attend combined ITP and HCP specific training annually. As part of the training, personnel are provided an overview of PG&E's environmental program including permit requirements, environmental policy, and general environmental stewardship. The training also includes covered activities, covered species, permit measures (APMs, MMs, AMMs, FPs, and BMPs), compliance requirements, and conservation strategy. Activity-specific tailboards will be conducted for staff working on any covered activity for which AMMs are required, when work is conducted in a hot zone, when species-specific measures are required on large activities, and as required when PG&E is working in Map Book zone areas.
- e. California Tiger Salamander Protection during Upland Movements or Exclusion Fencing.
- i. The following additional measures will be implemented for E9a (Reconductoring), G9 (Pipeline Lowering), G11 (Pipeline Replacement), and E14 (Minor Substation Expansion) activities, as well as E15 (Underground Line Construction) when the activity occurs outside of existing roadways or urban areas, in habitat within 0.5 mile of known or potential breeding habitat between November 1 and April 30. Work may not occur at night during rain events unless otherwise authorized by CDFW. The following day, crews will check for species around tires, equipment, and materials before work resumes. If a salamander is found, the crew will avoid the area and contact the project biologist for direction.
 - ii. Following a rain event of 0.25 inches for E9a (Reconductoring), G9 (Pipeline Lowering), G11 (Pipeline Replacement), and E14 (Minor Substation Expansion) activities, as well as E15 (Underground Line Construction) when the activity occurs outside of existing roadways or urban areas, PG&E will install exclusion fencing around the perimeter of work areas to prevent California tiger salamander movement into the work area after a California tiger salamander is found within the work area when the activities occur within 0.5 mile of known or potential breeding habitat between November 1 and April 30. The exclusion fence will be buried a

minimum of 4 inches below ground surface and equipped with one-way exits (if the work area still has burrows and has not been cleared of the species) to avoid entrapment of California tiger salamander and other amphibians or reptiles within the fenced area. PG&E will also avoid small mammal burrows to the maximum extent possible during the installation of the exclusion fencing.

- f. California Tiger Salamander Exclusion Fence Installation. The qualified biologist will ensure that California tiger salamander are not killed or injured during fence installation. The exclusion fence will be supported sufficiently to maintain its integrity under all conditions, such as wind and heavy rain, for the duration of the covered activities in the work area being fenced. The qualified biologist will inspect the completed fencing prior to construction. PG&E will check the exclusion fence at least once weekly and maintain/repair the fence when necessary. PG&E should install temporary exclusion fencing in a sequential manner that corresponds to the progression of covered activities within work area. For example, temporary fencing is not required to be installed simultaneously at all work areas and will be removed immediately upon completion of covered activities in each fenced work area.
- g. California Tiger Salamander in Work Area. If California tiger salamander is found by any person in the work area before or during covered activities, all work that could potentially injure the California tiger salamander will stop immediately until the qualified biologist can relocate the California tiger salamander following the California Tiger Salamander Mortality Reduction and Relocation Plan specified in MM BIO-3a above. The relocation area(s) will be identified in the California Tiger Salamander Mortality Reduction and Relocation Plan by the Designated Biologist(s) prior to the start of covered activities and are subject to CDFW approval.
- h. California Tiger Salamander Record of Handling. All California tiger salamander captures, relocations, and observations by the qualified biologist will include the following documented information: the date, time, and location of each occurrence using Global Positioning System (GPS); the name of the party that actually identified the California tiger salamander; circumstances of the incident; the general condition and health of each individual; any diagnostic markings, sex, age juvenile or adult); actions undertaken; and habitat description. PG&E will also submit this information to the CNDDDB with landowner approval. This information will also be included in Annual Report pursuant to MM BIO-1b.
- i. Cover or Ramp Open Excavations: Trenches or pits that are in modeled habitat will be covered or equipped with an escape ramp if left overnight. Crews will inspect any trench, pit, or hole prior to filling to ensure no individuals are trapped; if any animals are found staff will contact a qualified biologist.
- j. Soil Stockpiles. PG&E will ensure that soil stockpiles are placed where soil will not pass into potential California tiger salamander breeding pools or into any other "waters of the state," in accordance with Fish and Game Code section 5650. PG&E will appropriately protect stockpiles to prevent soil erosion.
- k. Fieldwork Code of Practice. When working in California tiger salamander potential breeding habitat, to ensure that disease is not conveyed between work areas, the qualified biologist will follow the Fieldwork Code of Practice developed by the Declining Amphibian Populations Task Force or the best available science for preventing spread of disease that could affect covered species. The qualified biologist may substitute a bleach solution (0.5 to

one cup of bleach to one gallon of water) for the ethanol solution. Care will be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.

MM BIO-4: Alameda whipsnake minimization measures

- a. Burrow and Rock Outcrop Avoidance. Burrow and rock outcroppings will be avoided by covered activities when they occur within modeled habitat for Alameda whipsnake, to the extent feasible.
- b. Seasonal Restriction. Disturbance in modeled core and perimeter core habitat for E9a (Reconductoring), G9 (Pipeline Lowering), G11 (Pipeline Replacement), and E14 (Minor Substation Expansion) for Alameda whipsnake will only take place between April 15 and October 31 to the extent feasible when Alameda Whipsnake is more active and less likely to be affected by covered activities. For activities E9a (Reconductoring), G9 (Pipeline Lowering), G11 (Pipeline Replacement), and E14 (Minor Substation Expansion) occurring in core or perimeter core habitat for Alameda whipsnake between November 1 and April 14, a qualified biological monitor, familiar with Alameda whipsnake, will be present during operations.
- c. Pre-construction Surveys. Pre-construction surveys for Alameda whipsnake will be conducted in modeled core and perimeter core habitat for E9a (Reconductoring), G9 (Pipeline Lowering), G11 (Pipeline Replacement), and E14 (Minor Substation Expansion). Pre-construction surveys will be conducted by a qualified biologist no more than 30 calendar days prior to any initial ground disturbance. These surveys will consist of walking the work area and, if possible, any accessible adjacent areas within at least 50 feet of the work area. The qualified biologist will investigate potential cover sites when it is feasible and safe to do so. This includes thorough investigation of mammal burrows, rocky outcrops, appropriately sized soil cracks, tree cavities, and debris.
- d. Personnel Training. All construction personnel (contractors and employees) that work within the administrative area of the ITP must attend combined ITP and HCP specific training annually. As part of the training, personnel are provided an overview of PG&E's environmental program including permit requirements, environmental policy, and general environmental stewardship. The training also includes covered activities, covered species, permit measures (APMs, MMs, AMMs, FPs, and BMPs), compliance requirements, and conservation strategy. The biologist may prescribe activity-specific tailboards trainings reminding staff of the importance of following measures to minimize impacts on Alameda whipsnake as they relate to the work site. Site specific tailboards will be conducted for staff working on any covered activity for which AMMs are required, when work is conducted in a hot zone, when species-specific measures are required on large activities, and as required when PG&E is working in Map Book zone areas.
- e. Stockpiling and Staging. Spoils will not be placed in chaparral, over burrows, or in wetland areas.
- f. Storage of Construction Materials. All pipes, culverts, and similar structures associated with E9a (Reconductoring), G9 (Pipeline Lowering), G11 (Pipeline Replacement), and E14 (Minor Substation Expansion) that are stored in modeled habitat at the work area will be capped and will be thoroughly inspected for trapped animals before being buried or moved.

- g. Cover or Ramp Open Excavations. Trenches or pits that are in modeled habitat will be covered or equipped with an escape ramp if left overnight. Crews will inspect any trench, pit, or hole prior to filling to ensure no individuals are trapped; if a snake is found, staff will contact a qualified biologist.
- h. Alameda Whipsnake in Work Area. If Alameda whipsnake is found by any person in the work area before or during covered activities, all work that could potentially injure the whipsnake will stop immediately and the snake will be allowed to leave the work area on its own. If the snake does not leave the work area or cannot move to an area with sufficient habitat outside of the work area, the qualified biologist will move the snake to suitable habitat outside the work area. Covered activities will resume only after the Alameda whipsnake has been confirmed to be out of the work area.
- i. Reporting. PG&E will report annually on the Alameda whipsnake detections pursuant to MM BIO-1.

Significance after Mitigation

California Freshwater Shrimp

MM BIO-2 would reduce potential impacts on California freshwater shrimp by restricting the timing of covered activities, developing a relocation plan prior to working in water in modeled habitat, conducting a pre-activity survey, and relocating shrimp from the work area where they could be affected. In addition, the mitigation requires personnel training, CDFW notification, and reporting. MM BIO-1 requires PG&E to provide habitat compensation at a 3:1 ratio for permanent impacts and 1:1 ratio for temporary impacts to offset the loss of habitat for California freshwater shrimp. With implementation of these mitigation measures, impacts on California freshwater shrimp from issuance of the ITP for PG&E's O&M and minor new construction would be fully mitigated and reduced to a less-than-significant level because injury or mortality to individuals would be minimized, and habitat compensation would be provided for loss of habitat.

California Tiger Salamander

MM BIO-3 would reduce potential impacts on California tiger salamander by requiring development of a standardized mortality reduction and relocation plan, pre-activity surveys, identification and avoidance of burrows, and excavation of burrows for the activities that result in the largest ground-disturbing effects. The measures restrict large, covered activities near breeding habitat after rainfall events or require exclusion fencing to be installed to avoid California tiger salamanders from entering the work area during upland movements. In addition, large activity night work is prohibited when rainfall has occurred, excavations will be covered or equipped with an escape ramp, and stockpiles will be placed to avoid erosion into aquatic habitat. MM BIO-3 also requires personnel training and notification, coordination, and reporting to CDFW.

MM BIO-1 requires PG&E to provide habitat compensation at a 3:1 ratio for permanent impacts on breeding habitat for both Central California and Sonoma County DPS. Habitat compensation for temporary impacts will be provided at a 1:1 ratio for breeding and upland habitat for Sonoma County DPS and breeding habitat for Central California DPS. For temporary impacts on upland habitat for Central California DPS, habitat compensation will be provided in advance of impacts at a 0.5:1 ratio for temporary impacts on upland habitat for Central California DPS.

With implementation of these mitigation measures, impacts on California tiger salamander from issuance of the ITP for PG&E's O&M and minor new construction would be fully mitigated and reduced to a less-than-significant level because injury or mortality to individuals would be minimized, and habitat compensation would be provided for loss of habitat.

Alameda Whipsnake

MM BIO-4 would reduce potential impacts on Alameda whipsnake by avoiding rock outcrops and requiring seasonal restrictions in modeled core and perimeter core habitat. Excavations will be covered or equipped with an escape ramp, and stockpiles and storage of materials will be inspected for whipsnake. MM BIO-4 also requires personnel training and reporting to CDFW.

MM BIO-1 requires PG&E to provide habitat compensation at a 3:1 ratio for permanent impacts on habitat for Alameda whipsnake. For temporary impacts on core or perimeter core habitat, habitat compensation will be provided at a 1:1 ratio. For non-core (movement) habitat for Alameda whipsnake, temporary impacts will be mitigated in advance of impacts at a 0.5:1 ratio for temporary impacts on non-core whipsnake habitat.

With implementation of these mitigation measures, impacts on Alameda whipsnake from issuance of the ITP for PG&E's O&M and minor new construction would be fully mitigated and reduced to a less-than-significant level because injury or mortality to individuals would be minimized, and habitat compensation would be provided for loss of habitat.

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 or permitted, per current practice, 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, conversion of existing poles to subject poles, 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, and FP-12~~ 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 ~~(FP-11)~~, 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 requires~~, 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. APM BIO-3a would also avoid or minimize the spread of invasive plants and plant pathogens to protect native plant communities.

Finally, issuance of the proposed ITP would not 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 because it would not change requirements for PG&E to notify CDFW when substantially changing or using the material from the bed, channel, or bank, or divert the natural flow, of any lake, stream, or river. Riparian vegetation is typically part of stream banks, and therefore is subject to this requirement. PG&E would also continue to employ practices to avoid and minimize impacts on riparian and other sensitive communities. Moreover, issuance of the ITP would likely have a positive effect on riparian habitat because habitat compensation for California freshwater shrimp as required by MM BIO-1 will likely include adjacent riparian habitat. Therefore, adverse impacts on riparian habitat or other sensitive natural communities from issuance of the ITP for PG&E's O&M and minor new construction would be less than significant.

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. The need for or frequency of this type of permitting is not expected to change with issuance of the proposed ITP. When permits are required, 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 a 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~~ such a 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 and work periods 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,~~ and FP-12 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 and APM BIO-3a 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.

Finally, issuance of the proposed ITP would not substantially adversely affect state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal) through direct removal, filling, hydrological interruption, or other means because it would not substantially change pre-existing PG&E practices to avoid impacts on protected wetlands and adhere to HCP and other permit terms and conditions. Further, MM BIO-1 will include habitat compensation for aquatic habitat for California freshwater shrimp and California tiger salamander. Therefore, impacts on state or federally protected wetlands from issuance of the ITP for PG&E's O&M and minor new construction would be 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 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 and~~ has managed vegetation growth at many sites. 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 where~~ installation, operation, and maintenance of existing gas and electric facility ROWs and access roads had occurred, 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 current activities. ~~baseline conditions.~~

A majority of O&M activities are small, localized, and primarily temporary in nature and these are not expected to change in scope or duration with issuance of the proposed ITP. 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 followed by specific implementations of APMs 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~~ In accordance with PG&E's current practices, covered activities will continue to be designed not to cut off or restrict the access of a wildlife species to a known breeding or nursery sites. 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.

Finally, issuance of the proposed ITP would not 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 because it would not substantially change PG&E practices to avoid and minimize impacts on native resident and migratory fish and wildlife species. Therefore, impacts on wildlife movement corridors or nursery sites from issuance of the ITP for PG&E's O&M and minor new construction would be 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)

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.

Likewise, issuance of the proposed ITP would not create a conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, because the ITP would have no effect on PG&E's practices and exemptions with regard to local policies and ordinances protecting biological resources. Therefore, there would be no impact on local policies or ordinances from issuance of the ITP for PG&E's O&M and minor new construction activities.

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~~ those 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.

Finally, issuance of the proposed ITP would not conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state habitat conservation plan because it would not

substantially change PG&E practices to avoid and minimize impacts on conservation lands. Issuance of the ITP would further support implementation of PG&E's Bay Area O&M HCP. Further, the conservation lands PG&E acquires could supplement and support other approved HCPs, NCCPs, or regional conservation efforts. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction would be less than significant.

3.4.3 References

- California Department of Fish and Game. 2003. *Atlas of the Biodiversity of California*. Sacramento, CA.
- California Department of Fish and Wildlife. 2010. List of California Terrestrial Natural Communities Recognized by the CNDDDB. September 2010 Edition. Online.
<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153398&inline>. Site visited August 2018.
- California Department of Fish and Wildlife. 2018a. Natural Diversity Database: Special Vascular Plants, Bryophytes, and Lichens List. August 2018. Quarterly publication. 127 pp.
- California Department of Fish and Wildlife. 2018b. Natural Diversity Database. Special Animals List. August 2018. Periodic publication. 66 pp.
- California Native Plant Society. 2018. A Manual of California Vegetation Online.
Online. <http://vegetation.cnps.org/>. Site visited April 2018.
- California Wildlife Habitat Relationships. 2000. *Foothill Yellow-legged Frog Species Profile*. CWHR Staff Updated January 2000. Available: <https://www.wildlife.ca.gov/Data/CWHR/Life-History-and-Range>.
- City of Gilroy, City of Morgan Hill, City of San Jose, County of Santa Clara, Santa Clara Valley Transportation Authority, and Santa Clara Valley Water District. 2012. *Santa Clara Valley Habitat Plan*. Final. Prepared by ICF International, San Francisco, CA. August.
- Crain, P. K. and P. B. Moyle. 2011. Biology, History, Status, and Conservation of the Sacramento Perch, *Archoplites interruptus*: A Review. *San Francisco Estuary and Watershed Science* 9(1):1-35.
- East Alameda County Conservation Strategy Steering Committee. 2010. *East Alameda County Conservation Strategy*. Final Draft. Prepared by ICF International. October.
- East Contra Costa County Habitat Conservation Plan Association. 2006. *East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan*. Prepared by Jones & Stokes, San Jose, CA. October.
- ICF. 2016. Bay Area Operations and Maintenance Habitat Conservation Plan Map Book Zone Survey Report. December. (ICF 03442.03) Sacramento, CA. Prepared for Pacific Gas and Electric Company, San Francisco, CA.
- Jennings, M. R. and M. P. Hayes. 1994. *Amphibian and Reptile Species of Special Concern in California*. California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, CA.
- Lind, A. J., H. H. Welsh, Jr., and C. A. Wheeler. 2016. Foothill Yellow-Legged Frog (*Rana boylei*) Oviposition Site Choice at Multiple Spatial Scales. *Journal of Herpetology* 50(2):263-270.
- Moyle P. B. 2002. Inland fishes of California, second edition. University of California Press, Berkeley CA.

- Moyle, P. B., J. A. Israel, and S.E. Purdy. 2008. Salmon, Steelhead, and Trout in California: Status of an Emblematic Fauna. Center for Watershed Sciences. University of California, Davis.
- Moyle, P. B., R. D. Baxter, T. Sommer, T. C. Foin, and S. A. Matern. 2004. Biology and Population Dynamics of Sacramento splittail (*Pogonichthys macrolepidotus*) in the San Francisco Estuary: A Review. *San Francisco Estuary and Watershed Science* [online serial] 2(2):1-47. Available: <http://repositories.cdlib.org/jmie/sfews/>.
- Moyle, P. B., R. M. Quiñones, J. V. Katz and J. Weaver. 2015. Fish Species of Special Concern in California. California Department of Fish and Wildlife, Sacramento, CA.
- National Marine Fisheries Service. 2010. *Public Draft Recovery Plan for Central California Coast Coho Salmon (Oncorhynchus kisutch) Evolutionarily Significant Unit*. National Marine Fisheries Service, Southwest Region, Santa Rosa, CA.
- Natural Resource Geospatial Geodata Systems Development GIS / Information Services and U.S. Fish and Wildlife Service. 2012. Northern spotted owl Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- Nussbaum, R. A., E. D. Brodie, Jr, and R. M. Storm. 1983. *Amphibians and Reptiles of the Pacific Northwest*. University Press of Idaho.
- Pacific Gas and Electric Company. 2017a. *Pacific Gas and Electric Company Bay Area Operations & Maintenance Habitat Conservation Plan*. Final. September. San Francisco, CA. Prepared by ICF, Sacramento, CA.
- Pacific Gas & Electric Company. 2017b. *Avian Protection Plan: PG&E's Program to Address Avian Electrocutions, Collisions, and Nesting Birds. Public Version*. Updated February 2018. Victor, CA.
- Pelton, E., S. Jepsen, C. Schultz, C. Fallon, and S.H. Black. 2016. State of the Monarch Butterfly Overwintering Sites in California. 40+vi pp. Portland, OR: The Xerces Society for Invertebrate Conservation. (Available online at www.xerces.org)
- Rosenberg, D. K., B. R. Noon, and E. C. Meslow. 1995. Towards a Definition of Biological Corridor. Pages 436–439 in *Integrating People and Wildlife for a Sustainable Future*, edited by Bissonette and Krausman. Bethesda, MD: International Wildlife Management Congress.
- Rosenberg, D. K., B. R. Noon, and E.C. Meslow. 1997. Biological Corridors: Form, Function, and Efficacy. *BioScience* 47:677–687.
- San Bruno Mountain Habitat Conservation Plan Steering Committee. 1982. *San Bruno Mountain Area Habitat Conservation Plan*. November.
- Shapovalov, L., and A. C. Taft. 1954. *The Life Histories of the Steelhead Rainbow Trout (Salmo gairdneri gairdneri) and Silver Salmon (Oncorhynchus kisutch) with Special Reference to Waddell Creek, California, and Recommendations Regarding their Management*. California Department of Fish and Game, Fish Bulletin No. 98.
- Solano County Water Agency. 2012. *Solano Habitat Conservation Plan*. Public Draft. Prepared by LSA. October.
- Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Rosmos, J. Strittholt, M. Parisi, and A. Pettler. 2010. California Essential Habitat Connectivity Project: A Strategy for

Conserving a Connected California. Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration.

- Thomson, R. C., A. N. Wright, and H. B. Shaffer. 2016. *California Amphibian and Reptile Species of Special Concern*. University of California Press.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 1978a. Contra Costa wallflower Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 1978b. Antioch Dunes evening primrose Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 1980. Delta green ground beetle Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 1994. Delta smelt Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 2002. Santa Cruz tarplant Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 2003a. Baker's larkspur Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 2003b. Yellow larkspur Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U.S. Fish and Wildlife Service. 2005. *Santa Rosa Plain Conservation Strategy*. Final. December 1.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 2006a. Conservancy fairy shrimp Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 2006b. Longhorn fairy shrimp Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 2006c. Vernal pool fairy shrimp Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 2006d. Contra Costa goldfields Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.

- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 2006e. Vernal pool tadpole shrimp Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 2006f. Alameda whipsnake. Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 2007a. Siusun thistle Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August: 17, 2018.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 2007b. Soft bird's beak Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 2008. Bay checkerspot butterfly Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Service. 2010. California red-legged frog Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U.S. Fish and Wildlife Service. 2011a. Alameda Whipsnake (*Masticophis lateralis euryxanthus*). 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, CA, September.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 2011b. California tiger salamander, Sonoma County population Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 2011c. Marbled murrelet Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U. S. Fish and Wildlife Service, Arcata Fish and Wildlife Office. 2012. Western snowy plover Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U. S. Fish and Wildlife Service, Ventura Fish and Wildlife Office. 2013a. Tidewater goby Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U. S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office. 2013b. Franciscan manzanita Critical Habitat. Available: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>. Accessed: August 17, 2018.
- U.S. Fish and Wildlife Service. 2020. Information, Planning, and Conservation online screening tool. Available: <http://ecos.fws.gov/ipac>. Accessed: September 13, 2020.
- Western Bat Working Group. 2007. Regional Bat Species Priority Matrix. Available: http://www.wbwg.org/spp_matrix.html.

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 are considered part of the baseline environmental

~~conditions 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 (see Table 2-3 of this EIR).

- 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 (see Table 2-4 of this EIR).

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.
- Contact information for the project (i.e., environmental planner who will reach out to the appropriate resource specialist, such as archaeologists, paleontologists, cultural monitors, or tribal monitors, as needed).

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~~ within 100 feet 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 within 24 hours, 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

As described in Chapter 3.0.2, *Baseline for CEQA Analysis*, PG&E's ongoing O&M activities are part of the CEQA environmental baseline. Although CDFW's issuance of the Incidental Take Permit (ITP) would not change the need or overall 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, it would include requirements for avoiding and minimizing take of the three covered species, which may alter the approach for carrying out O&M activities by shifting disturbance area locations, limiting timing, or implementing physical actions to protect the species and their habitat. The direct and indirect impacts of covered O&M and minor new construction activities that could occur as a result of CDFW issuing the ITP are the focus of the following environmental analysis. The potential environmental impacts are evaluated in the context of the state and federal regulatory framework within which PG&E operates, PG&E's standard practices, and the implementation of the voluntary applicant avoidance and minimization measures described in Chapter 2, Tables 2-3 and 2-4.

Impact CUL-1: Cause a substantial adverse change in the significance of a historical resources (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.

Issuance of the proposed ITP would not result in an impact on historical resources during these covered activities because it would not substantially change PG&E's work practices, which are adjacent to existing facilities and/or in utility or road ROWs. With implementation of AMMs and APMs, substantial adverse changes on significant historical resources from issuance of the ITP for PG&E's O&M and minor new construction would be less than significant.

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.

Issuance of the proposed ITP would not result in an impact on archaeological resources during these covered activities because it would not substantially change PG&E's work practices, which are adjacent to existing facilities and/or in utility or road ROWs. With implementation of AMMs and APMs, substantial adverse change in the significance of an archaeological resource from issuance of the ITP for PG&E's O&M and minor new construction would be less than significant.

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.

Issuance of the proposed ITP would not result in an impact on human remains during these covered activities because it would not substantially change PG&E's work practices. Consistent with the California Health and Safety Code, PG&E will require work to stop if human remains are found, communication with the county coroner, and the proper identification and treatment of the remains. Therefore, impacts on human remains from issuance of the ITP for PG&E's O&M and minor new construction 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.

Issuance of the proposed ITP would not result in an impact on significant tribal cultural resources during these covered activities because it would not substantially change PG&E's work practices, which are adjacent to existing facilities and/or in utility or road ROWs. With implementation of AMMs and APMs, substantial adverse change in the significance of a tribal cultural resource from issuance of the ITP for PG&E's O&M and minor new construction would be less than significant.

3.5.3 References Cited

- Beardsley, R. K. 1948. Culture Sequences in Central California Archaeology. In *The California Indians: A Source Book*. Edited by R. F. Heizer and M. A. Whipple. Berkeley, CA: University of California Press.
- Moratto, M. J. 1984. *California Archaeology*. San Diego, CA: Academic Press.
- National Park Service. 2018. *National Natural Landmarks, Mt. Diablo State Park*. Last revised: unknown. Available: <https://www.nps.gov/subjects/nnlandmarks/site.htm?Site=MTDI-CA>. Accessed: September 10, 2018.
- Wallace, W. J. 1978. Post-Pleistocene Archaeology, 9000 to 2000 B.C. In *Handbook of North American Indians*, volume 8, California, edited by R. F. Heizer and W. C. Sturtevant. Washington, D.C.: Smithsonian Institution.

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 ~~s~~State websites were reviewed for regulatory background information and information on existing energy providers and resources in Bay Area counties. Because PG&E has conducted O&M activities in the study area for more than 30 years, ongoing O&M activity impacts are considered part of the baseline environmental conditions. ~~described in this section represent 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 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

As described in Chapter 3.0.2, *Baseline for CEQA Analysis*, PG&E's ongoing O&M activities are part of the CEQA environmental baseline. Although CDFW's issuance of the Incidental Take Permit (ITP) would not change the need or overall 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, it would include requirements for avoiding and minimizing take of the three covered species, which may alter the approach for

carrying out O&M activities by shifting disturbance area locations, limiting timing, or implementing physical actions to protect the species and their habitat. The direct and indirect impacts of covered O&M and minor new construction activities that could occur as a result of CDFW issuing the ITP are the focus of the following environmental analysis. The potential environmental impacts are evaluated in the context of the state and federal regulatory framework within which PG&E operates, PG&E's standard practices, and the implementation of the voluntary applicant avoidance and minimization measures described in Chapter 2, Tables 2-3 and 2-4.

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.

Issuance of the proposed ITP would not result in the wasteful, inefficient, or unnecessary consumption of energy during these covered activities because it would not substantially change PG&E's work practices. Therefore, energy resource consumption impacts from issuance of the ITP for PG&E's O&M and minor new construction 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.

Issuance of the proposed ITP would have no adverse impact on energy resources during these covered activities. An incremental impact related to the transition to renewable energy would likely have a positive energy resource impact. Therefore, energy resource impacts from issuance of the ITP for PG&E's O&M and minor new construction would have no impact on state or local plans for renewables.

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

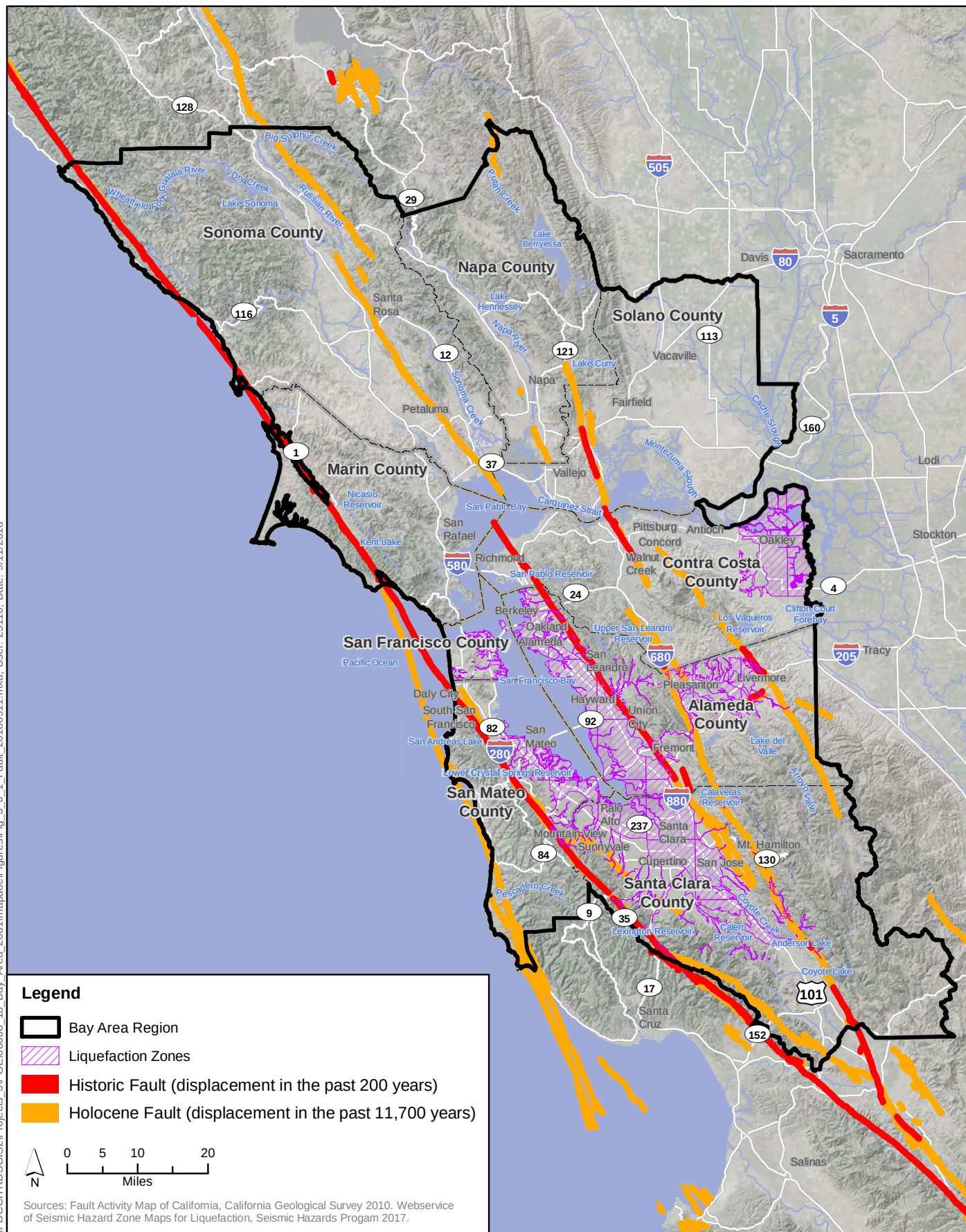


Figure 3.7-1
Active Faults and Areas Susceptible to Liquefaction

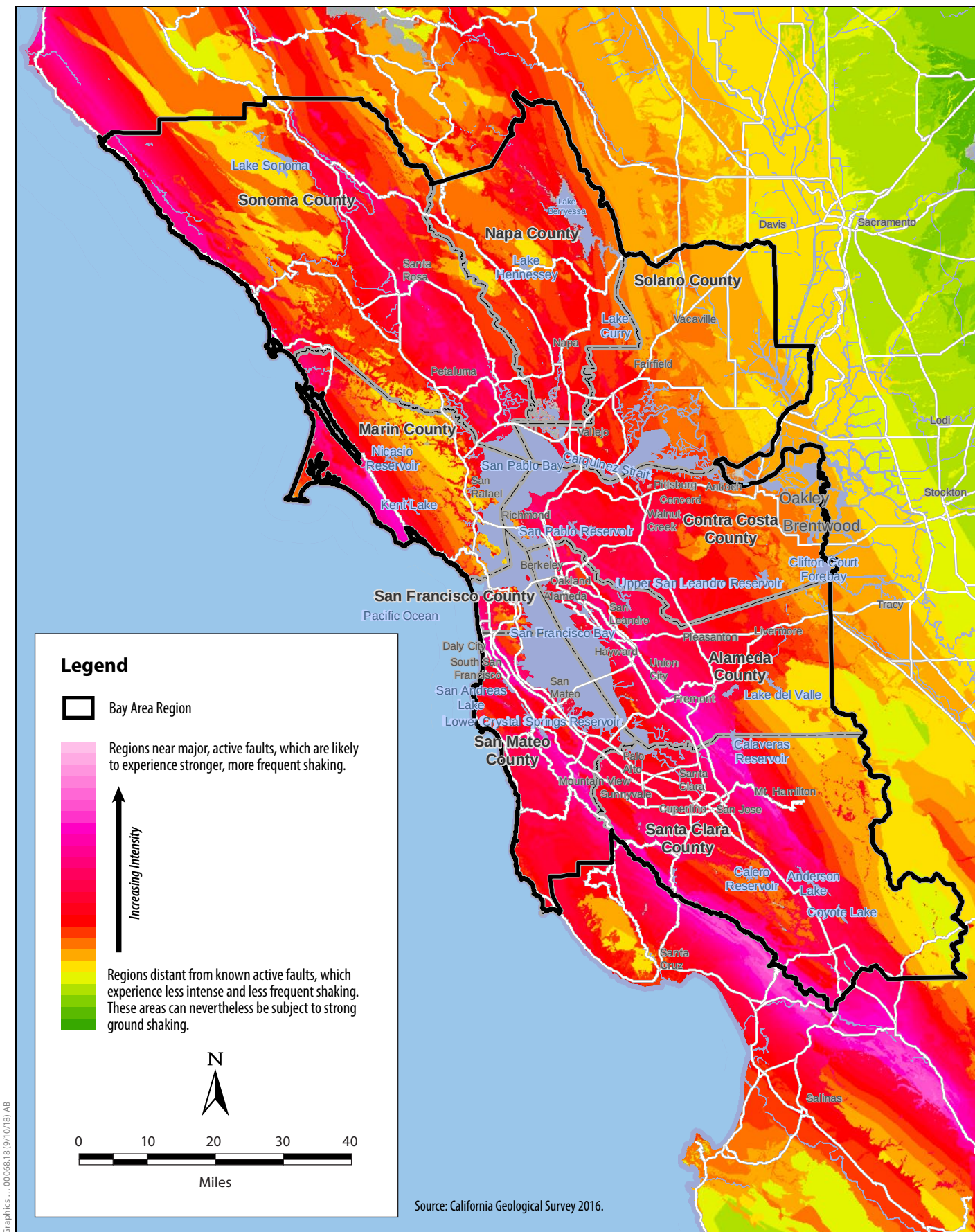


Figure 3.7-2
Earthquake Shaking Potential in the Study Area

Fault	Magnitude of Maximum Credible Earthquake ^a	Approximate Recurrence Interval ^b
Sargent	6.8	NA
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 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

County	University of California Museum of Paleontology Records		Example Vertebrate Fossils
	All Records ^a	Vertebrate Records	
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
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

Geologic Unit	Age	Example Fossils ^a	University of California Museum of Paleontology Vertebrate Records ^a
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.

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 biophysiographic 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, ongoing O&M impacts are considered part of the baseline environmental conditions. ~~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 (see Table 2-3 of this EIR).

- 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 (see Table 2-4 of this EIR).

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, who meets the minimum qualification standards established by the Society for Vertebrate Paleontology, 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 when in areas with known or discovered resources. This training ~~will~~ 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 ~~Impact Discussions and Mitigation Measures~~

As described in Chapter 3.0.2, *Baseline for CEQA Analysis*, PG&E's ongoing O&M activities are part of the CEQA environmental baseline. Although CDFW's issuance of the Incidental Take Permit (ITP) would not change the need or overall 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, it would include requirements for avoiding and minimizing take of the three covered species, which may alter the approach for carrying out O&M and minor new construction activities by shifting disturbance area locations, limiting timing, or implementing physical actions to protect the species and their habitat. The direct and indirect impacts of covered O&M and minor new construction activities that could occur as a result of CDFW issuing the ITP are the focus of the following environmental analysis. The potential environmental impacts are evaluated in the context of the state and federal regulatory framework within which PG&E operates, PG&E's standard practices, and the implementation of the voluntary applicant avoidance and minimization measures described in Chapter 2, Tables 2-3 and 2-4.

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 ongoing 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.

Issuance of the proposed ITP would not expose people or structures to adverse effects because it would not change PG&E's work practices related to project engineering. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction would be less than significant.

(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.

Issuance of the proposed ITP would not expose people or structures to seismic-related ground failure or liquefaction because it would not change PG&E's work practices related to project engineering. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction 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.

Issuance of the proposed ITP would not result in substantial soil erosion or loss of topsoil because it would not substantially change PG&E's work practices. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction would be less than significant.

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.

Issuance of the proposed ITP would not result in 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 because it would not change PG&E's work practices related to project engineering. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction would be 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.

Issuance of the proposed ITP would not result in placement of project-related facilities on expansive soil, creating substantial risks to life or property because it would not change PG&E's work practices related to project engineering. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction 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.

Issuance of the proposed ITP would not result in 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. 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 which are adjacent to existing facilities and/or in utility or road ROWs 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 are not expected to change substantially with issuance of the proposed ITP and 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.

Issuance of the proposed ITP would not directly or indirectly destroy a significant paleontological resource or site or unique geologic feature because it would not substantially change PG&E's work practices, which are adjacent to existing facilities and/or in utility or road ROWs. With implementation of AMMs and APMs, impacts from issuance of the ITP for PG&E's O&M and minor new construction would be less than significant.

3.7.3 References Cited

- American Society of Mechanical Engineers. 2016. *Managing System Integrity of Gas Pipelines*.
- Association of Bay Area Governments. 2001. *The Real Dirt on Liquefaction: A Guide to the Liquefaction Hazard in Future Earthquakes Affecting the San Francisco Bay Area*. Oakland, CA.
- Association of Bay Area Governments. 2013. *Shaking Hazard Map*. Available: <http://resilience.abag.ca.gov/earthquakes/>. Accessed: May 18, 2018.
- Bryant, W. and E. Hart. 2007. Special Publication 42, *Fault-Rupture Hazard Zones in California*. Interim Revision. California Geological Survey. August. Available: <ftp://ftp.consrv.ca.gov/pub/dmg/pubs/sp/Sp42.pdf>.
- California Geological Survey. 2002. California geomorphic provinces. Available: http://www.conservation.ca.gov/cgs/Documents/cgs-notes/Note_36.pdf. Accessed: August 30, 2018.
- California Geological Survey. 2009. *Seismic Hazard Map Availability: Northern California Counties*. Available: http://gmw.consrv.ca.gov/shmp/html/pdf_maps_no.html. Accessed: February 2018.

- Cao, T., W. A. Bryant, B. Rowshandel, D. Branum, and C. J. Wills. 2003. *The Revised 2002 California Probabilistic Seismic Hazard Maps June 2003*. Available: http://www.conservation.ca.gov/cgs/geologic_hazards/earthquakes/Pages/index.aspx. Accessed: February 2018.
- Elder, W. P. 2013. Bedrock Geology of the San Francisco Bay Area: A Local Sediment Source for Bay and Coastal Systems. *Marine Geology*, vol. 345: 18–30. DOI: 10.1016/j.margeo.2013.02.006.
- National Park Service. 2018. *National Natural Landmarks, Mt. Diablo State Park*. Last revised: unknown. Available: <https://www.nps.gov/subjects/nnlandmarks/site.htm?Site=MTDI-CA>. Accessed: September 10, 2018.
- Natural Resources Conservation Service. 2006. *Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin*. U.S. Department of Agriculture Handbook 296, 2006.
- Norris, R. M., and R. W. Webb. 1990. *Geology of California* (2nd edition). New York, NY: John Wiley & Sons.
- Society of Vertebrate Paleontology. 2010. *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources*. Last revised 2010. Available: http://vertpaleo.org/The-Society/Governance-Documents/SVP_Impact_Mitigation_Guidelines.aspx. Accessed: September 7, 2018.
- University of California Museum of Paleontology. 2018a. UCMP Specimen Search: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Sonoma, and Solano Counties. Available: <http://ucmpdb.berkeley.edu>. Accessed: September 7, 2018.
- University of California Museum of Paleontology. 2018b. UCMP Specimen Search [Vertebrates]: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Sonoma, and Solano Counties. Available: <http://ucmpdb.berkeley.edu>. Accessed: September 6, 2018.
- University of California Museum of Paleontology. 2018c. UCMP Advanced Specimen Search: Vertebrates and Selected Formations. Available: <http://ucmpdb.berkeley.edu/advanced.html>. Accessed: September 6, 2018.
- U.S. Fish and Wildlife Service. 2016. Draft Environmental Assessment for the Pacific Gas & Electric Company Bay Area Operations and Maintenance Habitat Conservation Plan. December. (NSR 26301). Redding, CA. With technical assistance from North State resources, Inc., Redding, CA.
- U.S. Geological Survey. 2006. Quaternary Fault and Fold Database for the United States. California. Available: <http://earthquake.usgs.gov/hazards/qfaults/citation.php>. Accessed: February 2018.
- Wentworth, C. M., S. E. Graham, R. J. Pike, G. S. Beukelman, D. W. Ramsey, and A. D. Barron. 2006. *Summary Distribution of Slides and Earth Flows in the San Francisco Bay Region, California*. Open-File Report 97-745 1997. Available: <http://wrgis.wr.usgs.gov/open-file/of97-745/>, <https://pubs.usgs.gov/of/1997/0745c/report.pdf>, and <https://pubs.usgs.gov/of/1997/of97-745/>. Accessed September 12, 2018.

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, ongoing O&M impacts are considered part of the baseline environmental conditions. ~~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 (see Table 2-4 of this EIR).

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

As described in Chapter 3.0.2, *Baseline for CEQA Analysis*, PG&E's ongoing O&M activities are part of the CEQA environmental baseline. Although CDFW's issuance of the Incidental Take Permit (ITP) would not change the need or overall 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, it would include requirements for avoiding and minimizing take of the three covered species, which may alter the approach for carrying out O&M and minor new construction activities by shifting disturbance area locations, limiting timing, or implementing physical actions to protect the species and their habitat. The direct and indirect impacts of covered O&M and minor new construction activities that could occur as a result of CDFW issuing the ITP are the focus of the following environmental analysis. The potential environmental impacts are evaluated in the context of the state and federal regulatory framework within which PG&E operates, PG&E's standard practices, and the implementation of the voluntary applicant avoidance and minimization measures described in Chapter 2, Tables 2-3 and 2-4.

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 and not expected to change substantially with issuance of the proposed ITP. 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 proposed 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 and not affected by issuance of the proposed ITP.

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.~~ Minor new construction includes construction of gas pressure limiting stations, minor electrical substation expansions and underground electric lines, which are adjacent to existing facilities and/or in utility or road ROWs (see G-14, E-14 and E-15). 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 CO₂e 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.

Issuance of the proposed ITP would not result in the generation of additional GHG emissions because it would not substantially change PG&E's work practices. Because emissions from minor new construction activities are not expected to exceed applicable thresholds or violate air district requirements and because APM GHG-1 will be implemented, GHG impacts from issuance of the ITP for PG&E's O&M and minor new construction would be 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 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.

Issuance of the proposed ITP would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases because it would not substantially change PG&E's work practices. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction would be less than significant.

3.8.3 References Cited

3.8.3.1 Printed References

Bay Area Air Quality Management District. 2017. *California Environmental Quality Act Air Quality Guidelines*. May. Available: http://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed: March 13, 2018.

California Air Resources Board. 2014a. *First Update to the Climate Change Scoping Plan*. May. Available: https://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf. Accessed: August 29, 2018.

California Air Resources Board. 2014b. Final Regulation Order to Adopt new Subarticle 3.1, Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear sections 95350 to 95359, title 17, California Code of Regulations. Available: <http://www.arb.ca.gov/cc/sf6elec/finalregulation.pdf>. Accessed: April 16, 2018.

- California Air Resources Board. 2017. *California's 2017 Climate Change Scoping Plan*. November. Available: https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed: January 22, 2018.
- Intergovernmental Panel on Climate Change. 2007. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor and H. L. Miller (eds.). Available: <http://www.ipcc.ch/ipccreports/ar4-wg1.htm>. Accessed: March 13, 2018.
- Sacramento Metropolitan Air Quality Management District. 2016. *Guide to Air Quality Assessment in Sacramento County*. Revised. Available: <http://www.airquality.org/LandUseTransportation/Documents/TitleTOCFINAL9-2016.pdf>. Accessed: April 20, 2018.
- U.S. Environmental Protection Agency. 2018. *Inventory of U.S. Greenhouse Gas Emissions and Sinks*. Available: <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks>. Accessed: April 20, 2018.

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, ongoing O&M impacts are considered part of the baseline environmental conditions. ~~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 (see Table 2-4 of this EIR).

APM HAZ-1: Spill response

PG&E will implement its hazardous substance control and emergency response procedures as needed. The procedures identify methods and techniques to minimize the exposure of the public and site workers to potentially hazardous materials during all phases of construction through operation. They address worker training appropriate to the site worker's role in hazardous substance control and emergency response. The procedures also require implementing appropriate control methods and approved containment and spill-control practices for construction and materials stored on site. If it is necessary to store chemicals on site, they will be managed in accordance with all applicable regulations. Material safety data sheets shall be maintained and kept available on site, as applicable.

In the event that soils suspected of being contaminated (on the basis of visual, olfactory, or other evidence) are removed during site grading activities or excavation activities, the excavated soil will be tested and, if contaminated above hazardous waste levels, will be contained and disposed of at a licensed waste facility. The presence of suspected contaminated soil will require testing and investigation procedures to be supervised by a qualified person, as appropriate, to meet state and federal regulations.

All hazardous materials and hazardous wastes shall be handled, stored, and disposed of in accordance with all applicable regulations, by personnel qualified to handle hazardous materials. The hazardous substance control and emergency response procedures include, but are not limited to, the following:

- Proper disposal of potentially contaminated soils.
- Establishing site-specific buffers for construction vehicles and equipment located near sensitive resources.
- Emergency response and reporting procedures to address hazardous material spills.
- Stopping work and contacting the local fire department or other agencies as appropriate. Work will resume after any necessary consultation and approval by the local fire department.
- 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.

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.

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

As described in Chapter 3.0.2, *Baseline for CEQA Analysis*, PG&E's ongoing O&M activities are part of the CEQA environmental baseline. Although CDFW's issuance of the Incidental Take Permit (ITP) would not change the need or overall 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, it would include requirements for avoiding and minimizing take of the three covered species, which may alter the approach for carrying out O&M and minor new construction activities by shifting disturbance area locations, limiting timing, or implementing physical actions to protect the species and their habitat. The direct and indirect impacts of covered O&M and minor new construction activities that could occur as a result of CDFW issuing the ITP are the focus of the following environmental analysis. The potential environmental impacts are evaluated in the context of the state and federal regulatory framework within which PG&E operates, PG&E's standard practices, and the implementation of the voluntary applicant avoidance and minimization measures described in Chapter 2, Tables 2-3 and 2-4.

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.

Issuance of the proposed ITP would not result in the 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 because it would not change PG&E's practices related to handling of hazards and hazardous materials. In addition, PG&E will implement AMMs and APMs HAZ-1 and HAZ-2. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction would be 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 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.

Issuance of the proposed ITP would not result in 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 because it would not change PG&E's practices related to handling of hazardous materials. In addition, PG&E will implement AMMs and APMs HAZ-1 and HAZ-2. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction would be 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 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.

Issuance of the proposed ITP would not result in the 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 because it would not change PG&E's siting practices. In addition, PG&E will implement AMMs and APMs HAZ-1 and HAZ-2. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction would be 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 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.

Issuance of the proposed ITP would not result in 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 because it would not change PG&E siting practices. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction 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.

Issuance of the proposed ITP would not result in 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 because it would not change PG&E siting practices. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction 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 gas pressure limiting stations (PLS), new limited electrical/natural gas transmission lines underground 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.

Issuance of the proposed ITP would not result in the impairment of implementation of or physical interference with an adopted emergency response plan or emergency evacuation plan because it would not alter PG&E emergency response process. PG&E will implement APMs TRA-1, HAZ-1, and

HAZ-2; therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction 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, *Wildfire*, 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.

PG&E will also implement APM FIRE-1, which involves implementation of fire prevention practices at active construction sites, as listed above. With adherence to the Utility Standards, HCP AMMs, APM FIRE-1, 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.

Issuance of the proposed ITP would not result in the exposure of people or structures to a significant risk involving wildland fires because it would not change PG&E siting practices. The ITP may facilitate wildland fire risk reduction work when in the vicinity of covered species and PG&E will implement AMMs and APM FIRE-1. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction would be less than significant.

3.9.3 References Cited

- Association of Bay Area Governments. 2016. *Resilience Program, Wildfire Maps and Information*. Available: <http://resilience.abag.ca.gov/wildfires/>. Accessed: January 25, 2018.
- California Department of Toxic Substances Control. 2018. *DTSC's Hazardous Waste And Substances Site List—Site Cleanup (Cortese List)*. Available: http://www.dtsc.ca.gov/SiteCleanup/Cortese_List.cfm. Accessed: January 25, 2018.
- California Public Utilities Commission. 2017. CPUC Adopts New Fire-Safety Regulations. Available: <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M201/K352/201352402.PDF>. Accessed: July 25, 2018.
- California Public Utilities Commission. 2018. *CPUC High Fire-Threat District Map*. Adopted January 19, 2018. Available: <https://www.cpuc.ca.gov/firethreatmaps/>. Accessed August 27, 2020.
- Pacific Gas and Electric Company. 2019. Utility Standard: TD-1464S. Publication Date: 08/01/2019 Rev: 2. Available: https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/wildfire-mitigation-plan/reference-docs/TD-1464S.pdf. Accessed: September 22, 2020.
- U.S. Environmental Protection Agency. 2018. *Superfund: National Priorities List*. Available: <http://www.epa.gov/superfund/sites/npl/index.htm>. Accessed: January 25, 2018.

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 *State* 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 *Porter-Cologne Water Quality Control Act* 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 *Federal* 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 *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 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 *Porter-Cologne Water Quality Control Act* 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.

Delta Reform Act

The Delta Reform Act of 2009, created the Delta Stewardship Council (Council), requires that the Council adopt a “legally enforceable” Delta Plan to further the achievement of the coequal goals of water management and ecosystem protection. The State Administrative Procedures Act (APA) identifies a rulemaking process through which Council-adopted Delta Plan policies become enforceable state regulations. The Delta Plan regulations are located in the official version of the California Code of Regulations at Title 23. Waters, Division 6. Delta Stewardship Council, Chapter 2. Consistency with Regulatory Policies Contained in the Delta Plan, Article 3. Consistency with the Regulatory Policies Contained in the Delta Plan. The Delta Reform Act requires any sState or local agency proposing to undertake a qualifying action (covered action) must submit to the Council a written certification of consistency with detailed findings as to whether the covered action is consistent with the Delta Plan (Water Code, Section 85225). A covered action is defined in Section 85057.5.

(a) “Covered action” means a plan, program, or project as defined pursuant to Section 21065 of the Public Resources Code that meets all of the following conditions:

(1) Will occur, in whole or in part, within the boundaries of the Delta or Suisun Marsh.

(2) Will be carried out, approved, or funded by the state or a local public agency.

(3) Is covered by one or more provisions of the Delta Plan.

(4) Will have a significant impact on achievement of one or both of the coequal goals or the implementation of government-sponsored flood control programs to reduce risks to people, property, and state interests in the Delta

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 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.

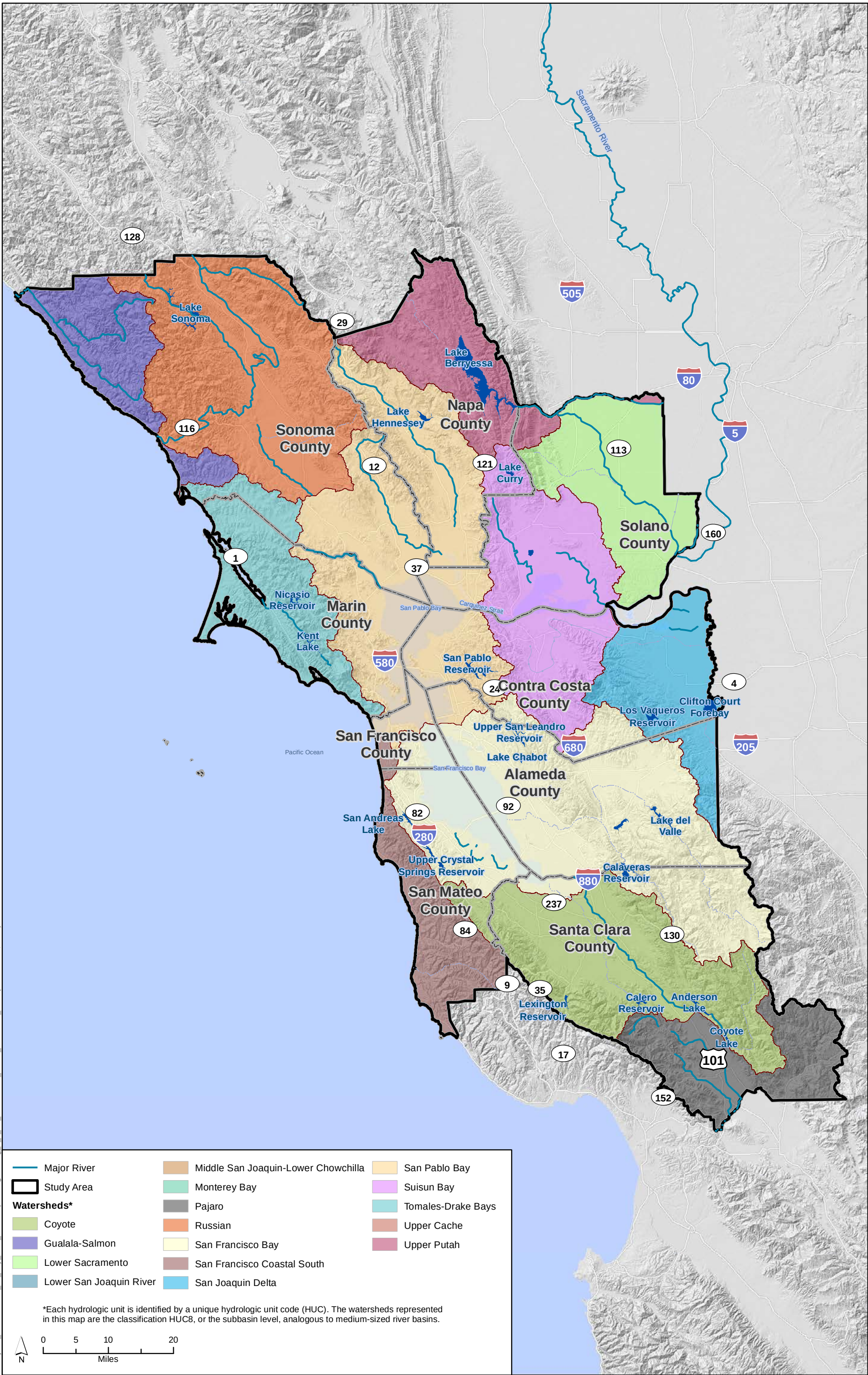


Figure 3.10-1A
Watersheds and Major Waterbodies Within the Study Area

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, central	Chlordane	Source unknown	Estimated 2013
		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

County Name	Stream Name	Pollutant/ Stressor	Source	TMDL Completion Date
	San Francisco Bay, south	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
		Chlordane	Source unknown	Estimated 2013
		DDT	Source unknown	Estimated 2013
		Dieldrin	Source unknown	Estimated 2013
		Selenium	Source unknown	Estimated 2021
Alameda County, continued	San Francisco Bay, south, continued	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
		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

County Name	Stream Name	Pollutant/ Stressor	Source	TMDL Completion Date
Santa Clara County, continued	Llagas Creek, above Chesbro Reservoir	Mercury	Source unknown	06/01/2010 ^a
		Temperature, water	Source unknown	Estimated 2023
		pH	Source unknown	Estimated 2027
	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
		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

County Name	Stream Name	Pollutant/ Stressor	Source	TMDL Completion Date
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
	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
		Oxygen, dissolved	Source unknown	Estimated 2021
		Temperature, water	Source unknown	Estimated 2021
	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

County Name	Stream Name	Pollutant/ Stressor	Source	TMDL Completion Date
	Delta waterways (northern portion)	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
		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
		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	Diazinon	Source unknown	5/16/2007 ^b
	Ulati Creek (Solano County)	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

County Name	Stream Name	Pollutant/ Stressor	Source	TMDL Completion Date
	San Pablo Bay	Trash	Source unknown	Estimated 2029
		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, Guerneville HSA	Aluminum	Source unknown	Estimated 2025
		Indicator bacteria	Source unknown	Estimated 2016
		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
		Aluminum	Source Unknown	Estimated 2025

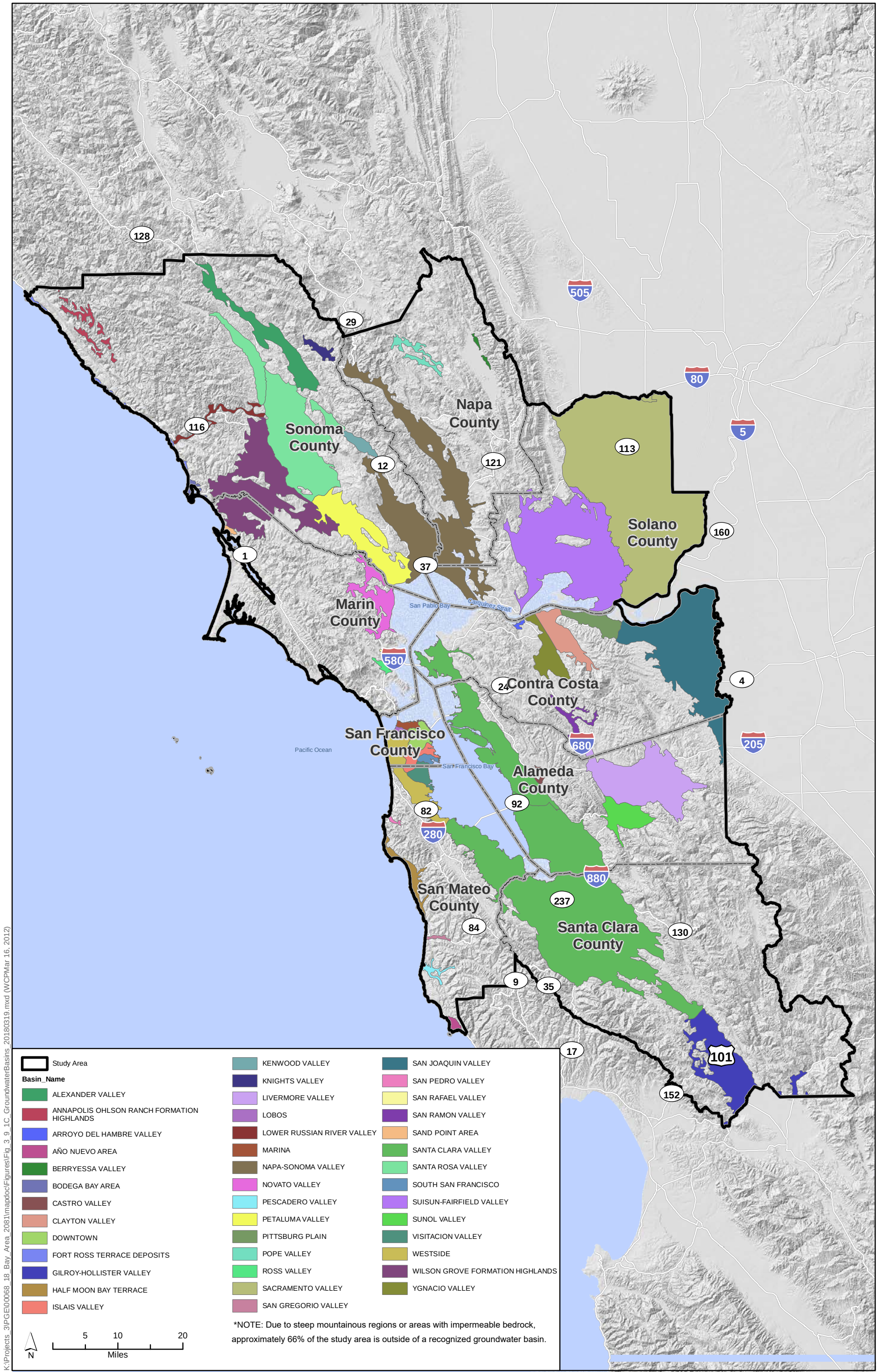
County Name	Stream Name	Pollutant/ Stressor	Source	TMDL Completion Date
	Russian River ^c HU, Upper Russian River HA, Ukiah has	Sedimentation/siltation	Flow alteration/ regulation/ modification Removal of riparian vegetation Streambank modification/ destabilization	Estimated 2025
		Temperature, water	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
		Temperature, water	Flow alteration/regulation/modification, 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/siltation	Source unknown	07/12/2010 ^b

County Name	Stream Name	Pollutant/ Stressor	Source	TMDL Completion Date
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.



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Figure 3.10-1B
Groundwater Basin within the Study Area

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
- 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, ongoing O&M impacts are considered part of the baseline environmental conditions. ~~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.

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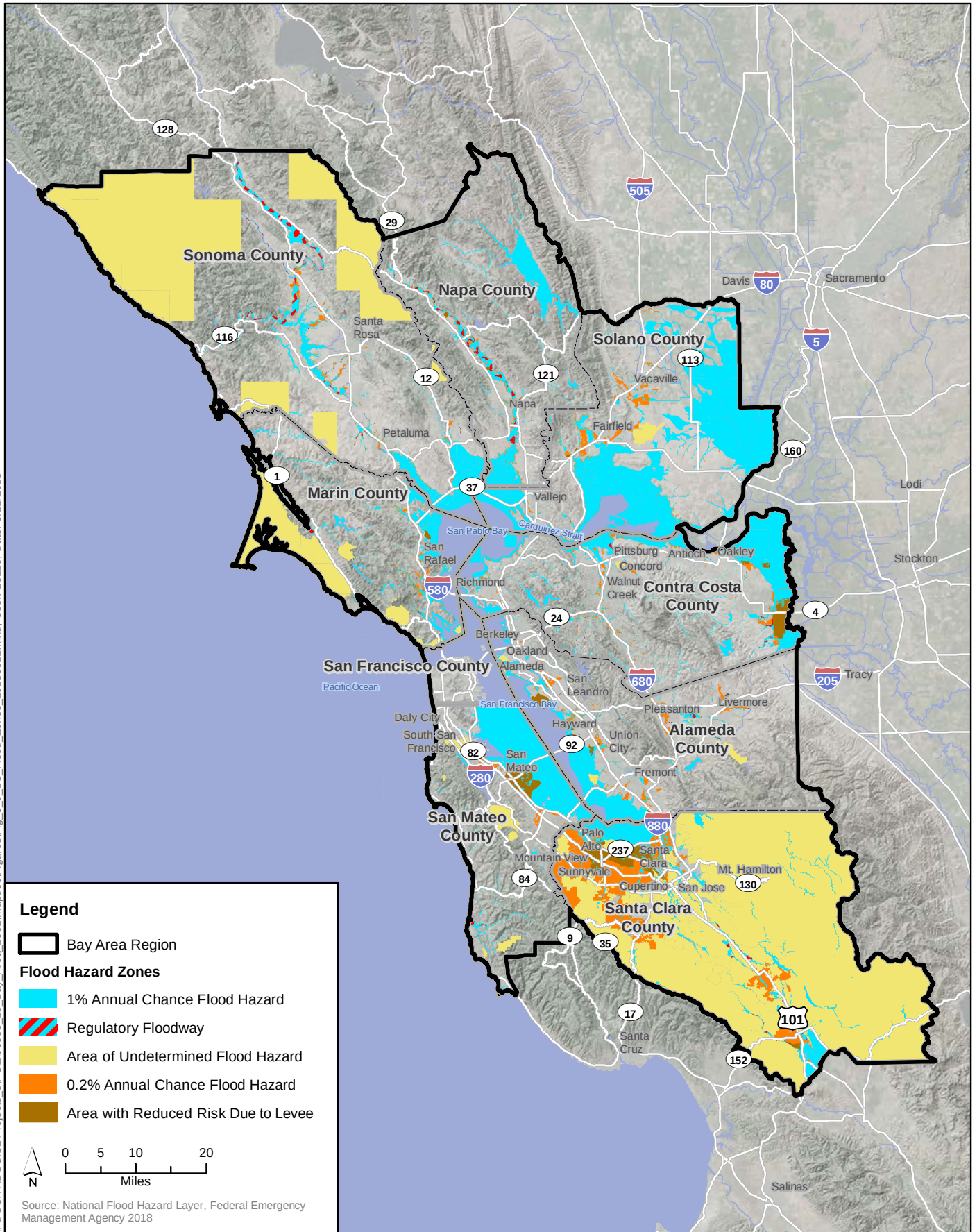


Figure 3.10-1C
FEMA Flood Zones within the Study Area

- 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 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.

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.

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

As described in Chapter 3.0.2, *Baseline for CEQA Analysis*, PG&E's ongoing O&M activities are part of the CEQA environmental baseline. Although CDFW's issuance of the Incidental Take Permit (ITP) would not change the need or overall 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, it would include requirements for avoiding and minimizing take of the three covered species, which may alter the approach for carrying out O&M and minor new construction activities by shifting disturbance area locations, limiting timing, or implementing physical actions to protect the species and their habitat. The direct and indirect impacts of covered O&M and minor new construction activities that could occur as a result of CDFW issuing the ITP are the focus of the following environmental analysis. The potential environmental impacts are evaluated in the context of the state and federal regulatory framework within which PG&E operates, PG&E's standard practices, and the implementation of the voluntary applicant avoidance and minimization measures described in Chapter 2, Tables 2-3 and 2-4.

Impact WQ-1: Violation of any water quality standards or waste discharge requirements (Less-than-Significant Impact)

Covered activities would continue to 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 continue to 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 continue to 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 new or incremental effects on water quality standards would result from this ongoing testing, which is part of baseline environmental conditions; ~~no and would not change is expected after issuance of the requested 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 continue to 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. Furthermore, PG&E would implement APM HAZ-1, *Spill Response*, and APM HAZ-2, *Vehicle Refueling*, (see Chapter 2, Table 2-4) which would further protect water quality by preventing refueling within wetlands or waters and implementing hazardous substance and emergency response procedures as needed. 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.

Issuance of the proposed ITP would not result in violation of any water quality standards or waste discharge requirements because it would not substantially change PG&E practices and AMMs and APMs would be implemented to protect water quality. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction would be less than significant.

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.

Issuance of the proposed ITP would not result in substantial depletion of groundwater supplies or substantial interference with groundwater recharge because of PG&E's limited use of water and limited construction of impermeable surfaces. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction 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 that would result in substantial erosion or siltation on site or off site have been, and would continue to be, less than significant.

Issuance of the proposed ITP would not result in 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 on site or off site because it would not substantially change PG&E's

practices to minimize impacts on waterways and prevent erosion. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction would 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; although the ITP would shape the way PG&E conducts covered activities, the continuing O&M of existing facilities in the ROW would not alter drainage patterns as site surface conditions would be reestablished post construction and would not change following approval of the ITP.

PG&E would continue to conduct covered minor new construction 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 drainage patterns would be maintained and 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 to maintain drainage patterns. 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.

Issuance of the proposed ITP would not result in 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 on site or off site because it would not substantially change PG&E's practices to minimize impacts on waterways and BMPs would be implemented to maintain drainage patterns and for erosion and sediment control. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction 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. Ongoing O&M activities~~

are part of baseline environmental conditions; although the ITP would shape the way PG&E conducts covered activities, the continuing O&M of existing facilities in the ROW would not alter drainage patterns as site surface conditions would be reestablished post construction.

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. Furthermore, PG&E would implement APM HAZ-1, Spill Response, and APM HAZ-2, Vehicle Refueling, (see Chapter 2, Table 2-4) which would further protect water quality by preventing refueling within wetlands or waters and implementing hazardous substance and emergency response procedures as needed. With compliance with regulatory requirements and the implementation of AMMs and APMs, 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.

Issuance of the proposed ITP would not result in the 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 because it would not substantially change PG&E's practices to minimize runoff and AMMs and APMs would be implemented to maintain drainage patterns and protect water quality. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction 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.

Issuance of the proposed ITP would not result in other substantial degradation of water quality because it would not substantially change PG&E's practices to minimize water quality impacts. There will be no other substantial degradation of water quality impacts from issuance of the ITP for PG&E's O&M and minor new construction.

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.

Issuance of the proposed ITP would not result in the placement of structures that would impede or redirect flood flows within a 100-year flood hazard area because it would not change PG&E's siting practices. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction 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 has been, and will continue to be, ongoing and represents 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.

Issuance of the proposed ITP would not result in exposure of people or structures to significant risk involving flooding, including flooding as a result of the failure of a levee or dam because it would not change PG&E's siting practices. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction 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.

Issuance of the proposed ITP would not result in contribution to inundation by seiche, tsunami, or mudflow because it would not change PG&E's siting practices. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction would be less than significant.

3.10.3 References Cited

- Bay Area Air Quality Management District. 2016. *Climate, Physiography, and Air Pollution Potential—Bay Area and its Subregions*. Available: http://hank.baaqmd.gov/dst/papers/bay_area_climate.pdf. Accessed: February 10, 2018.
- California Department of Water Resources. 2003. California's Groundwater—Bulletin 118, Update 2003. Available: <http://www.water.ca.gov/groundwater/>. Accessed: February 10, 2018.
- California Emergency Management Agency, University of Southern California, and California Geological Survey. 2009. *Tsunami Inundation Map for Emergency Planning*. State of California, City and County of San Francisco. Archer Rock, Duncans Mill, Bodega Head, Valley Ford, Petaluma River, Sears Point, Cuttings Wharf, Novato, Petaluma Point, Mare Island, Benicia, Tomales, Point Reyes NE, Drakes Bay, Inverness, Double Point, Bolinas, San Raphael San Quentin, Richmond, Point Bonita, San Francisco North, San Francisco South, Hunters Point, San Leandro, Oakland West, Oakland East, Montara Mountain, Half Moon Bay, San Gregorio, Pigeon Point, Franklin Point, Big Basin, Woodside, San Mateo, Redwood Point, Newark, Palo Alto, Año Nuevo, Mountain View, Milpitas, Calaveras Reservoir Quadrangles. June 15.

Federal Emergency Management Agency. 2016. County Flood Insurance Rate Map; Solano—2016. Available: <https://msc.fema.gov/portal/search#searc.>, Accessed February 10, 2018.

Federal Emergency Management Agency. 2017. County Flood Insurance Rate Map; Contra Costa—2017; Marin—2017; Sonoma—2017; Alameda—2017; San Mateo—2017. Available: <https://msc.fema.gov/portal/search#searc.>, Accessed February 10, 2018.

Federal Emergency Management Agency. 2018. County Flood Insurance Rate Map; Napa—2018; Santa Clara—2018. Available: <https://msc.fema.gov/portal/search#searc.>, Accessed February 10, 2018.

State Water Resources Control Board. 2018. 2014/2016 Integrated Report (Clean Water Act Section 303(d) List/305(b) Report). Last updated: 2018. Available: https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml. Accessed: June 6, 2018.

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, ongoing O&M impacts are considered part of the baseline environmental conditions. ~~O&M impacts described in this section represent baseline environmental conditions that would not change following approval of the Incidental Take Permit (ITP).~~



Figure 3.11-1
Historical Development Pattern and Agricultural Lands

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 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

As described in Chapter 3.0.2, *Baseline for CEQA Analysis*, PG&E's ongoing O&M activities are part of the CEQA environmental baseline. Although CDFW's issuance of the Incidental Take Permit (ITP) would not change the need or overall 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, it would include requirements for avoiding and minimizing take of the three covered species, which may alter the approach for carrying out O&M and minor new construction activities by shifting disturbance area locations, limiting timing, or implementing physical actions to protect the species and their habitat. The direct and indirect impacts of covered O&M and minor new construction activities that could occur as a result of CDFW issuing the ITP are the focus of the following environmental analysis. The potential environmental impacts are evaluated in the context of the state and federal regulatory framework within which PG&E operates, PG&E's standard practices, and the implementation of the voluntary applicant avoidance and minimization measures described in Chapter 2, Tables 2-3 and 2-4.

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, and not expected to change substantially with issuance of the proposed ITP, 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 underground lines, ~~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.~~ The facilities that are underground once construction is complete ~~and~~ would not result in new physical barriers. ~~Even when~~ When above ground, new towers and poles and their respective lines would typically be located in ROWs and 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.

Issuance of the proposed ITP would not result in any impacts related to physically dividing an established community. Therefore, the issuance of the ITP for PG&E's O&M and minor new construction would not result in impacts on existing land uses.

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.

Issuance of the proposed ITP would not result in any conflicts with any applicable land use plan, policy, or regulation. Therefore, the issuance of the ITP for PG&E's O&M and minor new construction would not result in impacts on existing land uses.

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. Because PG&E has conducted O&M activities in the study area for more than 30 years, ongoing O&M impacts are considered part of the baseline environmental conditions. Ongoing O&M activity impacts described in this section represent 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 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

As described in Chapter 3.0.2, *Baseline for CEQA Analysis*, PG&E's ongoing O&M activities are part of the CEQA environmental baseline. Although CDFW's issuance of the Incidental Take Permit (ITP) would not change the need or overall 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, it would include requirements for avoiding and minimizing take of the three covered species, which may alter the approach for carrying out O&M and minor new construction activities by shifting disturbance area locations, limiting timing, or implementing physical actions to protect the species and their habitat. The direct and indirect impacts of covered O&M and minor new construction activities that could occur as a result of CDFW issuing the ITP are the focus of the following environmental analysis. The potential environmental impacts are evaluated in the context of the state and federal regulatory framework within which PG&E operates, PG&E's standard practices, and the implementation of the voluntary applicant avoidance and minimization measures described in Chapter 2, Tables 2-3 and 2-4.

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.

Issuance of the proposed ITP would not 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 because it would not restrict mineral resource development over a substantial area (e.g., mitigation parcels will restrict mineral resource development but are expected to be several hundred acres in size). Further, high mineral resource development areas are typically in use and areas being used are not proposed for conservation because mineral resource development is incompatible with mitigation lands. Collectively, mineral resource development impacts from issuance of the ITP for PG&E's O&M and minor new construction 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.

Issuance of the proposed ITP would be unlikely to 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 because PG&E's mitigation parcels are typically secured in areas identified as open space, parkland, or agriculture. Therefore, issuance of the ITP for PG&E's O&M and minor new construction 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
Quiet urban nighttime	—40—	Theater, large conference room (background)
Quiet suburban nighttime		
	—30—	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	—20—	
		Broadcast/recording studio
	—10—	
	—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.

Sound Measurements	Definition
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.
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, ongoing O&M impacts are considered part of the baseline environmental conditions. ~~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 (see Table 2-4 of this EIR).

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 will be limited to the minimum necessary and will 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 whenever feasible and within 250 feet of occupied residences.

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

As described in Chapter 3.0.2, *Baseline for CEQA Analysis*, PG&E's ongoing O&M activities are part of the CEQA environmental baseline. Although CDFW's issuance of the Incidental Take Permit (ITP) would not change the need or overall 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, it would include requirements for avoiding and minimizing take of the three covered species, which may alter the approach for carrying out O&M and minor new construction activities by shifting disturbance area locations, limiting timing, or implementing physical actions to protect the species and their habitat. The direct and indirect impacts of covered O&M and minor new construction activities that could occur as a result of CDFW issuing the ITP are the focus of the following environmental analysis. The potential environmental impacts are evaluated in the context of the state and federal regulatory framework within which PG&E operates, PG&E's standard practices, and the implementation of the voluntary applicant avoidance and minimization measures described in Chapter 2, Tables 2-3 and 2-4.

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 includes construction of gas pressure limiting stations, minor electrical substation expansions, and underground electric lines, which are adjacent to existing facilities and/or in utility or road ROWs (see G-14, E-14, and E-15). ~~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
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.

Issuance of the proposed ITP would not result in the 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 because it would not alter PG&E's practices to minimize noise impacts. In addition, PG&E will implement APM NOI-1 and NOI-2; therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction 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 with issuance of the proposed ITP, 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.

Issuance of the proposed ITP would not result in the exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels because it would not alter PG&E's practices to minimize groundborne vibration and noise. In addition, PG&E will implement APM NOI-1; therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction would 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.

Issuance of the proposed ITP would not result in exposure of people residing or working near private airstrips, public airports, or airport land use plans because it would not alter PG&E's practices to minimize noise. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction would be less than significant.

3.13.3 References Cited

California Department of Transportation. 2013. *Technical Noise Supplement to the Traffic Noise Analysis Protocol*. September. Available: <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf>. Accessed: September 19, 2020.

Federal Transit Administration. 2018. *Transit Noise and Vibration Impact Assessment*. U.S. Department of Transportation, Federal Transit Administration, Office of Planning and Environment. Washington, DC. Available: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf. Accessed: September 19, 2020.

Nelson, P. 1987. *Transportation Noise Reference Book*. Butterworth Legal Publishers. Boston, Massachusetts.

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. Because PG&E has conducted O&M activities in the study area for more than 30 years, ongoing O&M impacts are considered part of the baseline environmental conditions.~~

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

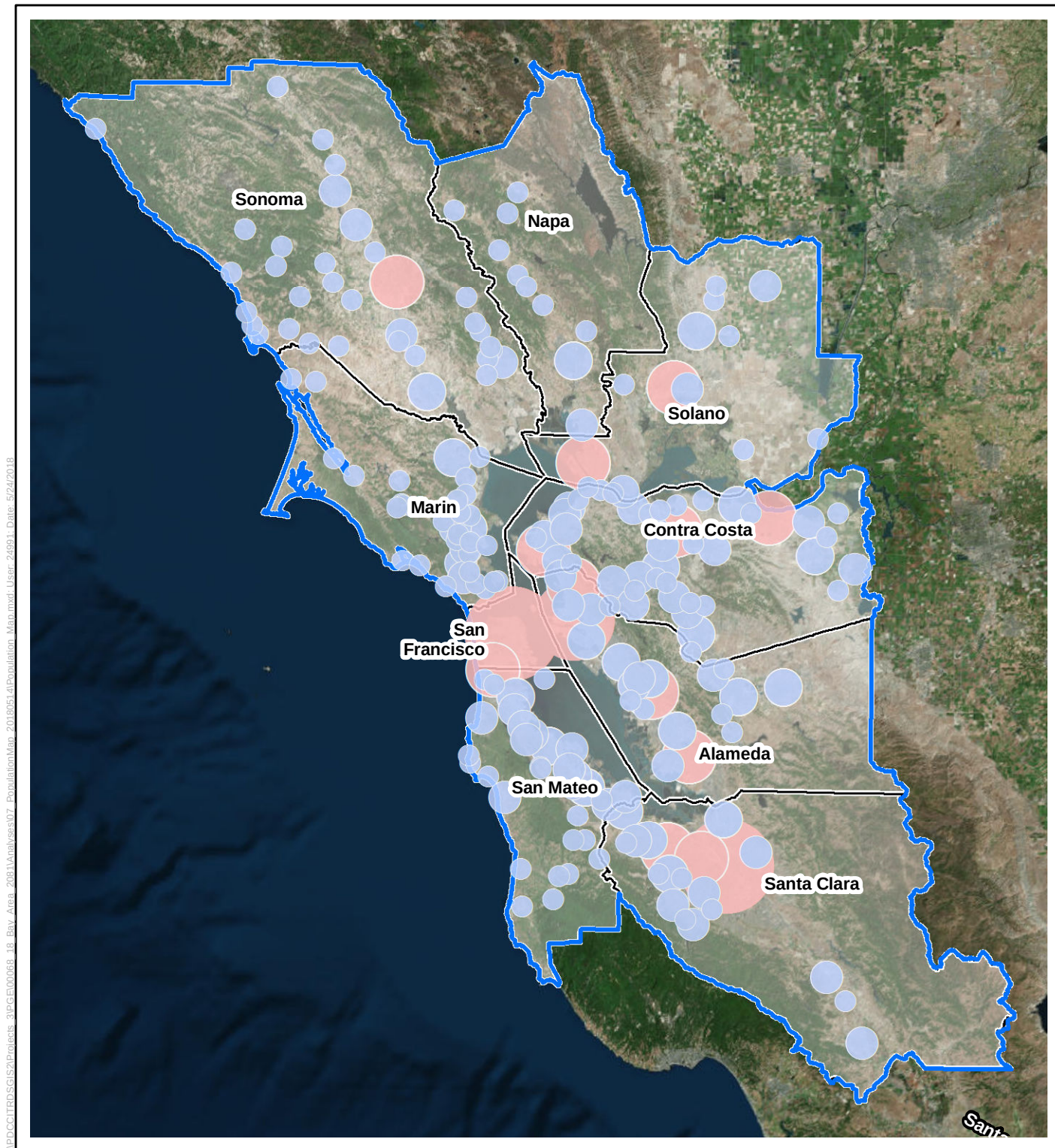
No practices, avoidance and minimization measures from PG&E's Bay Area *Operations and Maintenance Habitat Conservation Plan* or applicant proposed measures are applicable to population and housing.

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.

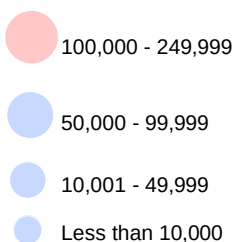
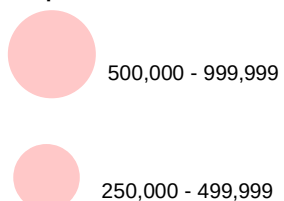
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Legend

- Study Area
- Counties

Population



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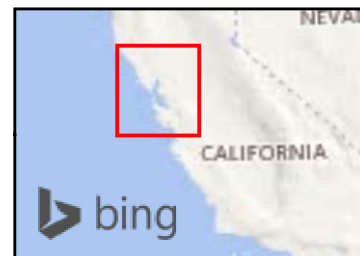


Figure 3-14.1
Population Dot Map

3.14.2.2 Impact Discussion

As described in Chapter 3.0.2, *Baseline for CEQA Analysis*, PG&E's ongoing O&M activities are part of the CEQA environmental baseline. Although CDFW's issuance of the Incidental Take Permit (ITP) would not change the need or overall 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, it would include requirements for avoiding and minimizing take of the three covered species, which may alter the approach for carrying out O&M and minor new construction activities by shifting disturbance area locations, limiting timing, or implementing physical actions to protect the species and their habitat. The direct and indirect impacts of covered O&M and minor new construction activities that could occur as a result of CDFW issuing the ITP are the focus of the following environmental analysis. The potential environmental impacts are evaluated in the context of the state and federal regulatory framework within which PG&E operates, PG&E's standard practices, and the implementation of the voluntary applicant avoidance and minimization measures described in Chapter 2, Tables 2-3 and 2-4.

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.

Issuance of the proposed ITP would not create substantial unplanned population growth in an area, either directly or indirectly, because it would not alter PG&E's obligation to serve and deliver power. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction 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.

Issuance of the proposed ITP and its associated covered activities would not result in the displacement of people or housing units. Therefore, population and housing impacts from the issuance of the ITP for PG&E's O&M and minor new construction would have 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).~~ O&M impacts are considered part of the baseline environmental conditions.

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 (see Table 2-3 of this EIR).

- 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

As described in Chapter 3.0.2, *Baseline for CEQA Analysis*, PG&E's ongoing O&M activities are part of the CEQA environmental baseline. Although CDFW's issuance of the Incidental Take Permit (ITP) would not change the need or overall 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, it would include requirements for avoiding and minimizing take of the three covered species, which may alter the approach for carrying out O&M and minor new construction activities by shifting disturbance area locations, limiting timing, or implementing physical actions to protect the species and their habitat. The direct and indirect impacts of covered O&M and minor new construction activities that could occur as a result of CDFW issuing the ITP are the focus of the following environmental analysis. The potential environmental impacts are evaluated in the context of the state and federal regulatory framework within which PG&E operates, PG&E's standard practices, and the implementation of the voluntary applicant avoidance and minimization measures described in Chapter 2, Tables 2-3 and 2-4.

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 and not expected to change substantially with the issuance of the proposed ITP, the activities and any effects are part of baseline environmental conditions. Minor new construction includes construction of gas pressure limiting stations, minor electrical substation expansions, and underground electric lines, which are adjacent to existing facilities and/or in utility or road ROWs (see G-14, E-14 and E-15). 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. Growth in California is governed by local general plans and zoning ordinances, on which the project would have no effect. 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~~ Because these O&M activities would be frequent and short term, and currently occurring throughout the project area, they 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. no new incremental impacts are expected from issuance of the requested ITP.~~ 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~~ construction 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; no new incremental impacts are expected from issuance of the requested ITP. ~~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.

Issuance of the proposed ITP would not 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 because it would not result in additional population growth. Therefore, public service impacts from the issuance of the ITP for PG&E's O&M and minor new construction 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 wildlife 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
Contra Costa	California Department of Fish and Wildlife	Robert W. Crown Memorial State Beach
		Point Edith Wildlife Area
		Lower Sherman Island Wildlife Area
	U.S. Fish and Wildlife Service	Rhode Island Wildlife Area
		Antioch Dunes National Wildlife Area
	National Park Service	Eugene O'Neill National Historic Site

County	Owner/Manager	Property
Contra Costa, continued	National Park Service, continued	Rosie the Riveter WW II Home Front National Historical Park
		John Muir National Historical Site
	California State Park System	Port Chicago Naval Magazine National Memorial
		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
		San Francisco Maritime National Historical Park
	California State Park System	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, ongoing O&M impacts are considered part of the baseline environmental conditions. ~~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

As described in Chapter 3.0.2, *Baseline for CEQA Analysis*, PG&E's ongoing O&M activities are part of the CEQA environmental baseline. Although CDFW's issuance of the Incidental Take Permit (ITP) would not change the need or overall 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, it would include requirements for avoiding and minimizing take of the three covered species, which may alter the approach for carrying out O&M and minor new construction activities by shifting disturbance area locations.

limiting timing, or implementing physical actions to protect the species and their habitat. The direct and indirect impacts of covered O&M and minor new construction activities that could occur as a result of CDFW issuing the ITP are the focus of the following environmental analysis. The potential environmental impacts are evaluated in the context of the state and federal regulatory framework within which PG&E operates, PG&E's standard practices, and the implementation of the voluntary applicant avoidance and minimization measures described in Chapter 2, Tables 2-3 and 2-4.

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 not expected to change substantially with issuance of the proposed ITP, 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.

Issuance of the proposed ITP would not result in the increased use of existing recreational facilities. Therefore, the issuance of the ITP for PG&E's O&M and minor new construction would not result in impacts on existing recreation resources.

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.

Issuance of the proposed ITP would not result in the construction or expansion of recreational facilities. Therefore, the issuance of the ITP for PG&E's O&M and minor new construction would not result in impacts on existing recreation resources.

3.16.3 References Cited

- Bureau of Land Management. 2017. *About the BLM*. Available: http://www.blm.gov/wo/st/en/info/About_BLM.html. Accessed: February 22, 2018.
- California Department of Fish and Wildlife. 2017. *About the California department of fish and wildlife land*. Available: <https://www.wildlife.ca.gov/Lands>. Accessed: February 22, 2018.
- California Department of Parks and Recreation. 2017a. *California State Parks*. Available: <https://www.parks.ca.gov/>. Accessed: February 22, 2018.
- . 2017b. *California State Parks, Find a California State Park*. Available: <http://www.parks.ca.gov/parkindex/>. Accessed: February 22, 2018.
- National Park Service. 2017. *National Park Service*. Available: <http://www.nps.gov/>. Accessed: February 22, 2018.
- U.S. Fish and Wildlife Service. 2017. *National Wildlife Refuge System*. Available: <http://www.fws.gov/refuges/>. Accessed: February 22, 2018.

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 administering 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).~~ ongoing O&M impacts are considered part of the baseline environmental conditions.

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

As described in Chapter 3.0.2, *Baseline for CEQA Analysis*, PG&E's ongoing O&M activities are part of the CEQA environmental baseline. Although CDFW's issuance of the Incidental Take Permit (ITP)

would not change the need or overall 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, it would include requirements for avoiding and minimizing take of the three covered species, which may alter the approach for carrying out O&M and minor new construction activities by shifting disturbance area locations, limiting timing, or implementing physical actions to protect the species and their habitat. The direct and indirect impacts of covered O&M and minor new construction activities that could occur as a result of CDFW issuing the ITP are the focus of the following environmental analysis. The potential environmental impacts are evaluated in the context of the state and federal regulatory framework within which PG&E operates, PG&E's standard practices, and the implementation of the voluntary applicant avoidance and minimization measures described in Chapter 2, Tables 2-3 and 2-4.

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 continue to 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 and minor new construction 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, has been, and will continue to be, ongoing and represents ~~are part of~~ baseline environmental conditions.

Minor new construction activities which are adjacent to existing facilities and/or in utility or road ROWs ~~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.

Issuance of the proposed ITP would not result in impacts on existing programs, plans, ordinances, or policies regarding the circulation system, as a result of performing these covered activities, because it would not change PG&E's practices to avoid traffic impacts and because PG&E will implement APM TRA-1. Therefore, traffic impacts from the issuance of the ITP for PG&E O&M and minor new construction 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.

Issuance of the proposed ITP would not substantially change VMT in the study area, as PG&E will continue to conduct its work and implement required mitigation. Therefore, traffic impacts from the issuance of the ITP for PG&E O&M and minor new construction 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 are currently ongoing and 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.

Issuance of the proposed ITP would not result in new geometric design features that substantially increase hazards or incompatible uses because it would not substantially change PG&E's existing practices and because PG&E will implement APM TRA-1. Therefore, impacts from the issuance of the ITP for PG&E O&M and minor new construction would be less than significant.

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 are ongoing and 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.

Issuance of the proposed ITP would not result in inadequate emergency access because it would not alter PG&E's safety or transportation practices and because PG&E will implement APM TRA-1. Therefore, impacts from the issuance of the ITP for PG&E O&M and minor new construction 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).~~ ongoing O&M impacts are considered part of the baseline environmental conditions.

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 (see Chapter 2, Table 2-3).

- **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

As described in Chapter 3.0.2, *Baseline for CEQA Analysis*, PG&E's ongoing O&M activities are part of the CEQA environmental baseline. Although CDFW's issuance of the Incidental Take Permit (ITP) would not change the need or overall 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, it would include requirements for avoiding and minimizing take of the three covered species, which may alter the approach for carrying out O&M and minor new construction activities by shifting disturbance area locations, limiting timing, or implementing physical actions to protect the species and their habitat. The direct and indirect impacts of covered O&M and minor new construction activities that could occur as a result of CDFW issuing the ITP are the focus of the following environmental analysis. The potential environmental impacts are evaluated in the context of the state and federal regulatory framework within which PG&E operates, PG&E's standard practices, and the implementation of the voluntary applicant avoidance and minimization measures described in Chapter 2, Tables 2-3 and 2-4.

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.

Issuance of the proposed ITP would not result in an exceedance of wastewater treatment requirements. Therefore, the issuance of the ITP for PG&E's O&M and minor new construction would not result in impacts on existing utilities or service systems.

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.

Issuance of the proposed ITP would not result in the construction or expansion of wastewater treatment facilities. Therefore, the issuance of the ITP for PG&E's O&M and minor new construction would not result in impacts on existing utilities or service systems.

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 (see Chapter 2, Table 2-3). 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.

Issuance of the proposed ITP would not result in the need for new or expanded stormwater drainage facilities, and PG&E will implement applicable AMMs related to stormwater runoff and erosion control. The proposed ITP may help facilitate PG&E's ability to conduct drainage improvements when in covered species habitat. Therefore, the issuance of the ITP for PG&E's O&M and minor new construction would result in less than significant impacts on existing utilities or service systems.

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.

Issuance of the proposed ITP would not result in the need for new or expanded water supply. Therefore, the issuance of the ITP for PG&E's O&M and minor new construction would not result in impacts on existing utilities or service systems.

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~~ up to 3 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.

Issuance of the proposed ITP would not result in an exceedance of existing wastewater treatment capacity. Therefore, the issuance of the ITP for PG&E's O&M and minor new construction would not result in impacts on existing utilities or service systems.

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.

Issuance of the proposed ITP would be unlikely to have any impact, or at most a minor incremental impact, on the relevant landfill capacity during these covered activities. Therefore, the issuance of the ITP for PG&E's O&M and minor new construction would result in less than significant impacts on existing utilities or service systems.

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.

Issuance of the proposed ITP would not result in an inconsistency with federal, state, or local regulations related to solid waste. Therefore, the issuance of the ITP for PG&E's O&M and minor new construction would not result in impacts on existing utilities or service systems.

3.18.3 References Cited

Alameda County Water District. 2016. *Urban Water Management Plan 2015–2020*. Available: <http://www.acwd.org/DocumentCenter/View/1264>. Accessed: March 14, 2018.

California Department of Water Resources. 2018. *California Water Plan Update 2018*. Available: <https://www.water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/California-Water-Plan/Water-Plan-Updates/Files/Update-2018/Water-Plan-Update-2018-Working-Draft.pdf>. Accessed: March 14, 2018.

City of Napa. 2017. *Urban Water Management Plan 2015 Update*. Available: <https://www.cityofnapa.org/DocumentCenter/View/1376>. Accessed: March 14, 2018.

- Contra Costa Water District. 2015. *Urban Water Management Plan*. Available: <http://www.ccwater.com/DocumentCenter/View/2216>. Accessed: March 14, 2018.
- East Bay Municipal Utility District. 2016. *Urban Water Management Plan, 2015*. Available: <http://www.ebmud.com/water-and-drought/about-your-water/water-supply/urban-water-management-plan/>. Accessed: March 14, 2018.
- Marin Municipal Water District. 2016. *Urban Water Management Plan, 2015 Update*. Available: <http://marinwater.org/DocumentCenter/View/3828>. Accessed: March 14, 2018.
- San Francisco Public Utilities Commission. 2016. *Urban Water Management Plan, 2015*. Available: <https://sfwater.org/modules/showdocument.aspx?documentid=9300>. Accessed: March 14, 2018.
- Santa Clara Valley Water District. 2016. *Urban Water Management Plan, 2015*. Available: <https://www.valleywater.org/sites/default/files/SCVWD%202015%20UWMP-Report%20Only.pdf>. Accessed: March 14, 2018.
- Solano County Water Agency. 2016. *Urban Water Management Plan, 2015*. Available: <http://www.scwa2.com/home/showdocument?id=2798>. Accessed: March 14, 2018.
- Sonoma County Water Agency. 2016. *Urban Water Management Plan, 2015*. Available: http://www.scwa.ca.gov/files/docs/water-resources/Sonoma%20CWA%202015%20UWMP_FINAL.PDF. Accessed: March 14, 2018.
- Zone 7 Water Agency. 2016. *Urban Water Management Plan, 2015*. Available: http://www.zone7water.com/images/pdf_docs/water_supply/urban_water_mgmt_plan_2015.pdf. Accessed: March 14, 2018.

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. Because PG&E has conducted O&M activities in the study area for more than 30 years, ongoing O&M activity impacts are considered part of the baseline environmental conditions. described in this section represent 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 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.

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

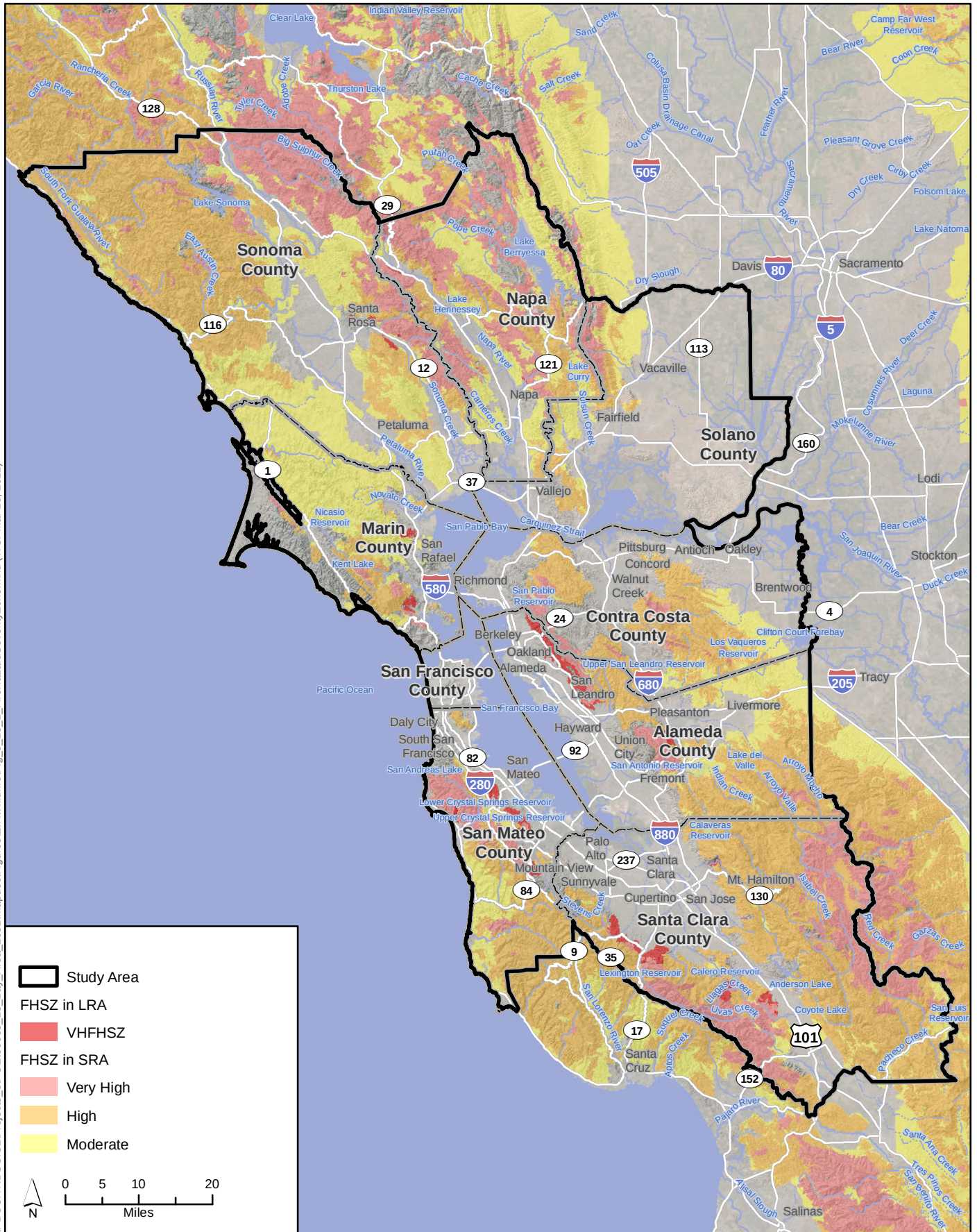


Figure 3.19-1
Fire Hazard Severity Zones in the Study Area

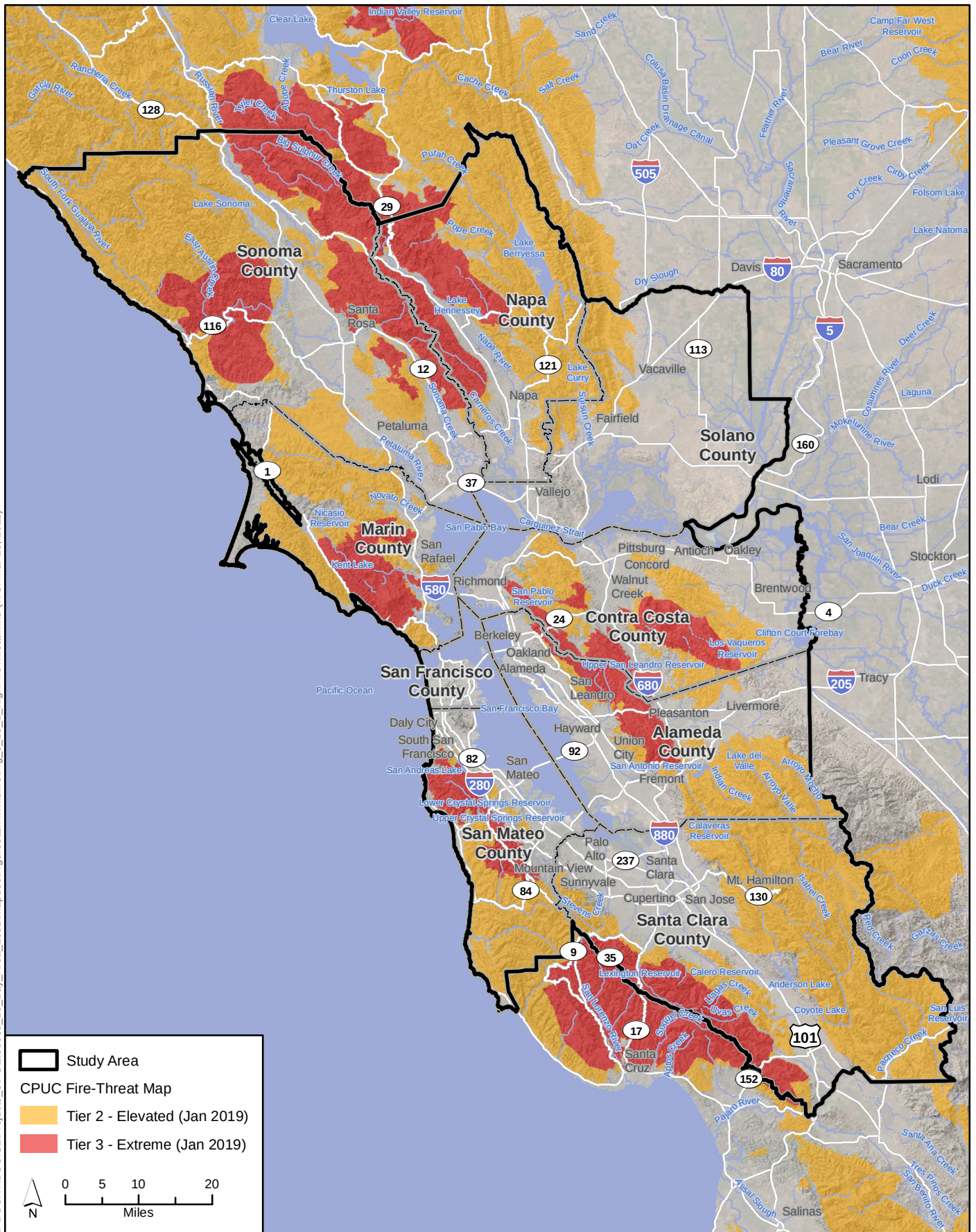


Figure 3.19-2
High Fire-Threat District Map

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

As described in Chapter 3.0.2, Baseline for CEQA Analysis, PG&E's ongoing O&M activities are part of the CEQA environmental baseline. Although CDFW's issuance of the Incidental Take Permit (ITP) would not change the need or overall 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, it would include requirements for avoiding and minimizing take of the three covered species, which may alter the approach for carrying out O&M and minor new construction activities by shifting disturbance area locations, limiting timing, or implementing physical actions to protect the species and their habitat. The direct and indirect impacts of covered O&M and minor new construction activities that could occur as a result of CDFW issuing the ITP are the focus of the following environmental analysis. The potential environmental impacts are evaluated in the context of the state and federal regulatory framework within which PG&E operates, PG&E's standard practices, and the implementation of the voluntary applicant avoidance and minimization measures described in Chapter 2, Tables 2-3 and 2-4.

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.

Issuance of the proposed ITP would not substantially impair an adopted emergency response or evacuation plan because it would not affect PG&E's safety practices and PG&E will implement APM TRA-1. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction 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~~ would 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 requiring 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~~would further ensure that wildfire risks ~~will~~would not be exacerbated.

Most PG&E covered activities ~~will~~would 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~~would add new, state-of-the-art facilities that will help to fire-harden the system. These activities ~~will~~would have a positive impact on existing fire safety.

Issuance of the proposed ITP would not expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire because it would not affect PG&E's obligation to maintain its facilities and because PG&E will implement APM FIRE-1. Further, the proposed ITP would help facilitate wildfire safety work when in the vicinity of covered species. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction would be less than significant.

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 ~~infrastructure 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.

Issuance of the proposed ITP would not require maintenance or installation of fire-related infrastructure during these covered activities that exacerbates fire risk or results in temporary or ongoing impacts because it would not affect PG&E's obligation to maintain its facilities. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction would be less than significant.

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~~would 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~~ would be less than significant.

Issuance of the proposed ITP would not 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 because it would not affect PG&E's requirements to maintain its facilities in a safe manner and because PG&E will implement applicable stormwater runoff and erosion control AMMs. Further, the proposed ITP would help facilitate work when in the vicinity of covered species. Therefore, impacts from issuance of the ITP for PG&E's O&M and minor new construction would be less than significant.

3.19.3 References Cited

California Department of Forestry and Fire Protection. 2020a. *California Fire Hazard Severity Zone Viewer*. Available: <https://gis.data.ca.gov/datasets/789d5286736248f69c4515c04f58f414>. Accessed: August 27, 2020.

California Department of Forestry and Fire Protection. 2020b. *Incidents Overview*. Available: <https://www.fire.ca.gov/incidents/>. Accessed: August 27, 2020.

California Public Utilities Commission. 2018. *CPUC High Fire-Threat District Map*. Adopted January 19, 2018. Available: <https://www.cpuc.ca.gov/firethreatmaps/>. Accessed August 27, 2020.

Pacific Gas and Electric Company. 2019. *Pacific Gas and Electric Company Amended 2019 Wildfire Safety Plan*. February 6, 2019. Available: https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/Wildfire-Safety-Plan.pdf. Accessed: August 27, 2020.

Pacific Gas and Electric Company. 2020. *Pacific Gas and Electric Company 2020 Wildfire Mitigation Plan Report Updated*. February 28, 2020. Available: https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/wildfire-mitigation-plan/2020-Wildfire-Safety-Plan.pdf. Accessed: August 27, 2020.

4.1 Introduction

This chapter presents a comparison of alternatives to the proposed issuance of an Incidental Take Permit (ITP) by the California Department of Fish and Wildlife (CDFW) for Pacific Gas & Electric Company's (PG&E's) covered activities, described in detail 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's)~~ 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's)~~ 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 field protocols (FPs), best management practices (BMPs), avoidance and minimization measures (AMMs), and applicant proposed measures (APMs) 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 FPs, BMPs, AMMs, and APMs 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~~ were considered for the definition of the alternative. 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. In response to comments on the Draft EIR, CDFW and PG&E agreed to eliminate gas and electric line extensions from the definition of covered activities (i.e., excluded from the definition of minor new construction). Therefore, this alternative ~~was~~ has been rejected from detailed consideration.

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 baseline conditions surrounding the evaluation of impacts are described in Section 3.0, *Baseline for CEQA Analysis*. 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 field protocols (FPs), best management practices (BMPs), applicant proposed measures (APMs) and 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~~ minor new construction over the 30-year permit term would be interspersed across the landscape which are adjacent to existing facilities and/or in utilities or road ROWs, adjacent to the ROW next to existing facilities (i.e., intermittent poles or towers), or buried underground, such facility extensions facilities do not create impermeable or impassable barriers to wildlife; further, APM BIO-3: Design and site minor new construction activities to avoid sensitive areas will help minimize impacts on sensitive natural communities, and APM BIO-3a: Minimize spread of invasive plants species in minor new construction will help ensure disturbed areas recover. In addition, since PG&E would implement ~~measures FPs, BMP, and APMs (i.e., APM BIO-6, APM BIO-6a, and APM BIO-7)~~ 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. Hot Zone AMM-1, Hot Zone AMM-6, APM BIO-2, and APM BIO-8 will help minimize these impacts. Further, mMitigating 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. PG&E

would implement Mitigation Measures BIO-1, BIO-2, BIO-3, and BIO-4 in addition to the FPs, BMPs, AMMs, and APMs to offset its impacts.

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 FPs, BMPs, APMs and 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.~~ PG&E would also implement Mitigation Measures BIO-2, BIO-3, and BIO-4 in addition to the FPs, BMPs, AMMs, and APMs to reduce impacts to three ITP-covered species—California tiger salamander, Alameda whipsnake, and California freshwater shrimp—to less than significant. 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~~ APM HAZ-1: Spill Response and APM HAZ-2: Vehicle Refueling to respond to and avoid impacts. ~~PG&E is required 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~~ measures to comply with hazardous waste regulations 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-~~ HAZ-1, APM HAZ-2, and 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 ~~such as of new gas pressure limiting stations, substation expansion, and undergrounding lines, and new lines to extend service to new commercial or residential customers. Extension of service to additional customers~~ Minor new construction 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.

5.6 References Cited

Association of Bay Area Governments. 2016. *Regional Forecast for Plan Bay Area 2040*.

Association of Bay Area Governments. 2017. *Plan Bay Area 2040*. Final. Adopted July 26.

Bay Area Air Quality Management District. 2015. *Bay Area Emissions Inventory Summary Report: Greenhouse Gases Base Year 2011*. Updated: January 2015. Available: http://www.baaqmd.gov/~media/files/planning-and-research/emission-inventory/by2011_ghgsummary.pdf. Accessed: April 30, 2018.

California Air Resources Board. 2017. *California Greenhouse Gas Emission Inventory – 2017 Edition*. Available: <https://www.arb.ca.gov/cc/inventory/data/data.htm>. Accessed: April 30, 2018.

California Department of Conservation. 2016. *Important Farmland 2016*. Alameda, Contra Costa, Marin, Napa, San Mateo, Santa Clara, Solano, and Sonoma Counties. Farmland Mapping and Monitoring Program, Sacramento, CA. Available: <http://www.conservation.ca.gov/dlrp/fmmp>. Accessed: February 20, 2018.

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.

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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.

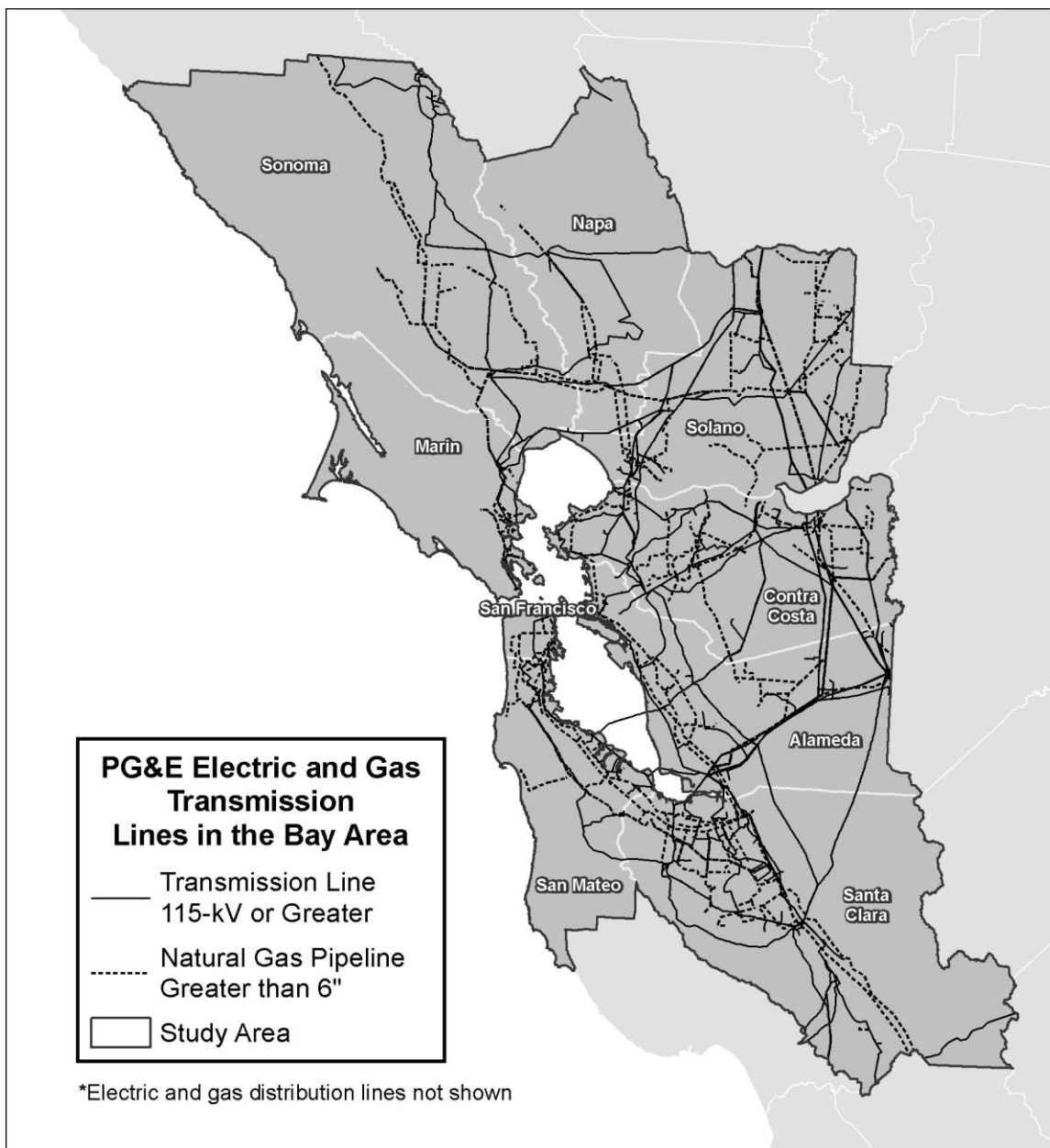
PG&E's Electrical Transmission and Distribution System

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@aspeneg.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.
-

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.
-

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.
-

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/replacment 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/replacment 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/replacmenet 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 spiralifera</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 ferrisiae</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/replacment could have long term effects	3	4	3	2	1
<i>Ceanothus foliosus</i> var. <i>vineatus</i>	Vine Hill ceanothus			1B.1	Evaluated at a programmatic basis			4	4	2	2
<i>Ceanothus gloriosus</i> var. <i>exaltatus</i>	Glory brush			4.3	Evaluated at a programmatic basis						
<i>Ceanothus gloriosus</i> var. <i>gloriosus</i>	Point Reyes ceanothus			4.3	Evaluated at a programmatic basis						
<i>Ceanothus gloriosus</i> var. <i>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</i> subsp. <i>congdonii</i>	Congdon's tarplant			1B.2	Evaluated at a programmatic basis			51	39	35	4
<i>Centromadia parryi</i> subsp. <i>parryi</i>	pappose tarplant			1B.2	Evaluated at a programmatic basis			28	22	16	6
<i>Centromadia parryi</i> subsp. <i>rudis</i>	Parry's red tarplant			4.2	Evaluated at a programmatic basis						
<i>Chlorogalum pomeridianum</i> var. <i>minus</i>	Dwarf soaproot			1B.2	Evaluated at a programmatic basis			4	3		3
<i>Chloropyron maritimum</i> subsp. <i>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</i> subsp. <i>hispidum</i>	Hispid bird's-beak			1B.1	Evaluated at a programmatic basis			2	2	2	
<i>Chloropyron molle</i> subsp. <i>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</i> var. <i>cuspidata</i>	San Francisco Bay spineflower			1B.2	Evaluated at a programmatic basis			17	15	8	7
<i>Chorizanthe cuspidata</i> var. <i>villosa</i>	Woolly-headed spineflower			1B.2	Evaluated at a programmatic basis			17	8	6	2
<i>Chorizanthe robusta</i> subsp. <i>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</i> var. <i>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</i> var. <i>campylon</i>	Mt. Hamilton thistle			1B.2	Evaluated at a programmatic basis			33	15	14	1
<i>Cirsium fontinale</i> var. <i>fontinale</i>	Fountain thistle	E	E	1B.1	Electric distribution & transmission and gas transmission lines cross 3 occurrences	Gas pipeline repair/replacment could have long term effects	5	5	3	3	
<i>Cirsium hydrophilum</i> var. <i>hydophilum</i>	Suisun thistle	E		1B.1	No facility corridors cross known occurrences, no impacts identified		1	4			
<i>Cirsium hydrophilum</i> var. <i>vaseyi</i>	Mt. Tamalpais thistle			1B.2	Evaluated at a programmatic basis			14	2	1	1
<i>Cirsium occidentale</i> var. <i>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</i> subsp. <i>automixa</i>	South Bay clarkia = Santa Clara red-ribbons			4.3	Evaluated at a programmatic basis			20	15	5	10
<i>Clarkia concinna</i> subsp. <i>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/replacment could have long term effects	4	4	3	3	
<i>Clarkia gracilis</i> subsp. <i>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 tenius</i> subsp. <i>brunneus</i>	Serpentine bird's-beak			4.3	Evaluated at a programmatic basis						
<i>Cordylanthus tenius</i> subsp. <i>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</i> var. <i>glandulosa</i>	Puruvian dodder			2B.2	Evaluated at a programmatic basis			1	1	1	
<i>Cuscuta pacifica</i> var. <i>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/replacment 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 ertterae</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
<i>Erysimum ammophilum</i>	Coast wallflower			1B.2	Evaluated at a programmatic basis			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</i> var. <i>tristulis</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</i> subsp. <i>gatense</i>	Serpentine bedstraw			4.2	Evaluated at a programmatic basis						
<i>Gilia capitata</i> subsp. <i>chamissonis</i>	San Francisco gilia = Dune giia			1B.1	Evaluated at a programmatic basis			37	19	12	7
<i>Gilia capitata</i> subsp. <i>pacifica</i>	Pacific gilia			1B.2	Evaluated at a programmatic basis			4	1		1
<i>Gilia capitata</i> subsp. <i>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	1	
<i>Grindelia hirsutula</i> var. <i>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</i> subsp. <i>congesta</i>	seaside tarplant			1B.2	Evaluated at a programmatic basis			50	40	26	14
<i>Hesperervax caulescens</i>	Hogwallow starfish			4.2	Evaluated at a programmatic basis						
<i>Hesperervax sparsiflora</i> var. <i>brevifolia</i>	Short-leaved evax			1B.2	Evaluated at a programmatic basis			23	8	5	3
<i>Hesperocyparis abramsiana</i> var. <i>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 occurrence, gas transmission lines cross 2 occurrences	Gas pipeline repair/replacment 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</i> var. <i>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</i> subsp. <i>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</i> var. <i>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/replacment could have long term effects	26	28	20	19	1
<i>Lasthenia californica</i> subsp. <i>bakeri</i>	Baker's goldfields			1B.2	Evaluated at a programmatic basis			9	8	4	4
<i>Lasthenia californica</i> subsp. <i>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/replacment 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</i> var. <i>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>	Wooly-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 lilaeopsis		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/replacment 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 vincularis</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/replacment 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/replacment 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 narvarretia			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				
<i>Navarretia rosulata</i>	Marin County navarretia			1B.2	Evaluated at a programmatic basis			3	1	1	
<i>Navarretia subuligera</i>	Awl-leaved navarretia			4.3	Evaluated at a programmatic basis			15	4	4	
<i>Neostapfia 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/replacment 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/replacment 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/replacment 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	

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>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 Gas pipeline repair/replacment could have long term effects	2	2	1		1
<i>Potentilla uliginosa</i>	Cunningham Marsh cinquefoil			1A	Electric distribution and gas distribution lines cross 1 occurrence		1	1	1		1
<i>Psilocarphus brevisissimus</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 checkermallow			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 checkermallow = marsh checkerbloom			1B.2	Evaluated at a programmatic basis			1	1		1
<i>Sidalcea oregana</i> subsp. <i>valida</i>	Kenwood Marsh checkermallow	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 microseris			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>pulchellus</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>Symphyotrichum lentum</i>	Suisun Marsh aster			1B.2	Evaluated at a programmatic basis			107	30	28	2
<i>Thamnolia 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.

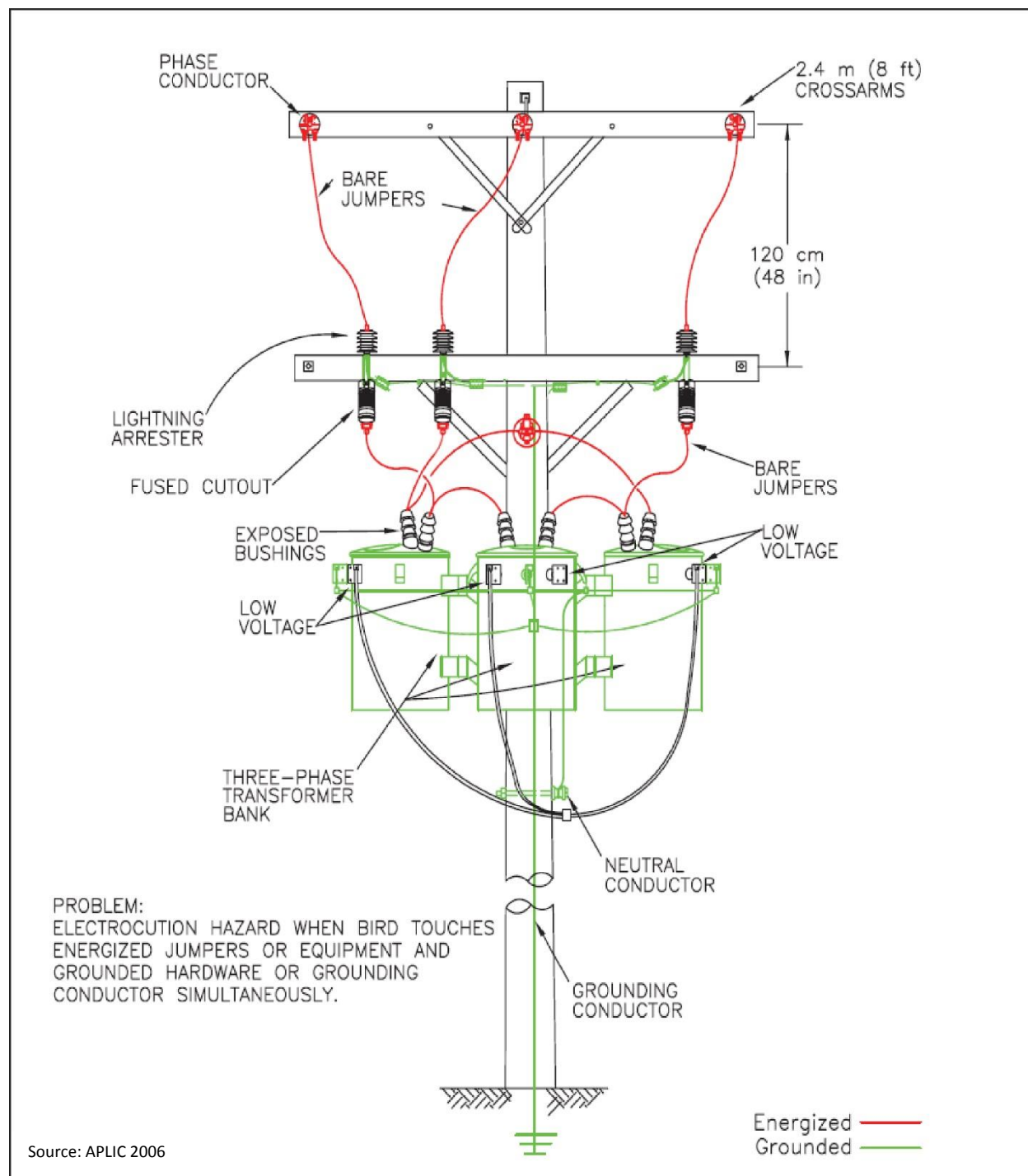


Figure 1. Schematic of a Problem Pole

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.

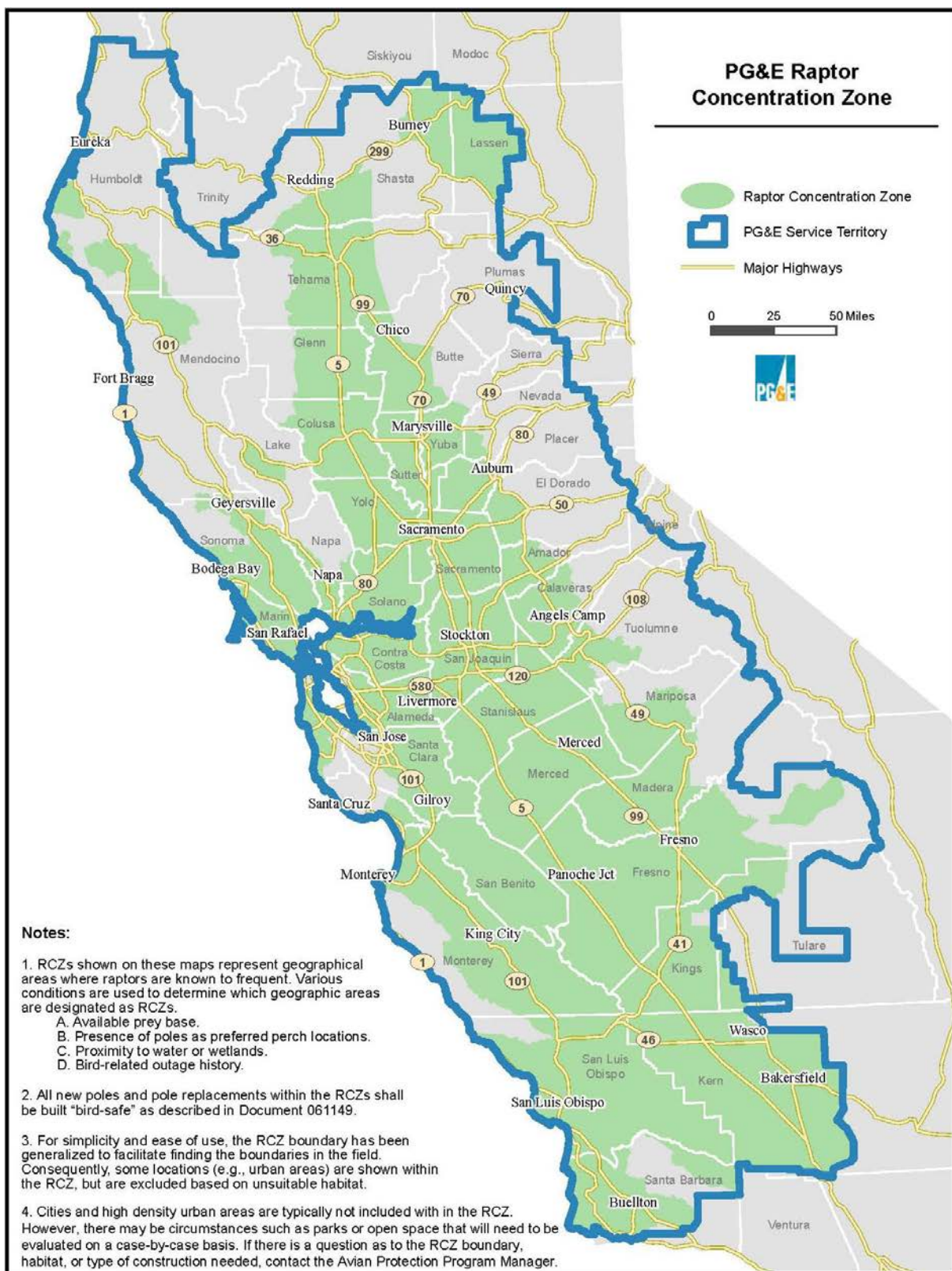


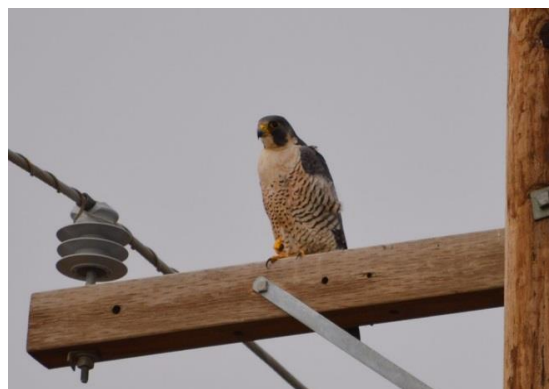
Figure 2. Raptor Concentration Zone

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

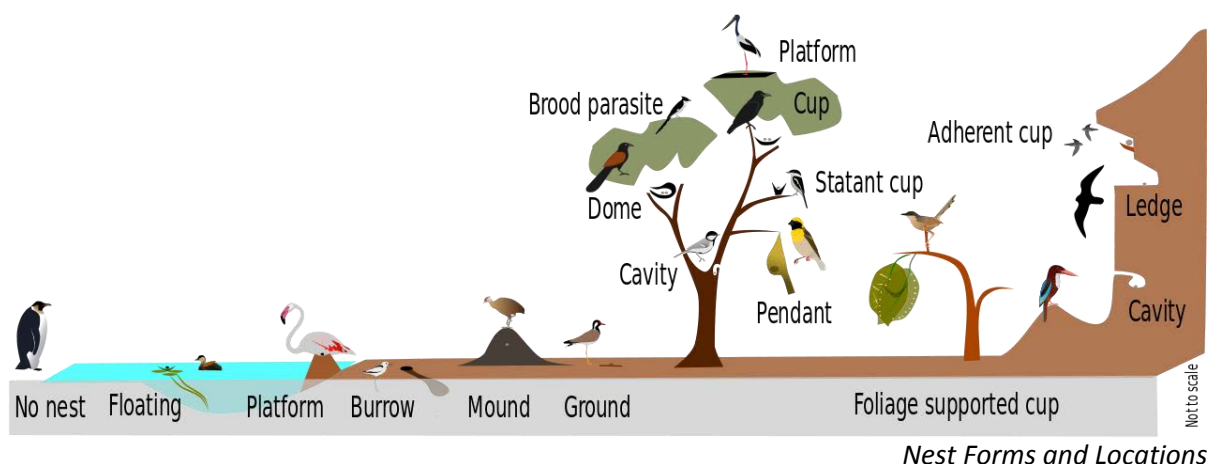
PG&E is focused on reducing potential impacts from all of its operations and maintenance activities on nesting birds. To address these impacts, and to maintain compliance with the MBTA and state statute, PG&E has developed a comprehensive plan to avoid and minimize impacts on nesting birds: PG&E's *Nesting 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.

Chapter 3

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.

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In 2008, PG&E earned Audubon California’s Corporate Achievement Award for protecting California’s birds and important habitat.

For more information, visit www.pge.com/environment



AVIAN PROTECTION PLAN
Helping protect California’s birds and keep customer service flying high.



AVIAN PROTECTION PLAN

Pacific Gas and Electric Company’s (PG&E) service area spans over 70,000 square miles and is home to wildlife and other important natural resources. More than 300 species of migratory birds live in northern and central California either permanently or during migration along the “Pacific Flyway.”

Since utility poles are often the highest and most prominent point in a landscape, birds often perch on the poles to hunt or rest. Also, it is often easier for birds to build nests on the flat surfaces of electric equipment than in trees.

When birds seek out power lines for perching and various other uses, they can come into direct contact with live electric wires and become electrocuted, which, in turn, can cause electric outages and fires. Birds can also collide with power lines while in flight. PG&E’s Avian Protection Plan seeks to protect migratory, threatened, and endangered birds, while improving safety and reliability for our customers.



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.

“Voluntary industry cooperation has long been essential to our conservation efforts, and many electric power companies have already taken steps to protect migratory birds,” said former U.S. Fish and Wildlife Service Director Matt Hogan. “The new [industry] guidelines build on and strengthen that tradition.”



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.



A PG&E crew installs a nest platform near Clear Lake. Nest platforms reduce outages and are preferred by large birds, such as ospreys.

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.

Appendix D

Nesting Bird Management Plan

Nesting Bird Management Plan

Nesting Birds: Species-Specific Buffers for PG&E Activities

November 2015
Public Version

Nesting Birds: Species-Specific Buffers for PG&E Activities

Within PG&E's Avian Program, standard nest buffers were developed for all common and special-status birds present within its Service Territory. There are no standard nest buffers specified in the Migratory Bird Treaty Act (MBTA) or within California Fish and Game Code. Table 1 provides nest buffers based on the best available information, including relevant literature review and avian biology. Disturbance factors including *nest location*, *human activity*, *activity duration*, and *noise level* may influence nesting behavior and reproductive success, and were each considered in establishing standard buffer distances for individual species. Where regulatory agencies have provided information on nest buffer distances for special-status species, those buffer distances are primarily used as *standard buffers* in Table 1. *Standard buffers* are species-specific buffer distances between occupied nest sites and work activities where work will not occur while the nest is active (containing eggs or young). These standard buffers are intended to be applied to nests located in proximity to PG&E activities at a sufficient distance to provide suitable nest protection. For example, a nesting black-crowned night heron has a standard buffer distance of 400 feet (Table 1).

Because it is not always possible to apply the standard buffer, non-standard species-specific buffer distances have also been established. As part of the determination of these non-standard buffers, PG&E activities are assigned disturbance rankings (Low, Medium, or High) for each factor identified above. Evaluation of all disturbance factors combined produces an overall disturbance category by assessing each disturbance factor for one or more PG&E activities. If the overall disturbance category is high, the standard buffer will generally apply. If the evaluation results in low or medium overall disturbance categories, the standard buffer is applied as feasible or reduced buffers may be appropriate. For example, in some circumstances it may be necessary to perform certain types of work within the standard buffer. In these cases, biologists consider all relevant site-specific conditions, including the species' tolerance for disturbance, work activity type, noise levels, and distance to nest to determine if reducing the standard buffer is appropriate. Alternatively, the buffer may be increased beyond the standard buffer for certain exceptions. Helicopters are the main exception that may require increased buffers.

Table 1 lists the standard buffers and non-standard buffer ranges for activities with low-medium and medium-high disturbances. Nest buffers will be implemented and adjusted by the biologist¹.

The following site-specific conditions are considered in determining if a reduced or increased buffer is appropriate:

- **Disturbance.** Evaluate nest disturbance, including consideration of activity intensity and duration, construction type, amount of habitat disturbance, level of human disturbance or acclimation, activity length, and the amount of noise generated by the activity.
- **Existing Conditions.** Assess site conditions to determine if there is acclimation to human disturbance.
- **Nest Concealment.** Evaluate surrounding habitat for its ability to provide visual and/or acoustic barriers between the nest and construction.
- **Species Natural History.** Consider individual species' natural history, nest stage (incubation, rearing, fledging), and known tolerances to disturbance.
- **Habituation.** Consider species habituation to new or ongoing activities.
- **Environmental Conditions.** Consider weather and other related factors.
- **Helicopter Use.** Consider helicopter type, flight plans, and duration.

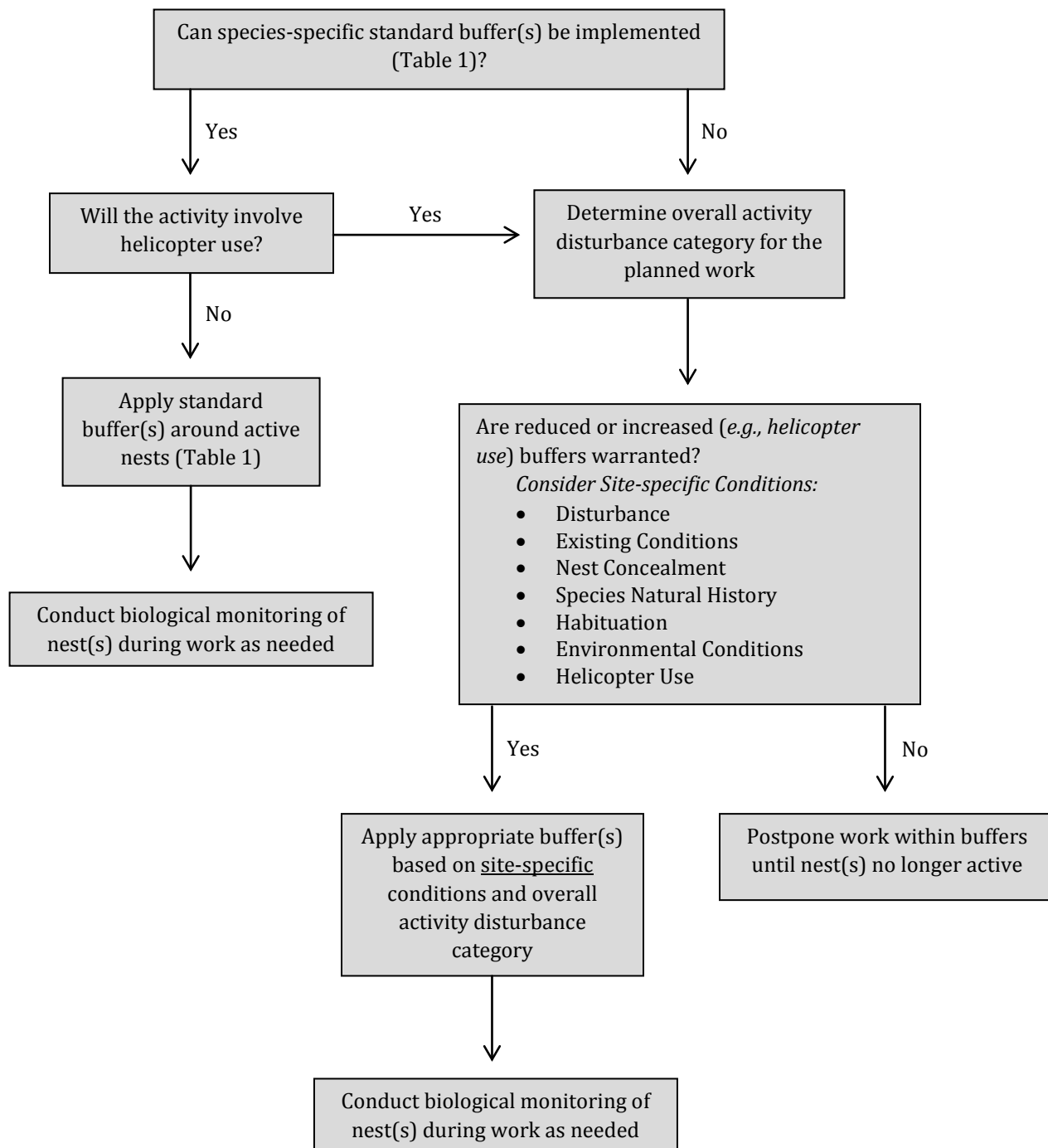
Nest Buffer Implementation Guidelines

Step/Task/Responsible	Outcome and Components
1. Desktop review <i>Biologist</i>	● Assess habitat types and potential nesting bird species ● Identify potentially appropriate buffers for the species that may nest
2. Preconstruction nesting bird surveys <i>Biologist</i>	● Conduct preconstruction surveys within the standard buffers ● Document species detections including nests and active nests
3. Assign Buffers <i>Biologist</i>	● Assess intensity/duration of activity ● Assess acclimation to human disturbance ● Assess site-specific conditions ● Consider species' natural history, reproductive stage, tolerances to disturbance, and observed behavior ● Evaluate and assign standard, reduced, or increased buffers
4. Implement Buffers <i>Biologist/Biological Monitor</i>	● Implement buffers when work activities are occurring ● Conduct periodic biological monitoring where needed ● Adjust buffers as appropriate

¹ Biologist refers to an individual with a bachelor's degree or above in a field related to biological sciences and demonstrated field expertise in ornithology, in particular, nesting behavior; these qualified biologists may be PG&E employees or contractors.

Species-Specific Buffers for PG&E Activities

Buffer Assignment Process – Quick Reference



Other Biological Considerations in Determining Buffers

- Provisioning frequency of hatchlings or older young
- Egg turning
- Egg incubation (female or male or combination)
- Egg hardiness
- Ambient Temperatures
- Heat tolerance (eggs or nestlings)
- Cold tolerance (eggs or nestlings)
- Unsheltered nest risk
- Premature fledging risk
- Unattended nests and predation risk

Time on Nest is Important. An egg initially requires a controlled heat input, but later in incubation the embryo may produce more heat and may need to be cooled rather than heated. Ambient temperatures need to be considered. Unattended unsheltered nests may experience temperature extremes (heat or cold). Egg turning during incubation is also a critical component for successful hatching; absence of turning during incubation will result in reduced and delayed hatching. During the nestling stage for altricial birds (i.e., birds that typically require feeding by adults), adults must provision food to nestlings. Provisioning rate is highly variable between species and is correlated to clutch size and body size, but most birds make frequent trips to attend nestlings. Collectively referred to as brooding, these forms of parental care are essential for reproductive success. Unattended nests also may experience increased rates of predation. Premature fledging is more likely to occur during later nest stages, when young are nearing fledging stage but not yet capable of flight.

Table 1. Species-specific Nest Buffers for PG&E Work Activities

**Atypically high-intensity activities, such as helicopter use usually require increased buffers beyond the standard buffer*

Common Name	Scientific Name	Nest Location, Substrate, and Habitat	Vertical Height	Peak Breeding Season/Number of Broods per Season	Incubation Duration/Chick-rearing Duration	Standard Buffer* (feet)	Medium to High Disturbance Category Buffer (feet)	Low to Medium Disturbance Category Buffer (feet)
Mallard	<i>Anas platyrhynchos</i>	Scrapes under overhanging cover or in dense vegetation in uplands near water.	Ground	March through June; single brood.	Clutch incubated for 26–29 days by female; young are precocial.	100	30–100	15–30
Cinnamon Teal	<i>Anas cyanoptera</i>	Scrapes under overhanging cover or in dense vegetation in uplands near water.	Ground	April through August; single brood.	Clutch incubated for 24–25 days by female; young are precocial.	100	30–100	15–30
Canada Goose	<i>Branta canadensis</i>	Scrapes on slightly elevated, firm ground in uplands near water.	Ground	February through June; single brood.	Clutch incubated for 27–28 days by female; young are precocial.	100	30–100	15–30
Wood Duck	<i>Aix sponsa</i>	Cavities in riparian woodlands and other woodland habitats near water.	Up to 60 feet	April through August; single or double brood.	Clutch incubated for 27–35 days by female; young are precocial.	100	30–100	15–30
Blue-winged Teal	<i>Anas discors</i>	Scrapes in dense grass or forbs in wetlands or grasslands near water.	Ground	June through July; single brood	Clutch incubated for 23–24 days by female; young are precocial.	100	30–100	15–30
Northern Shoveler	<i>Anas clypeata</i>	Scrapes in low grasses or forbs in uplands near water.	Ground	March through July; single brood.	Clutch incubated for 25–27 days by female; young are precocial.	100	30–100	15–30
Gadwall	<i>Anas strepera</i>	Scrapes in dense, low emergent vegetation or grasses in uplands near water.	Ground	April through July; single brood.	Clutch incubated for 22–29 days by female; young are precocial.	100	30–100	15–30
American Wigeon	<i>Anas americana</i>	Scrapes in dense vegetation cover in uplands near water.	Ground	May through July; single brood.	Clutch incubated for 24–25 days by female; young are precocial.	100	30–100	15–30

Common Name	Scientific Name	Nest Location, Substrate, and Habitat	Vertical Height	Peak Breeding Season/Number of Broods per Season	Incubation Duration/Chick-rearing Duration	Standard Buffer* (feet)	Medium to High Disturbance Category Buffer (feet)	Low to Medium Disturbance Category Buffer (feet)
Redhead	<i>Aythya americana</i>	Platform nests over water in dense vegetation; occasionally nests in uplands near water.	Ground	April through June; single brood.	Clutch incubated for 24–26 days by both sexes; young are precocial.	100	30–100	15–30
Ring-necked Duck	<i>Aythya collaris</i>	Platform nests over water in dense emergent vegetation in wetlands.	Ground	May through August; single brood.	Clutch incubated for approximately 26 days by female; young are precocial.	100	30–100	15–30
Common Merganser	<i>Mergus merganser</i>	Cavities in trees, snags and stumps in riparian woodlands.	Up to 200 feet	March through September; single brood.	Clutch incubated for 28–32 days by female; young are precocial.	100	30–100	15–30
Ruddy Duck	<i>Oxyura jamaicensis</i>	Platform nests constructed on shallow water in dense, tall emergent vegetation.	Ground	April through October; single or double brood.	Clutch incubated for approximately 23 days by female; young are precocial.	100	30–100	15–30
Pied-billed Grebe	<i>Podilymbus podiceps</i>	Platform nests constructed in emergent vegetation bordering open water.	Ground	March through July; double brood.	Clutch incubated for approximately 23 days by both sexes; young are precocial.	100	30–100	15–30
Eared Grebe	<i>Podiceps nigricollis</i>	Platform nests in water on emergent wetland vegetation.	Ground	April through July; single brood.	Clutch incubated for approximately 21 days by both sexes by both sexes; young are precocial.	100	30–100	15–30
Western Grebe	<i>Aechmophorus occidentalis</i>	Platform nests in emergent vegetation or open water or, less frequently, on dry land near water.	Ground	May through August; single brood.	Clutch incubated for approximately 23 days by both sexes; young are precocial.	100	30–100	15–30

Common Name	Scientific Name	Nest Location, Substrate, and Habitat	Vertical Height	Peak Breeding Season/Number of Broods per Season	Incubation Duration/Chick-rearing Duration	Standard Buffer* (feet)	Medium to High Disturbance Category Buffer (feet)	Low to Medium Disturbance Category Buffer (feet)
Clark's Grebe	<i>Aechmophorus clarkii</i>	Platform nests constructed in emergent vegetation or open water or, less frequently, on dry land near water.	Ground	May through August; single brood.	Clutch incubated for approximately 23 days by both sexes; young are precocial.	100	30-100	15-30
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	Platform nests on islands, on the ground or in trees; also in power poles and other artificial structures. Colonial nester.	Ground	March through August; single brood.	Clutch incubated for 25-29 days by both sexes; altricial young fledge at 37-44 days.	400	75-400	50-75
Pelagic Cormorant	<i>Phalacrocorax pelagicus</i>	Platform nests on steep cliffs along rocky and exposed shorelines along outer coasts, bays, inlets, estuaries, rapids, coves, surge narrows, harbors, lagoons, and coastal log-storage sites. Colonial nester.	Ground	April through August; single or double brood	Clutch incubated for 28-32 days by both sexes; altricial young fledge at approximately 47 days	400	75-400	50-75
American Bittern	<i>Botaurus lentiginosus</i>	Platform nests in shallow water or on ground near water.	Ground	April through July; single brood.	Clutch incubated for approximately 24 days by female; altricial young fledge at approximately 14 days.	100	50-100	25-50
Least Bittern	<i>Ixobrychus exilis</i>	Platform nests about a foot above the water in freshwater marshes.	Ground	March through July; double brood.	Clutch incubated for 16-19 days by both sexes; altricial young fledge at 13-15 days.	100	50-100	25-50

Common Name	Scientific Name	Nest Location, Substrate, and Habitat	Vertical Height	Peak Breeding Season/Number of Broods per Season	Incubation Duration/Chick-rearing Duration	Standard Buffer* (feet)	Medium to High Disturbance Category Buffer (feet)	Low to Medium Disturbance Category Buffer (feet)
Great Blue Heron	<i>Ardea herodias</i>	Platform nests in tall trees or other types of vegetation near water. Colonial nester.	Up to 130 feet	January through July; single brood.	Clutch incubated for 25–29 days by both sexes; altricial young fledge at approximately 60 days.	400	75–400	50–75
Great Egret	<i>Ardea alba</i>	Platform nests in tall trees or other types of vegetation near water. Colonial nester.	10–80 feet	March through July; single brood.	Clutch incubated for approximately 26 days; semi-altricial young fledge at approximately 35–42 days.	400	75–400	50–75
Snowy Egret	<i>Egretta thula</i>	Platform nests in tall trees or other types of vegetation near water. Colonial nester.	Up to 30 feet but usually 10–15 feet	March through July; single brood.	Clutch incubated for 20–24 days by both sexes; semi-altricial young fledge at 21–28 days.	400	75–400	50–75
Cattle Egret	<i>Bubulcus ibis</i>	Platform nests in tall shrubs and trees near water.	Up to 30 feet but usually 5–15 feet	April to July; single brood.	Clutch incubated for 23–25 days; semi-altricial young fledge at about 40 days.	400	75–400	50–75
Green Heron	<i>Butorides striatus</i>	Platform nests in shrubs, trees, thickets, or other vegetation near water.	10–30 feet, sometimes higher	March through July; single or double brood.	Clutch incubated for 19–21 days by both sexes; semi-altricial young fledge at 21–23 days.	100	50–100	25–50
Black-crowned Night-Heron	<i>Nycticorax</i>	Platform nests in shrubs, trees, thickets, or other vegetation near water. Colonial nester.	Up to 150 feet	January through June; double brood.	Clutch incubated for approximately 24 days by female; semi-altricial young fledge at 42–49 days.	400	75–400	50–75
White-faced Ibis	<i>Plegadis chihi</i>	Platform nests of emergent wetland vegetation in extensive wetlands. Colonial nester.	Ground	May to July; single brood.	Clutch incubated for 20–26 days by both sexes; altricial young fledge at 10–12 days.	400	75–400	50–75

Common Name	Scientific Name	Nest Location, Substrate, and Habitat	Vertical Height	Peak Breeding Season/Number of Broods per Season	Incubation Duration/Chick-rearing Duration	Standard Buffer* (feet)	Medium to High Disturbance Category Buffer (feet)	Low to Medium Disturbance Category Buffer (feet)
Turkey Vulture	<i>Cathartes aura</i>	Caves, rock crevices, possibly abandoned buildings, or other dark, secluded sites.	Up to 20 feet	March through June; single brood.	Clutch incubated for 37–41 days by both sexes; semi-altricial young fledge at approximately 77 days.	300	100–300	50–100
California Condor	<i>Gymnogyps californianus</i>	Caves on high, remote cliff-faces or in hollow in large redwood snag.	Cliff	Year-round, with egg-laying usually occurring in January or February; single brood.	Clutch incubated for 42–50 days by both sexes; semi-altricial young fledge at 35–49 days.	3,960	CR ^a	CR
White-tailed Kite	<i>Elanus caeruleus</i>	Platform nests in tall trees near grasslands, oak savannah, or other open habitats.	12–60 feet	February through July; sometimes double brood.	Clutch incubated for 28–30 days by both sexes; semi-altricial young fledge at 34–40 days.	300	200–300	100–200
Osprey	<i>Pandion haliaetus</i>	Platform nests on treetops, rocky outcrops, or utility poles near water.	Up to 60 feet	Mid-March through August; single brood.	Clutch incubated for 32–33 days by both sexes; semi-altricial young fledge at 51–59 days.	300	100–300	50–100
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Platform nests in large trees or rocky outcrops close to lakes and large rivers.	50–180 feet	January to August; single brood.	Clutch incubated for 35–46 days by both sexes; semi-altricial young fledge at 70–77 days.	2,640	CR	CR
Northern Harrier	<i>Circus cyaneus</i>	Platform nests on ground in grasslands and open marshland with vegetative cover.	Ground	March through August; single brood.	Clutch incubated for 29–39 days by both sexes; altricial young fledge at 37 days.	300	200–300	100–200
Sharp-shinned Hawk	<i>Accipiter striatus</i>	Platform nests in trees in riparian woodland or other forested habitat with thick cover.	10–60 feet	April through August; single brood.	Clutch incubated for 30–35 days by both sexes; semi-altricial young fledge at approximately 23 days.	300	100–300	50–100

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Cooper's Hawk	<i>Accipiter cooperii</i>	Platform nests in trees in riparian woodlands or other forested habitat.	20–60 feet	March through July; single brood.	Clutch incubated for 36 days by female while male provisions her; semi-altricial young fledge at 30–34 days.	300	100–300	50–100
Northern Goshawk	<i>Accipiter gentilis</i>	Platform nests in top of tall coniferous or deciduous trees in mature forest.	Up to 75 feet	April through August; single brood.	Clutch incubated for 36–41 days by female while male provisions her; semi-altricial young fledge at 45 days old	1,320	200–1,320	100–200
Red-shouldered Hawk	<i>Buteo lineatus</i>	Platform nests below canopy in a variety of tree species.	20–60 feet	March through June; single brood.	Clutch incubated for 23–25 days by both sexes; semi-altricial young fledge at 35–42 days.	300	100–300	50–100
Swainson's Hawk	<i>Buteo swainsoni</i>	Platform nests in isolated trees in grasslands and agricultural areas.	5–30 feet	April through late June; single brood.	Clutch incubated for approximately 28 days by both sexes; semi-altricial young fledge at 28–35 days.	1,320–2,640	CR	CR
Red-tailed Hawk	<i>Buteo jamaicensis</i>	Platform nests in tall trees and other structures in a variety of open habitats.	35–90 feet	February through September; single brood.	Clutch incubated for 28–32 days by both sexes; semi-altricial young fledge at approximately 42 days.	250	100–300	50–100
Ferruginous Hawk	<i>Buteo regalis</i>	Nest in substrates ranging from cliffs, trees, utility structures, and farm buildings to haystacks and relatively level ground.	Up to 70 feet	Early March through May; single brood	Clutch incubated for 32–33 days by both sexes; altricial and nidicolous young fledge at 38–50 days.	300	100–300	50–100

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Golden Eagle	<i>Aquila chrysaetos</i>	Platform nests on rock ledges of outcrops or cliffs, and occasionally trees, in proximity to grassland, farmland, oak savannah, and other foraging grounds.	10–100 feet or higher on cliffs	February through July; single brood.	Clutch incubated for 43–45 days by female and occasionally male; semi-altricial young fledge at 63–70 days.	2,640	CR	CR
American Kestrel	<i>Falco sparverius</i>	Cavities in trees or other structures near grasslands, agricultural areas, oak savannah, or other open areas.	7–80 feet	March through July; may double brood.	Clutch incubated for 29–30 days by female while male provisions her; semi-altricial young fledge at approximately 30 days.	200	50–200	25–50
Prairie Falcon	<i>Falco mexicanus</i>	Ledges under overhangs on rock outcrops or cliffs near grassland, farmland, oak savannah, or other foraging habitat.	30–40 feet	March to May; single brood.	Clutch incubated for 29–31 days by female while male provisions her; semi-altricial young fledge at 40 days.	300	100–300	50–100
American Peregrine Falcon	<i>Falco peregrinus</i>	Cliff ledges, tall buildings, high bridges, and other high locations near open habitats.	High on cliffs or tall structures	March through June; single brood.	Clutch incubated for 28–29 days by both sexes; semi-altricial young fledge at 35–42 days.	500	CR	CR
Mount Pinos Sooty Grouse	<i>Dendragapus fuliginosus</i>	Scrapes near logs, shrubs, or other cover in coniferous forests, shrub-steppe habitat, and subalpine forests.	Ground	April through August; single brood.	Clutch incubated for 26–28 days by female; young are precocial.	100	50–100	25–50
Ruffed Grouse	<i>Bonasa umbellus</i>	Scrapes near the base of stumps, trees, or logs in forested habitat.	Ground	February through August; single brood.	Clutch incubated for approximately 24 days by female; young are precocial.	100	50–100	25–50

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Wild Turkey	<i>Meleagris gallopavo</i>	Scrapes in thick, low vegetation in oak woodlands and forest edges and clearings.	Ground	March through August; single brood.	Clutch incubated for approximately 28 days by female; young are precocial.	100	30–100	15–30
Gambel's Quail	<i>Callipepla gambellii</i>	Scrapes under shrubs in desert habitats.	Ground	April through June; single or (rarely) double brood	Clutch incubated for 21–23 days by female while male guards; young are precocial.	100	50–100	25–50
California Quail	<i>Callipepla californica</i>	Scrapes under shrubs in riparian woodland, coastal scrub, chaparral, shrub-steppe, and mixed-hardwood forest.	Ground	March through July; single or double brood.	Clutch incubated for 21–23 days by female; young are precocial.	100	50–100	25–50
Mountain Quail	<i>Oreortyx pictus</i>	Scrapes under shrubs in mountain woodland and scrub habitats, usually near water.	Ground	April through June; single brood.	Clutch incubated for 24–25 days by female; young are precocial.	100	50–100	25–50
California Black Rail	<i>Laterallus jamaicensis coturniculus</i>	Cup nests on or near ground at upper edges of tidal marshes.	0–1 foot	March through July; single brood.	Clutch incubated for 17–20 days by both sexes; young are semi-precocial.	300–600	CR	CR
Clapper Rail (California, Yuma, Light-footed)	<i>Rallus longirostris obscurus/yumanensis/levipes</i>	Platform nests in dense tidal marsh vegetation dominated by cordgrass or gumplant.	0–1 foot	February through August; single or double brood.	Clutch incubated for 23–29 days by both sexes; young are semi-precocial.	700	CR	CR
Virginia Rail	<i>Rallus limicola</i>	Platform nests in dense emergent vegetation in freshwater or estuarine marshes.	0–1 foot	April through June; single or double brood.	Clutch incubated for 14–16 days by both sexes; young are precocial.	100	50–100	25–50
Sora	<i>Porzana carolina</i>	Cup nests secured to reeds and rushes in freshwater or estuarine marshes.	0–1 foot	April through August; single brood.	Clutch incubated for approximately 14 days by both sexes; young are precocial.	100	50–100	25–50

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Common Gallinule	<i>Gallinula galeata</i>	Platform nests in dense vegetation at edge of marshes and other freshwater habitats.	Ground or water level	April through June; single or double brood.	Clutch incubated for 19–22 days by both sexes; young are precocial.	100	50–100	25–50
American Coot	<i>Fulica americana</i>	Platform nests in dense vegetation at edge of marshes and other freshwater habitats.	Ground or water level	March through July; single or double brood.	Clutch incubated for 21–24 days by both sexes; young are precocial.	100	30–100	15–30
Greater Sandhill Crane	<i>Grus canadensis tabida</i>	Platform nests in wetland vegetation on dry ground or shallow water in extensive marsh systems or grasslands.	Ground	April through August; single brood.	Clutch incubated for approximately 30 days by both sexes; young are precocial.	500	CR	CR
Western Snowy Plover	<i>Charadrius alexandrinus nivosus</i>	Scrapes on sand beaches/bars, salt pannes, or dry river beds.	Ground	April through August; double or triple brood.	Clutch incubated for approximately 24 days by both sexes; young are precocial.	600 (coastal) 300 (interior)	CR (coastal) 200–300 (interior)	CR (coastal) 100–200 (interior)
Killdeer	<i>Charadrius vociferus</i>	Scrapes in open places usually in areas with short grass, sand, or gravel.	Ground	March through June; sometimes double brood.	Clutch incubated for 24–26 days by both sexes; young are precocial.	75	30–75	15–30
Black-necked Stilt	<i>Himantopus mexicanus</i>	Scrapes or plant tufts/tussocks in fresh, brackish, or salt marshes.	Ground	April through June; single brood.	Clutch incubated for 25–26 days by both sexes; young are precocial.	150	50–150	25–50
American Avocet	<i>Recurvirostra americana</i>	Scrapes on salt pannes, dikes, levees, and bare islands.	Ground	April through June; single brood.	Clutch incubated for 22–24 days by both sexes; young are precocial.	150	50–150	25–50

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Spotted Sandpiper	<i>Actitis macularia</i>	Scrapes in grasses among rocks, wrack, or driftwood.	Ground	April through August; single brood.	Clutch incubated for approximately 21 days by male; young are precocial.	75	30–75	15–30
Wilson's Snipe	<i>Gallinago gallinago</i>	Scrapes in dense, medium to tall marshy or wet meadow vegetation.	Ground	April to August; single brood.	Clutch incubated for 17–20 days by female; young are precocial.	75	30–75	15–30
Lesser Yellowlegs	<i>Tringa flavipes</i>	Scrapes on shallow wetlands, trees or shrubs, and open areas.	Ground	Late April to mid-May; single brood.	Clutch incubated for 22–23 days by both sexes; young are precocial.	75	30–75	15–30
Whimbrel	<i>Numenius phaeopus</i>	Hummocks or mounds near dwarfed shrub, flat heath tundra, in grass or sedge tussocks, and on gravel.	Ground	Early June to early July; single brood.	Clutch incubated 22–28 days by both sexes; young are precocial.	75	30–75	15–30
Black Skimmer	<i>Rynchops niger</i>	Saucer-shaped depressions on beaches, bars, dredge deposition, salt marsh.	Ground	May through August; single brood.	Clutch incubated 21–23 days by both sexes; young are semi-precocial.	300	100–300	50–100
Long-billed Curlew	<i>Numenius americanus</i>	Scrapes in short-grass or mixed-prairie habitat with flat to rolling topography.	Ground	Mid-late March to early July; single brood.	Clutch incubated for 27–29 days by both sexes; young are precocial.	75	30–75	15–30
Marbled Godwit	<i>Limosa fedoa</i>	Scrapes in short, sparsely to moderately vegetated landscapes that include native grassland and wetland complexes with a variety of wetland classes (ephemeral to semipermanent).	Ground	Mid-May to late June; single brood.	Clutch incubated for 23–26 days by both sexes; young are precocial	75	30–75	15–30

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California Gull	<i>Larus californicus</i>	Scrapes on islands in alkali or freshwater lakes and ponds or salt ponds.	Ground	April through August; single brood.	Clutch incubated for 23–27 days by both sexes; young are precocial.	150	50–150	25–50
Western Gull	<i>Larus occidentalis</i>	Ledges on cliffs, bluffs, bridges, buildings, and other areas inaccessible to nest predators.	Ground/cliff	April through August; single brood.	Clutch incubated for 30–32 days by both sexes; young are semi-precocial.	150	50–150	25–50
Caspian Tern	<i>Sterna caspia</i>	Scrapes on islands, beaches, and levees.	Ground	April through August; single brood.	Clutch incubated for approximately 20 days by both sexes; semi-precocial young fledge at approximately 14 days.	300	100–300	50–100
Forster's Tern	<i>Sterna forsteri</i>	Scrapes on open levees, islands, and occasionally reed beds.	Ground	April through September; single brood.	Clutch incubated for approximately 23 days by both sexes; semi-altricial young fledge after approximately 7 days.	300	100–300	50–100
California Least Tern	<i>Sterna antillarum</i>	Scrapes on bare sandy or gravelly substrates in undisturbed areas.	Ground	May through June; single brood.	Clutch incubated for 20–25 days by both sexes; young are semi-precocial.	600	CR	CR
Black Tern	<i>Chlidonias niger</i>	Platform nests constructed of dead plant stems in freshwater wetlands and flooded rice fields.	Ground	May through August; single brood.	Clutch incubated for 20–22 days by both sexes; semi-precocial young fledge at approximately 14 days.	300	100–300	50–100

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Marbled Murrelet	<i>Brachyramphus marmoratus</i>	Horizontal limbs of large, old-growth conifers.	20–250 feet	March through September; likely a single brood.	Clutch incubated for approximately 30 days by both sexes; semi-precocial young fledge at approximately 21 days.	1,320 (high disturbance) ^b	CR	CR
Cassin's Auklet	<i>Ptychoramphus aleuticus</i>	Excavates burrows in soft soil, sod or natural cavities such as rock crevices and under trees, cacti or logs. Colonial nester.	Ground/cliff	Varies within November through May; single and double brood.	Clutch incubated 37–42 days by both sexes; altricial young confined to nest for 30 days.	400	75–400	50–75
Band-tailed Pigeon	<i>Columba fasciata</i>	Platform nests in trees or shrubs in oak woodlands, mixed hardwood forests, and mixed coniferous forests, usually in areas with oak trees.	5–180 feet	March through November; double or triple brood.	Clutch incubated for 18–20 days by both sexes; altricial young fledge at 25–30 days.	75	50–75	25–50
Mourning Dove	<i>Zenaida macroura</i>	Platform nests in a tree or shrub, but also on buildings or on ground, in a variety of habitats.	0–25 feet	February through September; several broods.	Clutch incubated for 14–15 days by both sexes; altricial young fledge at 13–15 days.	50	20–50	10–20
Western Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Platform nests in bushes or trees in dense, wide riparian woodlands.	2–20 feet	June through July; single brood.	Clutch incubated for 9–11 days by both sexes; altricial young fledge at 21 days.	500	CR	CR
Greater Roadrunner	<i>Geococcyx californianus</i>	Cup nests in dense, brushy habitats in desert, sagebrush, and chaparral habitats.	3–15 feet	April through June; double brood.	Clutch incubated for 16–20 days by male; altricial young fledge at 18–30 days.	100	50–100	25–50

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Barn Owl	<i>Tyto alba</i>	Cavities in trees, buildings, crevices in rocks, outcrops, cliffs and quarries.	1–400 feet	January through May; often double broods.	Clutch incubated for 32–34 days by female while male provisions her; altricial young fledge at 60 days.	150	100–150	50–100
Flammulated Owl	<i>Otus flammeolus</i>	Cavities in trees, including aspens, oaks, pines, or other trees in forested areas.	10–40 feet	May through October; single brood.	Clutch incubated for 21–24 days by female while male provisions her; altricial young fledge at 20–26 days	200	100–200	50–100
Western Screech Owl	<i>Otus kennicottii</i>	Cavities in trees, particularly cottonwoods, in open woodlands.	10–30 feet	March through June; single brood.	Clutch incubated for 21–30 days by female while male provisions her; altricial young fledge at approximately 28 days.	200	100–200	50–100
Great Gray Owl	<i>Strix nebulosa</i>	Near high elevation meadows, on broken top trees or stick nests of other species.	30–50 feet	Late March through early July; single brood	Average clutch incubated for 29.7 days by female, with male provisioning her; semi-precocial young fledge at 21–28 days but can be dependent on nest site and male parent until fall.	1,320	CR	CR
Great Horned Owl	<i>Bubo virginianus</i>	Cavities or large nest platforms of other species in trees, rock ledges, or caves.	Uses existing platforms at various heights	January through May; single brood.	Clutch incubated for 26–35 days by female while male provisions her; altricial young fledge at 28–35 days.	300	100–300	50–100

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Northern Pygmy Owl	<i>Glaucidium gnoma</i>	Cavities in trees in oak woodlands and coniferous forests.	8–20 feet	April through August; number of broods unknown.	Clutch incubated for 25–30 days by female while male provisions her; semi-altricial young fledge at approximately 23 days.	200	50–200	25–50
Spotted Owl (Northern/California)	<i>Strix occidentalis caurina/occidentalis</i>	Cavities or platforms (natural or old nests of other species) in coniferous or mixed hardwood forests.	30–165 feet	March through August; single brood.	Clutch incubated for 29–30 days by female while male provisions her; altricial young fledge at 34–36 days.	1,320 (high disturbance) ^b	CR	CR
Burrowing Owl	<i>Athene cunicularia</i>	Small mammal burrows in open grasslands or at the edge of agricultural areas.	Ground	February through August; single brood.	Clutch incubated for 27–30 days by female while male provisions her; altricial young fledge at 40–45 days.	250	CR	CR
Long-eared Owl	<i>Asio otus</i>	Platform nests built by other species high in trees in coniferous forests or mixed woodlands.	10–30 feet	February through May; single brood.	Clutch incubated for 25–30 days by female while male provisions her; altricial young fledge at 23–24 days.	300	100–300	50–100
Short-eared Owl	<i>Asio flammeus</i>	Scrapes in tall, dense vegetation in grasslands and freshwater or brackish marshes.	Ground	March through July; single or possibly double brood.	Clutch incubated for 21–28 days by female while male provisions her; semi-altricial young leave nest at 31–36 days.	300	100–300	50–100
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	Cavities in trees in forested areas.	5–50 feet	March through August; single or double brood.	Clutch incubated for 21–28 days by female; semi-altricial young fledge at approximately 30 days.	200	100–200	50–100

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Lesser Nighthawk	<i>Chordeiles acutipennis</i>	Scrapes on bare gravelly or sandy ground in desert and sparsely vegetated habitats.	Ground	April through July; single or double brood.	Clutch incubated for 18–19 days by female; semi-precocial young fledge after 3 weeks.	75	30–75	20–30
Common Nighthawk	<i>Chordeiles minor</i>	Scrapes on bare gravelly or sandy ground in open areas within chaparral, grasslands, and forest openings.	Ground	June through July; double brood.	Clutch incubated for 18–20 days by female; semi-precocial young fledge after about 21 days.	75	30–75	20–30
Common Poorwill	<i>Phalaenoptilus nuttallii</i>	Scrapes on bare gravelly, sandy, or leaf-litter-covered ground in grasslands and desert habitats.	Ground	March through August; double brood.	Clutch incubated for 20–21 days by both sexes; young are precocial.	75	30–75	20–30
Black Swift	<i>Cypseloides niger</i>	Sheltered crevices or ledges on cliff faces on coast or under waterfall.	20–45 feet	May through September; single brood.	Clutch incubated for 21–27 days by both sexes; altricial young fledge at 45–49 days.	75	30–75	15–30
Vaux's Swift	<i>Chaetura vauxi</i>	Cavities in redwoods, other conifers, and occasionally sycamores, chimneys, and buildings.	Up to 50 feet	May through August; single brood.	Clutch incubated for 18–20 days; altricial young fledge at approximately 28 days.	75	30–75	15–30
White-throated Swift	<i>Aeronautes saxatalis</i>	Rock cracks and crevices on cliffs and tall bridges.	10–195 feet	May through July; single brood.	Clutch incubated for 20–27 days; altricial young fledge at 40–46 days.	75	30–75	15–30
Black-chinned Hummingbird	<i>Arcgilochus alexandri</i>	Cup nests in trees and shrubs in woodlands, urban areas, and other habitats with nectar sources.	4–10 feet	April through June; two or three broods.	Clutch incubated for 13–16 days by female; altricial young fledge at approximately 21 days.	50	20–50	15–20

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Anna's Hummingbird	<i>Calypte anna</i>	Cup nests in trees and shrubs in woodlands, urban areas, and other habitats with nectar sources.	1–30 feet	December through June; two or three broods.	Clutch incubated for 16–17 days by female; altricial young fledge at 25–26 days.	50	20–50	15–20
Costa's Hummingbird	<i>Calypte costae</i>	Cup nests in trees and shrubs in riparian scrub, urban areas, and other habitats with nectar sources.	4–5 feet	April through July; single or occasionally double brood.	Clutch incubated for 15–18 days by female; altricial young fledge at 20–23 days.	50	20–50	15–20
Calliope Hummingbird	<i>Stellula calliope</i>	Cup nests in montane or riparian woodlands.	2–70 feet	May through August; single brood.	Clutch incubated for 15–16 days by female; altricial young fledge at 21–23 days.	50	20–50	15–20
Allen's Hummingbird	<i>Selasphorus sasin</i>	Cup nests in shrubs, trees, or vines in a variety of forest and woodland types, as well as coastal scrub.	1–10 feet; occasionally as high as 90 feet	February through August; double brood.	Clutch incubated for 16–22 days by female; altricial young fledge at approximately 22 days.	50	20–50	15–20
Belted Kingfisher	<i>Ceryle alcyon</i>	Burrow in banks near fresh water.	Ground	April through July; single brood.	Clutch incubated for 23–24 days by both sexes; altricial young fledge at 30–35 days.	100	50–100	25–50
Lewis's Woodpecker	<i>Melanerpes lewis</i>	Cavities in snags or dead branches in oak woodlands and mixed hardwood forests.	5–80 feet	May through July; single brood.	Clutch incubated for 13–14 days by both sexes; altricial young fledge at 28–34 days.	50	15–50	10–15
Acorn Woodpecker	<i>Melanerpes formicivorus</i>	Cavities in trees or snags in open woodlands, partly wooded areas, or utility poles near a source of acorns.	5–25 feet	April through July; two or three broods.	Clutch incubated for approximately 11 days by both sexes; altricial young fledge at approximately 31 days.	50	15–50	10–15

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Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	Cavities in trees or snags in coniferous or mixed forest.	5–45 feet	May through June; single brood.	Clutch incubated for 12–14 days by both sexes; altricial young fledge at 23–28 days.	50	15–50	10–15
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	Tree cavities in conifer and mixed conifer-deciduous forests.	8–52 feet	Late April through late July; single brood.	Clutch incubated 12–14 days by both sexes; altricial young fledge at 31–32 days.	50	15–50	10–15
Ladder-backed Woodpecker	<i>Picoides scalaris</i>	Cavities in trees and cactus.	4–20 feet	Unknown in CA; single brood.	Clutch incubated 14 days by both sexes; altricial young with unknown fledging period.	50	15–50	10–15
Nuttall's Woodpecker	<i>Picoides nuttallii</i>	Cavities in trees or snags in oak woodlands, or less frequently riparian or other woodlands.	2–60 feet	April through June; single brood.	Clutch incubated for approximately 14 days by both sexes; altricial young fledge at approximately 29 days.	50	15–50	10–15
Downy Woodpecker	<i>Picoides pubescens</i>	Cavities in trees or snags in riparian or other deciduous woodlands, or less frequently in coniferous forests.	3–44 feet	April through May; double brood.	Clutch incubated for approximately 12 days by both sexes; altricial young fledge at 20–22 days.	50	15–50	10–15
Hairy Woodpecker	<i>Picoides villosus</i>	Cavities in snags or dead branches in woodlands and coniferous forests.	3–102 feet	March through August; single brood.	Clutch incubated for 11–15 days by both sexes; altricial young fledge at 28–30 days.	50	15–50	10–15
White-headed Woodpecker	<i>Picoides albolarvatus</i>	Cavities in snags or stumps at least 2 feet in diameter in pine forests.	6–50 feet	April through August; single brood.	Both sexes incubate clutch for 13–15 days; altricial young fledge at approximately 26 days.	50	15–50	10–15

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Northern Flicker	<i>Colaptes auratus</i>	Cavities in tree trunks or snags in open or sparsely wooded areas; more often in live wood.	8–45 feet	April through June; single brood.	Clutch incubated for 11–13 days by both sexes; altricial young fledge at 25–28 days.	50	15–50	10–15
Pileated Woodpecker	<i>Dryocopus pileatus</i>	Cavities in snags or dead branches in mature forests.	15–70 feet	March to July; single brood	Clutch incubated for approximately 18 days by both sexes; altricial young fledge at 26–28 days.	50	15–50	10–15
Olive-sided Flycatcher	<i>Contopus cooperi</i>	Cup nest in trees in open conifer forest or mixed woodland.	5–70 feet	June through July; single brood.	Clutch incubated for 16–17 days by female; altricial young fledge at 15–19 days.	75	30–75	15–30
Western Wood-Pewee	<i>Contopus sordidulus</i>	Cup nests in trees, mainly coniferous but sometimes deciduous woodlands near watercourses.	15–30 feet	May through July; single brood.	Clutch incubated for approximately 12 days by female; altricial young fledge at 14–18 days.	75	30–75	15–30
Willow Flycatcher (Southwestern, Little, adastus)	<i>Empidonax traillii extimus/brewsteri/adastus</i>	Cup nests in densely vegetated riparian associations of cottonwoods and willows.	5–20 feet	May through July; single brood.	Clutch incubated for 12–13 days by female; altricial young fledge at 14 days.	300	CR	CR
Vermilion Flycatcher	<i>Pyrocephalus rubinus</i>	Loosely constructed nest in wooded riparian areas.	8–55 feet	Mid-March through mid-July; single or double brood.	Clutch incubated for 14–15 days by female; altricial young fledge at 14–16 days.	75	30–75	15–30
Hammond's Flycatcher	<i>Empidonax hammondi</i>	Cup nests in trees in forests and woodlands.	6–65 feet	May through July; single brood.	Clutch incubated for 12–15 days by female; altricial young fledge at 17–18 days .	75	30–75	15–30

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Dusky Flycatcher	<i>Empidonax oberholseri</i>	Cup nests in small trees or shrubs pine forests	3–20 feet	May through July; single brood.	Clutch incubated for 12–15 days by female; altricial young fledge at approximately 18 days.	75	30–75	15–30
Western (Pacific-slope and Cordilleran) Flycatcher	<i>Empidonax difficilis/occidentalis</i>	Cup nests in cavities or tree stumps or on ledges or crevices in woodlands and forests often in riparian areas.	0–30 feet	April through July; sometimes double brood.	Clutch incubated for 14–15 days by female; altricial young fledge at 15–18 days.	75	30–75	15–30
Black Phoebe	<i>Sayornis nigricans</i>	Cup nests of mud cemented to vertical structures, often under an overhang.	3–10 feet	March through June; double brood.	Clutch incubated for 15–18 days by female; altricial young fledge at approximately 21 days.	75	30–75	15–30
Say's Phoebe	<i>Sayornis saya</i>	Cup nests on ledges with overhang or under a bridge; nest not made of mud like black phoebe.	0–79 feet	March through June; double brood.	Clutch incubated for 12–14 days by female; altricial young fledge at 14–18 days.	75	30–75	15–30
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	Cavities in trees and other structures in open deciduous woodland.	2–70 feet	May through July; single brood.	Clutch incubated for approximately 15 days by female; altricial young fledge at 16–17 days.	50	15–50	10–15
Cassin's Kingbird	<i>Tyrannus vociferans</i>	Cup nests in trees in savannahs and other open habitats.	25–74 feet	April through June; double brood.	Clutch incubated for 12–14 days by female; altricial young fledge at 14 days.	75	30–75	15–30
Western Kingbird	<i>Tyrannus verticalis</i>	Cup nests in trees and artificial structures (e.g., power poles) in variety of open habitats.	13–55 feet	April through June; double brood.	Clutch incubated for 12–14 days by both sexes; altricial young fledge at 13–19 days.	75	30–75	15–30

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Loggerhead Shrike	<i>Lanius ludovicianus</i>	Cup nests in dense shrubs near grasslands and other open habitats.	3–8 feet	February through June; two or three broods.	Clutch incubated for 14–16 days by female while male provisions her; altricial young fledge at 17–21 days.	75	30–75	15–30
Least Bell's Vireo	<i>Vireo bellii pusillus</i>	Cup nests in dense shrubs and small trees in dense riparian areas.	1–3 feet	April through August; double brood.	Clutch incubated for approximately 14 days by both sexes; altricial young fledge at 10–12 days.	500	CR	CR
Arizona Bell's Vireo	<i>Vireo bellii arizonae</i>	Cup nests in dense shrubs and small trees in dense riparian areas.	1–3 feet	April through August; double brood.	Clutch incubated for approximately 14 days by both sexes; altricial young fledge at 10–12 days.	500	CR	CR
Cassin's Vireo	<i>Vireo cassinii</i>	Cup nests in a trees or shrubs in oak or oak-coniferous or mixed riparian woodland.	5–35 feet	April through July; single brood.	Clutch incubated for approximately 15 days by both sexes; altricial young fledge at 13 days.	75	30–75	15–30
Hutton's Vireo	<i>Vireo huttoni</i>	Cup nests on a twig forks in oaks and other trees along streams and canyons.	3–45 feet	March thorough June; single or double brood.	Clutch incubated for 14–16 days by both sexes; altricial young fledge at approximately 14 days.	75	30–75	15–30
Warbling Vireo	<i>Vireo gilvus</i>	Cut nests high in trees in mature oak woodlands and mixed deciduous forests.	20–60 feet	May through July; double brood.	Clutch incubated for 12–13 days by both sexes; altricial young fledge at approximately 14 days.	75	30–75	15–30
Gray Vireo	<i>Vireo vicinior</i>	Nests in thorn scrub or pinyon-juniper woodland, low in thorny or twiggy shrub or tree.	2–8 feet	Mid-April through mid-August	Clutch incubated 13-14 days by both sexes; altricial young fledge at 13-14 days.	75	30–75	15–30

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Gray Jay	<i>Perisoreus canadensis</i>	Cup nests in shrubs or trees in coniferous forests and sometimes oak woodlands.	5–30 feet	March through July; single brood.	Clutch is incubated for 16–18 days; altricial young fledge at approximately 15 days.	75	30–75	15–30
Steller's Jay	<i>Cyanocitta stelleri</i>	Cup nests in trees or shrubs in coniferous or mixed hardwood forests or other woodlands.	7–16 feet	April through June; likely single brood.	Clutch incubated for approximately 16 days by female while male provisions her; altricial young fledge at 18 days.	75	30–75	15–30
Western Scrub-jay	<i>Aphelocoma californica</i>	Platform nests in shrubs, trees, bushes or vine tangles in a wide variety of habitats, including oak woodlands, savannah, agricultural, and suburban.	2–50 feet	March through June; single brood.	Clutch incubated for 15–17 days by female while male provisions her; altricial young fledge at 18 days.	75	30–75	15–30
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>	Cup nests in trees in ponderosa-pine forest.	3–115 feet	Mid-March through late June; single brood.	Clutch incubated 17 days by female, male provisions female; altricial young fledge at 21–22 days.	75	30–75	15–30
Clark's Nutcracker	<i>Nucifraga columbiana</i>	Cup nests in pines, junipers, and firs in mountain coniferous forests.	8–45 feet	February through August; single brood.	Clutch incubated for 16–18 days by both sexes; altricial young fledge at approximately 22 days.	75	30–75	15–30
Yellow-billed Magpie	<i>Pica nuttallii</i>	Platform nests in oak trees and occasionally other trees in savannah.	30–80 feet	February through July; single brood.	Clutch incubated for 16–18 days by female while male provisions her; altricial young fledge at approximately 30 days.	75	30–75	15–30

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American Crow	<i>Corvus brachyrhynchos</i>	Platform nests in variety of large trees, usually near the trunk, and artificial structures in a wide variety of habitats.	10–70 feet	February through July; single brood.	Clutch incubated for approximately 18 days by female and possibly helpers; altricial young fledge at 35 days.	50	30–50	15–30
Common Raven	<i>Corvus corax</i>	Platform nests on sheltered rock ledges or in forks of large trees and artificial structures in a wide variety of habitats.	45–80 feet	February through July; single brood.	Clutch incubated for 20–21 days by female while male provisions her; altricial young fledge at 35–42 days.	50	30–50	15–30
Western Bluebird	<i>Sialia mexicana</i>	Cavities in woodland clearings, savannahs, and other open habitats.	4–48 feet	April through June; double brood.	Clutch incubated for 13–14 days by female; altricial young fledge at approximately 20 days.	50	15–50	10–15
Townsend's Solitaire	<i>Myadestes townsendi</i>	Cup nests on ground usually on cutbanks and other slopes in mountain coniferous forests.	0–12 feet	April through June; single or double brood.	Clutch incubated for 11–14 days by female; altricial young fledge at 10–14 days.	75	30–75	15–30
Swainson's Thrush	<i>Catharus ustulatus</i>	Cup nests in dense shrubs, often in riparian woodlands and mixed coniferous forests.	2–20 feet	April through August; single or (rarely) double brood.	Clutch incubated for 10–13 days by female; altricial young fledge after 10–12 days.	75	30–75	15–30
Hermit Thrush	<i>Catharus guttatus</i>	Cup nests in dense shrubs variety of forests and woodlands.	2–10 feet	June through July; single or double brood.	Clutch incubated for 12–13 days by female; altricial young fledge at 12–13 days.	75	30–75	15–30
American Robin	<i>Turdus migratorius</i>	Cup nests in trees or shrubs, ledges of buildings, or in a tree forks in variety of open habitats.	3–25 feet	May through July; two or three broods.	Clutch incubated for 11–14 days by female; altricial young fledge at 14–16 days.	75	30–75	15–30

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Varied Thrush	<i>Ixoreus naevius</i>	Cup nests on horizontal branches of trees in moist coniferous forests.	5–20 feet	April through August; double brood.	Clutch incubated for approximately 14 days by female; altricial young fledge at 13–15 days.	75	30–75	15–30
Horned Lark	<i>Eremophila alpestris</i>	Scrapes in a small hollow usually sheltered by plant tufts in grasslands and other open habitats.	Ground	February through August; two or three broods.	Clutch incubated for 10–14 days by female; altricial young fledge at 9–12 days.	75	30–75	15–30
Purple Martin	<i>Progne subis</i>	Cavities in trees in mountain forests, particularly burned areas with snags.	10–34 feet	April through August; single brood	Clutch incubated for 15–18 days by the female; altricial young fledge at 24–31 days.	75	30–75	15–30
Tree Swallow	<i>Tachycineta bicolor</i>	Cavities in open habitats, such as grasslands or wetlands with dead standing trees; usually near water.	10–16 feet	April through August; double brood.	Clutch is incubated for 13–16 days; altricial young fledge at 16–20 days.	50	30–50	15–30
Violet-green Swallow	<i>Tachycineta thalassina</i>	Cavities or occasionally on cliffs or banks in deciduous, coniferous, and mixed woodlands.	9–17 feet	April through August; single brood.	Clutch is incubated for 13–15 days; altricial young fledge at 16–24 days.	50	30–50	15–30
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	Cavities on a steep slope or use crevices and holes in bridges and buildings.	Ground/cliff	April through June; single brood.	Clutch incubated for 15–16 days by female; altricial young fledge at 18–21 days.	75	30–75	15–30
Bank Swallow	<i>Riparia riparia</i>	Cavities in sandy banks or cliffs along rivers.	Ground/cliff	May through July; single brood.	Clutch incubated for 12–16 days by both sexes; altricial young fledge at 18–24 days.	100	CR	CR

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Barn Swallow	<i>Hirundo rustica</i>	Cup nests often on buildings and bridges in open habitats near water.	6–40 feet	April through July; double brood.	Clutch incubated for 14–16 days by both sexes; altricial young fledge at 17–24 days.	50	30–50	15–30
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	Closed mud nests often on cliff faces, buildings, or bridges in open habitats near water.	5 feet and higher	April through June; double brood.	Clutch incubated for 12–14 days by both sexes; altricial young fledge at approximately 23 days.	50	30–50	15–30
Mountain Chickadee	<i>Poecile gambeli</i>	Cavities in trees in coniferous mountain forests.	16–50 feet	April through August; single or double brood.	Clutch is incubated for 14 days; altricial young fledge at 20 days.	50	15–50	10–15
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	Cavities trees in coniferous forests and deciduous woodlands.	0–80 feet	March through July; single or (rarely) double brood.	Clutch is incubated for 12–14 days by female; altricial young fledge at 18–21 days.	50	15–50	10–15
Oak Titmouse	<i>Baeolophus inornatus</i>	Cavities in trees in oak woodlands.	2–40 feet	March through June; single brood.	Clutch incubated for 14–16 days by female; altricial young fledge at 17 days.	50	15–50	10–15
Bushtit	<i>Psaltiriparus minimus</i>	Pendulous nests in trees and shrubs in a variety of habitats.	3–98 feet	February through June; double brood.	Clutch incubated for 12–13 days by both sexes; altricial young fledge at 14–15 days.	50	30–50	15–30
Red-breasted Nuthatch	<i>Sitta canadensis</i>	Cavities in trees in coniferous forests and mixed woodlands.	5–40 feet	April through July; single or (rarely) double brood.	Clutch incubated for approximately 12 days by female while male provisions her; altricial young fledge at 18–21 days.	75	30–75	15–30
White-breasted Nuthatch	<i>Sitta carolinensis</i>	Cavities in trees in deciduous woodlands and mixed coniferous forests.	1–50 feet	March through June; single brood.	Clutch incubated for 12–14 days by female while male provisions her; altricial young fledge at 14–16 days.	50	15–50	10–15

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Pygmy Nuthatch	<i>Sitta pygmaea</i>	Cavities in dead trees or dead portions of trees in long-needled pine forests.	20–70 feet	May through July; single or double brood.	Clutch incubated for 15–16 days by female while male provisions her; altricial young fledge at 20–21 days.	75	30–75	15–30
Brown Creeper	<i>Certhia americana</i>	Cup nests concealed behind loose bark, in crevices on a trees in coniferous forests and mixed coniferous forests..	5–15 feet	May through July; single brood.	Clutch incubated for 15–18 days by female while male provisions her; altricial young fledge at 21 days.	75	30–75	15–30
Rock Wren	<i>Salpinctes obsoletus</i>	Cavities on rocky slopes	Ground/cliff	March through June; double or triple brood.	Clutch incubated for 12–14 days by female; altricial young fledge at 14–16 days.	75	30–75	15–30
Canyon Wren	<i>Catherpes mexicanus</i>	Cup nests in rock crevices or ledges in rocky habitats.	Ground/cliff	March through July; double brood.	Clutch incubated for 12–18 days by female; altricial young fledge at approximately 15 days.	75	30–75	15–30
Bewick's Wren	<i>Thryomanes bewickii</i>	Cavities in trees, brush, or between rocks in open woodlands and shrubby areas.	0–20 feet	March through July; double or triple brood.	Clutch incubated for approximately 14 days by female while male provisions her; altricial young fledge at approximately 14 days.	75	30–75	15–30
House Wren	<i>Troglodytes aedon</i>	Cavities in shrubby cover and thickets in open woodlands and hedgerows.	0–20 feet	April through July; double brood.	Clutch incubated for 13–15 days by female; altricial young fledge at 12–18 days.	50	30–50	15–30
Pacific Wren	<i>Troglodytes pacificus</i>	Cavities or crevices in logs, stumps, root balls, or trees in variety of forests.	0–10 feet	March through August; single or double brood.	Clutch is incubated for 14–17 days by female; altricial young fledge at approximately 19 days.	75	30–75	15–30

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Marsh Wren	<i>Cistothorus palustris</i>	Domed nests over the water in tall rushes and marsh grasses in wetland habitats.	1–5 feet	March through July; double or triple brood.	Clutch incubated for 12–14 days by female; altricial young fledge at 13–15 days.	75	30–75	15–30
American Dipper	<i>Cinclus mexicanus</i>	Domed nests in crevices in rocks, logs, bridges, or other protected areas immediately adjacent to water.	0–30 feet	March through August; single or double brood.	Clutch is incubated for approximately 16 days by female; altricial young fledge at 18–25 days.	75	30–75	15–30
Golden-crowned Kinglet	<i>Regulus satrapa</i>	Hanging nests woven onto conifer twigs in coniferous forests and mixed woodlands.	6–50 feet	May through August; single or double brood.	Clutch is incubated for 14–15 days by female; altricial young fledge at 16–19 days.	75	30–75	15–30
Ruby-crowned Kinglet	<i>Regulus calendula</i>	Cup nests in trees in coniferous woodlands.	4–100 feet	May through July; single brood.	Clutch incubated for 12–14 days by female; altricial young fledge at 16 days.	75	30–75	15–30
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	Cup nests in trees or shrubs in a variety of habitats from shrublands to mature forests.	3–80 feet	April through July; double brood.	Clutch incubated for approximately 15 days by both sexes; altricial young fledge at 12–13 days.	75	30–75	15–30
Coastal California Gnatcatcher	<i>Poliophtila californica californica</i>	Cup nests in coastal sage scrub and chaparral.	2–3 feet	February through August; double brood.	Clutch incubated for approximately 14 days by both sexes; altricial young fledge at 15–16 days.	500	CR	CR
Wrentit	<i>Chamaea fasciata</i>	Cup nests in coastal sage scrub and chaparral.	1–4 feet	March through July; double brood.	Clutch incubated for 15–16 days by both sexes; altricial young fledge at 15–16 days.	75	30–75	15–30

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Northern Mockingbird	<i>Mimus polyglottos</i>	Cup nests in shrubs and trees in variety of habitats, including woodlands and in developed areas.	3–10 feet	March through July; double or triple brood.	Clutch incubated for 11–14 days by female; altricial young fledge at 12–14 days.	75	30–75	15–30
Sage Thrasher	<i>Oreoscoptes montanus</i>	Cup nests in low shrubs in sagebrush habitat.	2–3 feet	April through August; single or double brood.	Clutch is incubated for 13–17 days; altricial young fledge at approximately 11 days.	75	30–75	15–30
Le Conte's Thrasher	<i>Toxostoma lecontei</i>	Cup nests in cholla or a low tree, in desert areas with shrubby growth.	2–8 feet	February through June; double or triple brood.	Clutch incubated for 14–20 days by both sexes; altricial young fledge at 14–17 days.	75	30–75	15–30
California Thrasher	<i>Toxostoma redivivum</i>	Cup nests in low trees or shrubs in sage scrub and chaparral.	2–4 feet	February through July; double brood.	Clutch incubated for approximately 14 days by both sexes; altricial young fledge at 12–14 days.	75	30–75	15–30
Bendire's Thrasher	<i>Toxostoma bendirei</i>	Cup nests in shrubs, cacti, or trees.	2–5 feet	Late February through April; single, double, or triple brood.	Clutch incubated 12–14 days by both parents; altricial young fledge at 12–13 days.	75	30–75	15–30
Cedar Waxwing	<i>Bombycilla cedrorum</i>	Cup nests in forks of trees in riparian or redwood forests.	5–50 feet	June through August; single or double brood.	Clutch is incubated for 12–14 days; altricial young fledge at 16–18 days	75	30–75	15–30
Phainopepla	<i>Phainopepla nitens</i>	Cup nests in trees in desert scrub and coastal chaparral.	6–11 feet	Late February—desert; April through June—coastal; double brood.	Clutch incubated for 14–15 days by both sexes; altricial young fledge at 18–19 days.	75	30–75	15–30

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Orange-crowned Warbler	<i>Oreothlypis celata</i>	Cup nests on the ground or in crevices near ground in a variety of habitats, often where woodland and chaparral habitats meet.	Ground	April through July; single or double brood.	Clutch incubated for 12–14 days by female; altricial young fledge at 12–13 days.	75	30–75	15–30
Nashville Warbler	<i>Oreothlypis ruficapilla</i>	Cup nests on ground concealed in bushes or small trees in woodland edges or shrubby areas.	Ground	May through July; single brood.	Clutch incubated for 11–12 days by female; altricial young fledge at 11 days.	75	30–75	15–30
Yellow Warbler	<i>Setophaga petechia</i>	Cup nests in trees or shrubs in shrubby growth in riparian areas.	2–12 feet	April through July; single brood.	Clutch incubated for 11–12 days by female; altricial young fledge at days.	75	30–75	15–30
Yellow-rumped Warbler	<i>Setophaga coronata</i>	Cup nests in trees in coniferous woodlands.	4–50 feet	April through July; single or (rarely) double brood.	Clutch incubated for 12–13 days by female; altricial young fledge at 12–14 days.	75	30–75	15–30
Black-throated Gray Warbler	<i>Setophaga nigrescens</i>	Cup nests in trees or shrubs in open woodlands in mountainous areas.	8–35 feet	May through July; single or double brood.	Clutch incubated by female; young are altricial. Length of incubation period and age at fledging undocumented.	75	30–75	15–30
Hermit Warbler	<i>Setophaga occidentalis</i>	Cup nests high in trees in coniferous forests	20–40 feet	May through July; single brood.	Clutch incubated for approximately 12 days by both sexes; altricial young fledge at 8–10 days.	75	30–75	15–30

Common Name	Scientific Name	Nest Location, Substrate, and Habitat	Vertical Height	Peak Breeding Season/Number of Broods per Season	Incubation Duration/Chick-rearing Duration	Standard Buffer* (feet)	Medium to High Disturbance Category Buffer (feet)	Low to Medium Disturbance Category Buffer (feet)
MacGillivray's Warbler	<i>Geothlypis tolmiei</i>	Cup nests in low thick shrub in riparian woodlands and coniferous or mixed forests.	1–5 feet	May through July; single brood.	Clutch incubated for 11–13 days by female; altricial young fledge at 8–10 days.	75	30–75	15–30
Common Yellowthroat	<i>Geothlypis trichas</i>	Cup nests in reeds and other wetland vegetation over water or near water.	1–3 feet	April through July; single brood.	Clutch incubated for approximately 12 days by female; altricial young fledge at 9–10 days.	75	30–75	15–30
Wilson's Warbler	<i>Cardellina pusilla</i>	Cup nests on ground, hidden by vegetation in shrub habitats in forests and chaparral.	Ground	April through June; single or (rarely) double brood.	Clutch incubated for 11–13 days by female; altricial young fledge at 10–11 days.	75	30–75	15–30
Yellow-breasted Chat	<i>Icteria virens</i>	Cup nests in a dense shrub or tangle in thick riparian vegetation.	1–8 feet	April through July; single or (rarely) brood.	Clutch incubated for 11–12 days by female; altricial young fledge at 8–11 days.	75	30–75	15–30
Western Tanager	<i>Piranga ludoviciana</i>	Cup nests high in trees on outer branches in coniferous and mixed hardwood forests.	8–75 feet	May through July; single brood.	Clutch incubated for approximately 13 days by female; altricial young fledge at 10–11 days.	75	30–75	15–30
Green-tailed Towhee	<i>Pipilo chlorulus</i>	Cup nests in or at base of low shrubs in chaparral and disturbed (low growth) forest habitats.	0–2 feet	April through August; single or double brood.	Clutch incubated for 11–13 days by female; altricial young fledge at 11–14 days.	75	30–75	15–30
Spotted Towhee	<i>Pipilo maculatus</i>	Cup nests usually on the ground or very low in bushes shrubby habitats.	2–12 feet	April through July; single or double brood.	Clutch incubated for 12–13 days by female; altricial young fledge at approximately 9 days.	75	30–75	15–30

Common Name	Scientific Name	Nest Location, Substrate, and Habitat	Vertical Height	Peak Breeding Season/Number of Broods per Season	Incubation Duration/Chick-rearing Duration	Standard Buffer* (feet)	Medium to High Disturbance Category Buffer (feet)	Low to Medium Disturbance Category Buffer (feet)
California Towhee	<i>Melospiza crissalis</i>	Cup nests in shrubs or small trees in brushy habitats.	4–12 feet	March through July; double or triple brood.	Clutch incubated for approximately 14 days by female; altricial young fledge at approximately 10 days.	75	30–75	15–30
Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>	Cup nests at the base of a grass clumps, in dry rocky areas with sparse undergrowth.	0–2 feet	April through June; single or double brood.	Clutch incubated for 11–13 days by female; altricial young fledge at 9 days.	75	30–75	15–30
Chipping Sparrow	<i>Spizella passerina</i>	Cup nests in trees or shrubs in open woodlands.	3–20 feet	April through July; double brood.	Clutch incubated for 11–14 days by female; altricial young fledge at 9–12 days.	75	30–75	15–30
Black-chinned Sparrow	<i>Spizella atrogularis</i>	Cup nests in shrubs in chaparral habitat.	1–3 feet	April through August; single brood.	Clutch incubated for 12–13 days by female; altricial young fledge at approximately 10 days.	75	30–75	15–30
Lark Sparrow	<i>Chondestes grammacus</i>	Cup nests usually in scrapes on ground in open grasslands, or cup nests in herbaceous or woody shrubs.	0–9 feet	April through July; double brood.	Clutch incubated for 11–13 days by female; altricial young fledge at 9–10 days.	75	30–75	15–30
Black-throated Sparrow	<i>Amphispiza bilineata</i>	Cup nests in thorny shrubs or cactus in chaparral or desert habitats.	1 foot	April through June; single or double brood.	Clutch incubated for 12–13 days by female; altricial young fledge at approximately 9.5 days.	75	30–75	15–30
Sage Sparrow	<i>Artemisiospiza belli</i>	Cup nests in thick bushes in chaparral and desert habitats.	1 foot	March through June; double brood.	Clutch incubated for 10–16 days by female; altricial young fledge at 9–10 days.	75	30–75	15–30

Common Name	Scientific Name	Nest Location, Substrate, and Habitat	Vertical Height	Peak Breeding Season/Number of Broods per Season	Incubation Duration/Chick-rearing Duration	Standard Buffer* (feet)	Medium to High Disturbance Category Buffer (feet)	Low to Medium Disturbance Category Buffer (feet)
Bryant's Savannah Sparrow	<i>Passerculus sandwichensis alaudinus</i>	Cup nests on ground in dense, moist grasslands, ruderal vegetation, or saltmarsh vegetation.	Ground	April through July; single or double brood.	Clutch incubated for 10–13 days; altricial young fledge at 7–14 days.	75	30–75	15–30
Belding's Savannah Sparrow	<i>Passerculus sandwichensis beldingi</i>	Cup nests on ground in dense, moist grasslands, ruderal vegetation, or saltmarsh vegetation.	Ground	April through July; single or double brood.	Clutch incubated for 10–13 days; altricial young fledge at 7–14 days.	75	CR	CR
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	Ground nest at the base of bunchgrass or other vegetation in grasslands.	Ground	April through July; double or triple brood.	Clutch incubated for 11–12 days by female; altricial young fledge after 9 days.	75	30–75	15–30
Song Sparrow	<i>Melospiza melodia</i>	Cup nests in low grass and shrubs or thickets in a variety of forest, shrub, grassland, marsh, and riparian habitats.	1–3 feet	March through July; double, triple, or quadruple brood.	Clutch incubated for 12–14 days by female; altricial young fledge at 10 days.	75	30–75	15–30
Suisun Song Sparrow	<i>Melospiza melodia maxillaris</i>	Cup nests in low grass and shrubs or thickets in a variety of forest, shrub, grassland, marsh, and riparian habitats.	1–3 feet	March through July; double, triple, or quadruple brood.	Clutch incubated for 12–14 days by female; altricial young fledge at 10 days.	75	30–75	15–30
Alameda Song Sparrow	<i>Melospiza melodia pusillula</i>	Cup nests in low grass and shrubs or thickets in a variety of forest, shrub, grassland, marsh, and riparian habitats.	1–3 feet	March through July; double, triple, or quadruple brood.	Clutch incubated for 12–14 days by female; altricial young fledge at 10 days.	75	30–75	15–30

Common Name	Scientific Name	Nest Location, Substrate, and Habitat	Vertical Height	Peak Breeding Season/Number of Broods per Season	Incubation Duration/Chick-rearing Duration	Standard Buffer* (feet)	Medium to High Disturbance Category Buffer (feet)	Low to Medium Disturbance Category Buffer (feet)
San Pablo Song Sparrow	<i>Melospiza melodia samuelis</i>	Cup nests in low grass and shrubs or thickets in a variety of forest, shrub, grassland, marsh, and riparian habitats.	1–3 feet	March through July; double, triple, or quadruple brood.	Clutch incubated for 12–14 days by female; altricial young fledge at 10 days.	75	30–75	15–30
Lincoln's Sparrow	<i>Melospiza lincolnii</i>	Cup nests in depressions on the ground in shrubby growth at forest edges, clearings; often near wet areas	Ground	May through July; double brood.	Clutch incubated for 13–14 days by female; altricial young fledge at 10–12 days.	75	30–75	15–30
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	Cup nests on ground or in shrubs or small trees in coastal or mountain chaparral and mountain forests.	0–5 feet	May through September; double or triple brood.	Clutch incubated for 9–15 days; altricial young fledge at 9–11 days	50	30–50	15–30
Dark-eyed Junco	<i>Junco hyemalis</i>	Cup nests in depressions on the ground among tree roots or brush in variety of woodland habitats; also on building ledges or in trees.	Ground, but up to 8 feet on ledges or trees	April through July; double or triple brood.	Clutch incubated for 12–13 days by female; altricial young fledge at 10–13 days.	50	30–50	15–30
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	Cup nests in trees or shrubs in thickets, under trees along streams in riparian woodlands or coniferous or mixed forests near edges.	6–12 feet	April through July; single brood.	Clutch incubated for 12–13 days by both sexes; altricial young fledge at 12 days.	75	30–75	15–30

Common Name	Scientific Name	Nest Location, Substrate, and Habitat	Vertical Height	Peak Breeding Season/Number of Broods per Season	Incubation Duration/Chick-rearing Duration	Standard Buffer* (feet)	Medium to High Disturbance Category Buffer (feet)	Low to Medium Disturbance Category Buffer (feet)
Blue Grosbeak	<i>Guiraca caerulea</i>	Cup nests small trees, shrubs, or other low vegetation, usually near open areas in desert, chaparral, savannah, and forest edge habitats.	<1–16 feet	April through August; single or double brood.	Clutch incubated for 11–12 days by female; altricial young fledge at 9–13 days.	75	30–75	15–30
Lazuli Bunting	<i>Passerina amoena</i>	Cup nests in low thick shrubby riparian or chaparral habitat.	1–10 feet	May through July; double brood.	Clutch incubated for approximately 12 days by female; altricial young fledge at 10–15 days.	75	30–75	15–30
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	Cup nests in cattails, bulrushes, and other marsh vegetation or in shrubs in grasslands and shrubby habitats.	1–13 feet	March through June; double brood.	Clutch incubated for 10–12 days by female; altricial young fledge at 10–11 days.	75 350 (Kern Red-winged Blackbird)	30–75 200–350 (Kern Red-winged Blackbird)	15–30 100–200 (Kern Red-winged Blackbird)
Tricolored Blackbird	<i>Agelaius tricolor</i>	Cup nests in cattails and bulrushes in marshes and shrubby areas in uplands and agricultural areas. Colonial nester.	1–5 feet	April through June; double brood.	Clutch incubated for approximately 11 days by female; altricial young fledge at 13 days.	350	CR	CR
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	Cup nests cattails or other emergent vegetation over water in marshes with thick vegetative growth. Colonial nester.	2–3 feet	May through June; single brood.	Clutch incubated for 10–13 days by female; altricial young fledge at 9–12 days old	350	200–350	100–200
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	Cup nests high in trees or shrubs near water in agricultural or suburban/urban areas.	8–43 feet	March through July; single or double brood.	Clutch incubated for 12–13 days by female; altricial young fledge at approximately 13 days.	50	30–50	15–30

Common Name	Scientific Name	Nest Location, Substrate, and Habitat	Vertical Height	Peak Breeding Season/Number of Broods per Season	Incubation Duration/Chick-rearing Duration	Standard Buffer* (feet)	Medium to High Disturbance Category Buffer (feet)	Low to Medium Disturbance Category Buffer (feet)
Western Meadowlark	<i>Sturnella neglecta</i>	Domed nests on ground in open grasslands.	Ground	March through June; double brood.	Clutch incubated for 13–15 days by female; altricial young fledge at 10–12 days.	75	30–75	15–30
Hooded Oriole	<i>Icterus cucullatus</i>	Closed cup nests high in trees (often palm trees) or shrubs, often in riparian habitat and in suburban areas.	10–45 feet	April through August; double or triple brood.	Clutch incubated for 12–14 days by female; altricial young fledge at approximately 14 days.	75	30–75	15–30
Bullock's Oriole	<i>Icterus bullockii</i>	Pensile cup nests in twig fork of trees in riparian and oak woodlands.	6–15 feet	April through July; single brood.	Clutch incubated for approximately 14 days by female; altricial young fledge at approximately 14 days.	75	30–75	15–30
Pine Grosbeak	<i>Pinicola enucleator</i>	Cup nests near the end of horizontal tree branches in coniferous forests.	16–35 feet	May through August; single brood.	Clutch incubated for 13–14 days by female; altricial young fledge at approximately 14 days.	75	30–75	15–30
Purple Finch	<i>Haemorhous purpureus</i>	Cup nests high in trees well hidden by foliage, in coniferous forests and woodlands.	5–60 feet	April through June; double brood.	Clutch incubated for approximately 13 days by female; altricial young fledge at approximately 14 days.	75	30–75	15–30
House Finch	<i>Haemorhous mexicanus</i>	Cup nests in trees, building ledges, and other locations in urban/suburban, agriculture, woodlands, desert, and chaparral habitats.	5–7 feet	March through July; double or triple brood.	Clutch incubated for 12–14 days by female; altricial young fledge at 14–16 days.	50	15–30	10–15
Red Crossbill	<i>Loxia curvirostra</i>	Loose cup constructed near the end of horizontal branch in coniferous forests.	6–60 feet	February through June; single brood.	Clutch incubated for 12–16 days by female; altricial young fledge at 17–22 days.	75	30–75	15–30

Common Name	Scientific Name	Nest Location, Substrate, and Habitat	Vertical Height	Peak Breeding Season/Number of Broods per Season	Incubation Duration/Chick-rearing Duration	Standard Buffer* (feet)	Medium to High Disturbance Category Buffer (feet)	Low to Medium Disturbance Category Buffer (feet)
Pine Siskin	<i>Spinus pinus</i>	Cup nest constructed on conifer or hardwood in coniferous or mixed hardwood forests.	3–50 feet	April through July; single or double brood.	Clutch incubated for approximately 13 days; altricial young fledge at 14–15 days.	75	30–75	15–30
Lesser Goldfinch	<i>Spinus psaltria</i>	Cup nests in trees and shrubs in a variety of open habitats including oak woodlands, mixed coniferous forests, riparian woodlands, chaparral, agricultural and suburban habitats.	3–36 feet	April through July; single or double brood.	Clutch incubated for approximately 12 days by female; altricial young fledge at 11 days.	75	30–75	15–30
Lawrence's Goldfinch	<i>Spinus lawrencei</i>	Cup nests in scattered trees in oak woodlands and savannahs.	3–40 feet	April through July; single or (rarely) double brood	Clutch incubated for 12–13 days by female; altricial young fledge at approximately 11 days.	75	30–75	15–30
American Goldfinch	<i>Spinus tristis</i>	Cup nests in a variety of shrubs in variety of open habitats including ruderal fields and grasslands with shrub component nearby.	3–10 feet	April through August; single or double brood.	Clutch incubated for 12–14 days by female; altricial young fledge at 11–17 days.	75	30–75	15–30
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	Cup nests in fir or other conifers in coniferous forests.	30–60 feet	June through August; single or (rarely) double brood.	Clutch incubated for 12–14 days by female; altricial young fledge at 13–14 days.	75	30–75	15–30

^a Consultation recommended to perform work within the standard buffer. Confer internally on avoidance and minimization approach.

^b The 1,320-foot (0.25-mile) buffer applies to the highest noise level category (90 dB or greater measured at 50 feet). Smaller buffers may be appropriate based on the noise levels of the project. Biologists should follow the methodology found in *Estimating the Effects of Auditory and Visual Disturbance to Northern Spotted Owls and Marbled Murrelets in Northwestern California* (U.S. Fish and Wildlife Service 2006) to determine the noise level and appropriate buffer for their specific project.

2020 ACTIVITIES INVOLVING VERNAL POOL TADPOLE SHRIMP AND THE CALIFORNIA TIGER SALAMANDER AT DON EDWARDS SAN FRANCISCO BAY NWR

Contact: Ivette Loreda, USFWS Refuge Specialist
22 December 2020

INTRODUCTION

Vernal pools are precipitation-filled topographic depressions that alternate between periods of inundation in the winter and desiccation in the summer. These ephemeral wetlands provide habitat for a variety of rare and endemic flora and fauna. California's vernal pool ecosystems have been significantly fragmented and reduced in size by anthropogenic habitat alterations including urbanization, agricultural conversion, unsuitable grazing regimes, and non-native plant invasion. As a result, many of the endemic species that inhabit these vanishing wetlands are experiencing population declines. Two such species that reside in Warm Springs' vernal pools are the federally endangered vernal pool tadpole shrimp and federally threatened California tiger salamander. These species were first found to exist on the Refuge in a 1993 survey of biodiversity on the site conducted by a conservation biology class at San Jose State University. The Don Edwards San Francisco Bay NWR (Refuge) has been monitoring the presence of these species at the Warm Springs Unit since 1997.

On June 1, 2012, the Refuge took over management of the adjacent mitigation lands formerly known as the "Pacific Commons Preserve", totaling 444 acres (Fig. 1). This additional acreage brought the Warm Springs Unit to 719 acres. A new monitoring program was initiated in 2012 based on methods outlined in the Biological Monitoring Plan for Warm Springs ("2012 Monitoring Plan"), a collaborative effort of WRA, Inc and the USFWS (WRA Inc., 2012). The plan outlines monitoring protocols and specifies which pools will be monitored over the entire expanded unit (Fig. 2). 2020 is the ninth year under this monitoring program and the eighth year that the Refuge reported activities over the entire 719 acres (WRA reported for the Pacific Commons Preserve in 2012).

Site Description

The vernal pools at Warm Springs occur within a 719-acre vernal pool grassland located at 37° 29' N and 122° 57' 30" W in the USGS Milpitas Quadrangle in Fremont, Alameda County, California. The site is located on Pescadero and Willows Clay soils, both of which have sufficiently low permeability that fresh water vernal pools are supported despite the absence of a distinct hardpan. The vegetation is comprised primarily of European annual grasses with interspersed stands of native perennial grasses and forbs. The climate is Mediterranean, characterized by warm, dry summers and moist, mild winters. Rainfall averages 13.97 inches annually, falling mainly during November-April.

Figure 1. Warm Springs Unit of Don Edwards San Francisco Bay NWR

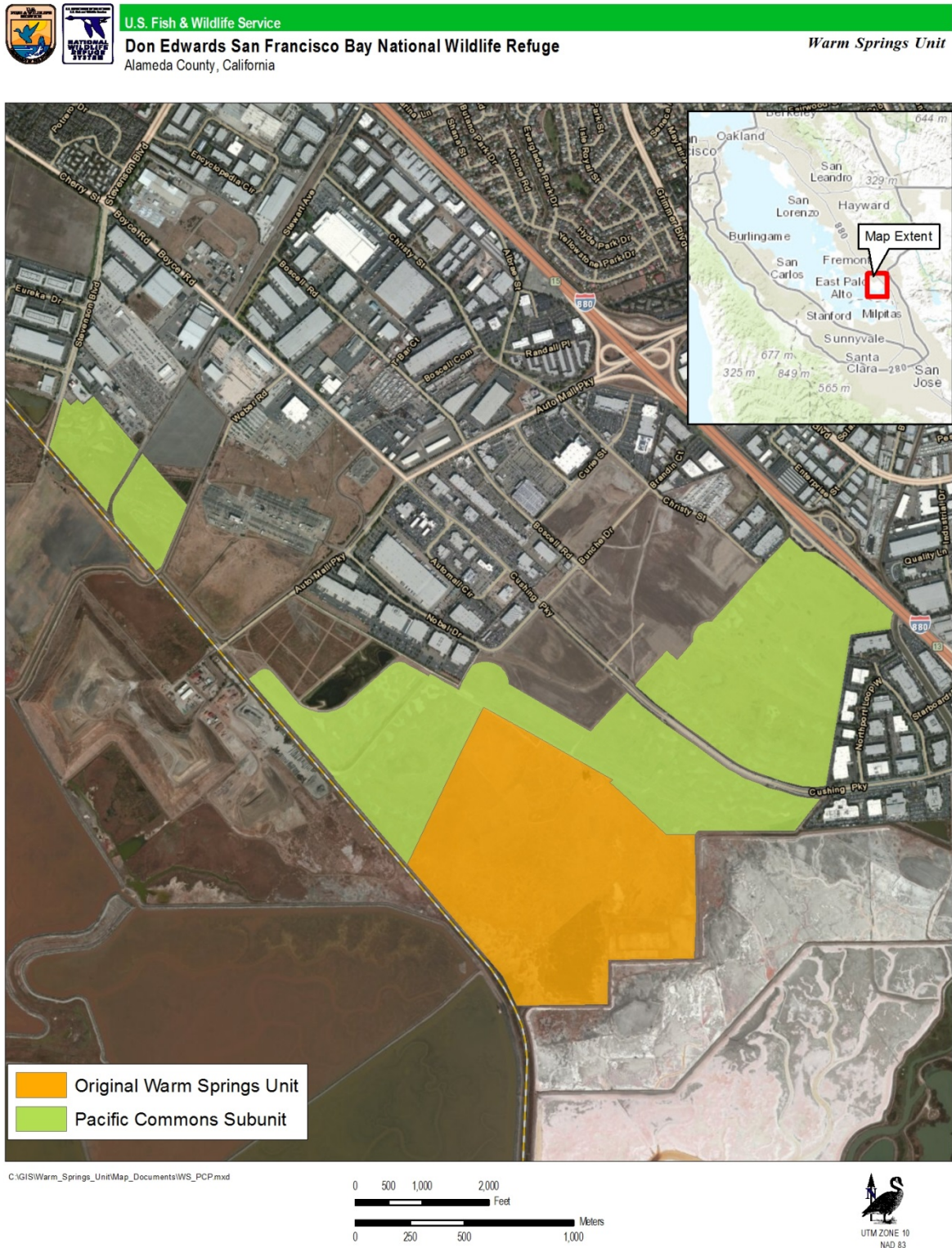


Figure 2. Monitored Pools at Warm Springs



Vernal Pool Tadpole Shrimp

The endangered vernal pool tadpole shrimp (*Lepidurus packardii*) (VPTS) is endemic to California and found primarily in the Central Valley. Its range extends from Shasta County south to Tulare County, bordered on the east by the Sierra Nevada and Cascade foothills and extending west into Solano and Alameda Counties. It is found sporadically throughout its range in areas bearing suitable vernal pool habitat. The Warm Springs Seasonal Wetland Unit (Warm Springs), an offsite parcel of the Don Edwards San Francisco Bay NWR in Alameda County, supports one of only two known populations found outside the Central Valley.

VPTS have adapted to the vernal pool environment by producing many drought resistant cysts (eggs) each winter that remain viable in the soil until hatching conditions are favorable. As the winter rains fill the pools, the VPTS cysts hatch and can reach sexual maturity in as little as three weeks. After VPTS mate, females deposit eggs on vegetation, rocks, or other objects on the bottom of pools. If annual precipitation is sufficient, these eggs can hatch and breed during the same winter season, but in a dry year they will hatch the following winter. Embedded in the top

layer of vernal pool soil sediments, VPTS cysts can remain dormant and viable for at least 10 years. The cysts are dispersed among pools by migrating and breeding waterfowl or during very wet years when many pools interconnect.

California Tiger Salamander

The Central Valley population of California tiger salamander (*Ambystoma californiense*) (CTS) was listed as federally threatened in August 2004. CTS inhabit large ephemeral pools and their surrounding grasslands throughout the Central Valley as well as adjacent foothill and coastal grasslands. It is the only tiger salamander species known to occur in its range. It is estimated that 75 percent of the original CTS habitat is now lost due to anthropogenic impacts and that 55-58 percent of documented historic breeding sites has been eliminated. Warm Springs is a remnant vernal pool grassland that supports one of the remaining CTS populations.

CTS survive in California's Mediterranean climate consisting of cool, moist winters and hot, dry summers. They breed in ephemeral pools that fill during the winter months. After the first storms of the winter, male and juvenile CTS migrate to the breeding pools where they spend approximately six weeks. Female CTS are found in pool sites for a short while (a few days to a two weeks), during which they breed and lay between 400-1300 eggs. Eggs are attached singly or in groups of 2-3 to vegetation at the edge of pools or objects on the bottom if there is little to no vegetation. Eggs take an average of 20 days to hatch and larvae require approximately 3 months to complete metamorphosis. Pool duration is the principal factor determining CTS persistence and survival. A longer period of inundation allows the metamorphs to grow larger and increases their chance of survival.

During the summer months, CTS persist in open grasslands, using ground squirrel and pocket gopher burrows, as well as deep cracks or holes in the ground. Burrows range in depth from 20 cm to one meter. Dispersal distances from pool breeding sites to upland burrows depend on local topography and vegetation, the distribution of burrows, and climatic conditions.

METHODS

Presence of VPTS and CTS within the Warm Springs vernal pools are assessed using sampling methods outlined in the 2012 Monitoring Plan. Given the large number of pools present in Warm Springs, a representative subset of 58 vernal pools is now monitored annually. Monitoring of hydrology, VPTS, and CTS occur in the same 58 pools.

To determine presence of VPTS, CTS, and macroscopic invertebrates in each vernal pool, an 80- μ m mesh size dip net is swept along the length of the pool and new organisms are recorded as present. Representative portions of the pool/swale bottom, edges, and vertical water column are sampled. The number of dips varied with the size of the pool. In pools where VPTS or CTS are not observed, a greater proportion of the pool is sampled to confirm negative findings. Beginning in April, staff switched to surveying pools using seine nets in pools holding enough water. One to three short passes were used.

Pools need to have held water continuously for approximately 4 weeks and need to be at least 5 cm deep in order to conduct aquatic sampling. The 2019 season was characterized by late start of the wet season and an abnormally wet May, which resulted in relatively late inundation and a

late start of the VPTS and CTS breeding activity. All 58 pools we monitor were inundated for more than 65 days.

RESULTS

Climate

Rainfall patterns affect pool inundation periods and timing, as well as maximum pool depths. Therefore, reproductive success of aquatic breeding organisms and germination of vernal pool plants are greatly affected by rainfall patterns and amounts. Prior to 2018, monthly precipitation data was collected using a rain logger onsite. However, due to major malfunction of the logger in 2018 and consistent failures in the previous years, we decided to use precipitation data from the National Oceanic and Atmospheric Administration's Newark weather station (NCDC #6144), located approximately 4 miles west of Warm Springs (Table 1) (Retrieved from: <https://www.ncdc.noaa.gov/cdo-web/datasets/GHCND/stations/GHCND:USC00046144/detail>). Precipitation received from November through April is the most effective at influencing vernal pool inundation; precipitation received before or after these months is typically less influential with regards to pool inundation because of high evapotranspiration demand in comparison to the very small amounts of precipitation normally received. However, in recent years, there was often a forward shift of the wet season with a high abundance of the precipitation in May, which was critical in prolonging the inundation period of the pools. Therefore, since 2019, we decided to include the rain data for May in the annual report as well.

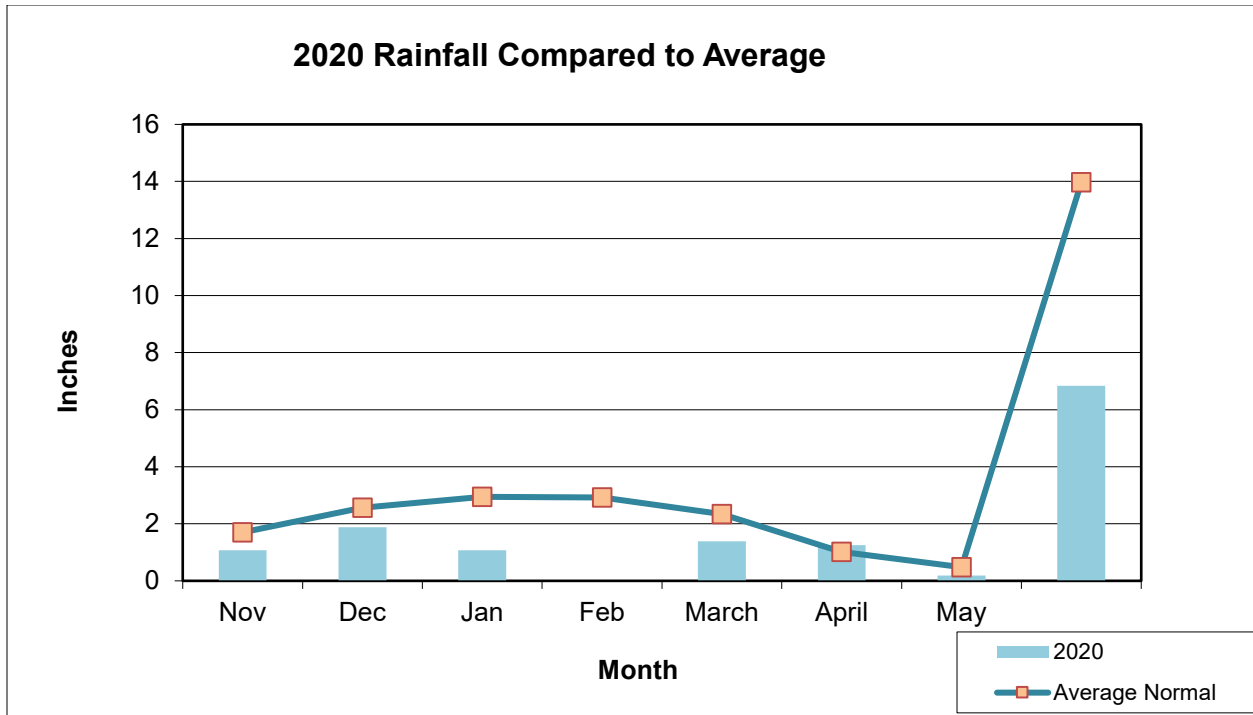
Water year 2020 (October 1, 2019 through September 30, 2020) was dry in Northern California. November was drier than normal for the Pacific Northwest; temperatures were well above normal across the region and for the month numerous California weather stations reported in the top ten warmest average monthly temperatures. Locally, the first wet front of the year arrived on November 27. That day the Newark weather station recorded 0.92 inches of rain and it was the highest recording in the whole water year. The wet weather continued through the first week of December but daily precipitation amounts were very low. Sporadic and weak rain events occurred in the rest of the month. A ridge off the West Coast associated to the positive East Pacific Oscillation played a major role in drier than usual conditions in the Pacific Northwest for the months of January and February. California experiencing its driest February on record as well as its 10th warmest (NOAA 2020a). The Newark station closest to Warm Springs recorded 0 inches of precipitation that month. The Pacific/North American pattern (PNA), which is associated with strong fluctuations in the strength and location of the East Asian jet stream, was negative during the month of March, particularly near the end of the month. A trough along the West Coast resulted in wet weather (NOAA 2020b) and a much needed moisture in our area. The pattern continued in early April, when the Newark Station recorded 1.25 inches of rain in the first week of the month. April was the only month in the 2020 water year with precipitation near and slightly higher than the average. The weak rain events in mid-May were the last precipitation for the water year. The wet spring partially compensated for the dry winter months but was insufficient to restore Northern California to average conditions (California Department of Water Resources 2020).

The seasonal rainfall amount is the most important variable affecting pool hydrology. The timing of the storm activity and its strength are also important factors determining the inundation pattern at the pools. For our site, the total precipitation in 2020 was below average (Table 1 and Figures 3).

Table 1. Monthly rainfall for Warm Springs between 1999 and 2020. For the years between 1999 and 2017 data came from a rain logger installed onsite Warm Springs with occasional gaps in the data set filled with data from nearby weather stations including Newark (NCDC #6144) and Union City (CIMIS #171). Since 2018 we use data from the Newark water station (NCDC#6144). The mean normal was calculated over the period of thirty years from 1981-2010 and was provided by the National Centers for Environmental Information

	Nov	Dec	Jan	Feb	Mar	April	Total
1999	2.00	0.82	2.33	3.89	1.71	1.30	12.05
2000	0.78	0.14	4.12	5.02	1.48	0.62	12.16
2001	0.84	0.42	2.25	3.72	1.58	1.40	10.21
2002	3.02	4.88	0.77	0.9	1.54	0.36	11.47
2003	1.6	5.97	0.5	1.98	0.84	3.00	13.89
2004	1.62	2.94	1.64	3.23	0.36	0.06	9.85
2005	.85	3.98	2.24	3.69	2.76	1.55	15.07
2006	0.72	4.86	2.49	0.96	5.45	2.83	17.31
2007	1.30	1.88	0.82	3.19	0.2	1.53	8.92
2008	0.51	1.58	5.18	2.30	.09	.03	9.69
2009	1.09	1.84	1.16	3.78	1.9	0.34	10.11
2010	0.32	1.62	5.31	2.14	2.26	3.28	14.93
2011	1.69	3.34	0.79	2.61	4.45	0.09	12.97
2012	1.54	0.18	1.72	0.72	2.59	2.14	8.89
2013	3.56	4.99	0.29	0.46	0.81	0.22	10.33
2014	1.15	0.24	0.05	2.96	2.18	1.18	7.76
2015	1.34	8.95	0	1.65	0.38	1.56	13.88
2016	2.12	2.24	3.78	0.68	2.68	1.38	12.88
2017	1.08	2.51	5.59	5.18	2.21	1.34	17.91
2018	2.03	0.06	3.47	0.49	2.08	1.46	9.59
2019	1.6	1.27	2.09	4.95	3.91	0.35	14.17
2020	1.07	1.88	1.07	0	1.39	1.25	6.66
Mean normal	1.7	2.56	2.95	2.92	2.34	1.02	13.49

Figure 3: Water year 2020 Monthly Rainfall Totals Compared to Average. Data from Newark NOAA Weather Station (NCDC #6144). The mean normal was calculated over the period of thirty years from 1981-2010 and was provided by the National Centers for Environmental Information.



Vernal Pool Hydrology

Priming, the process of the clay swelling and becoming impermeable, at the pools in Warm Springs did not occur until mid-December, when we recorded a few pools holding some traces of water (below 5cm depth). The first inundated pools were recorded in January. With the exception of three pools in Pasture 10 which stayed inundated for the whole year due to the feed from an artesian well, only three pools got inundated in January, namely pools 3-35, 7-5, 7-42 and all of them were dry by mid-February. The precipitation received in mid-March, most likely inundated several pools, however, due to Covid-19 restriction we were not able to perform any field surveys until the end of May. Table 2 shows the inundation periods for the pools in Warm Springs for 2020. As mentioned above, there was no data collection between mid-March and end of May. By the end of May all pools were dry, except the three pools in Pasture 10. Besides these three pools, which stayed inundated for the whole year, all pools had a hydroperiod less than 29 days (Table 2). This inundation period would not be sufficient to support the completion of the VPTS or CTS breeding cycle.

Table 2. Warm Springs monitored pools inundation period for 2020. The maximum hydroperiod is reported in the last column where green denotes inundation longer than 99 days, yellow longer than 54 but less than 100 days, and pink less than 54 days. No survey data exist for the days marked grey.

Pool #	Nov				Dec				Jan				Feb				Mar				Apr				May				Jun				Hydro-period
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4					
1-1																													0				
1-2A																													0				
1-2B																													0				
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3-27																													0				
3-30																													0				
3-35																													28				
4-2																													0				
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7-27																													0				
7-35																													0				
7-42																													27				
8-6																													0				
8-13																													0				
9-6																													0				
10-1A																													365				
10-1B																													365				
10-1D																													365				

Vernal Pool Tadpole Shrimp

The data from the vernal pool hydroperiod survey combined with field observations support that in 2020, in our pool monitoring sample, no vernal pool had long enough hydroperiod to sustain the complete cycle of the VPTS. In 2020, conditions in the three continuously inundated pools in Pasture 10 most likely were prohibiting for VPTS. Although year 2020 was a dry year with absent recruitment of VPTS, long period trends might be more informative on the status of the species. Table 6 shows annual presence of VPTS in the sampled Warm Springs pools from 2012 to 2020. In the Complex Natural Resources Management Plan (NRMP) (USFWS 2019), the indicator of VPTS presence at Warm Springs Unit is calculated as the rolling average of the best three of the last five years number of pools with VPTS presence and hydroperiod long enough to support completion of VPTS breeding cycle. The index value for year 2020 is 44 pools and based on the ranking system we established for the NRMP (Table 4), the rating is “very good”. Figure 4 presents the trend of the indicator value from 2016 to 2020.

California Tiger Salamander

Because of the sparsity of strong storm events and the paucity of rain in February, it is very likely that CTS were not triggered to initiate breeding. CTS is known as a boom and bust species and 2020 for the Warm Springs CTS population was a bust year. Table six show the number of the pools that supported CTS breeding effort from 2012 to 2020. In the Complex NRMP we use as an indicator of CTS breeding effort an index that considers the number of the pools (from the 58 pools monitored) with CTS presence and hydroperiod long enough to complete metamorphosis. The index is calculated by averaging the three highest numbers of pools with CTS in the last five years. The value of the index in 2020 was 24 pools and according to the ranking system we established for the NRMP (Table 4), the rating is “good”. Our goal is a “very good” rating. Figure 5 shows the indicator index trend from 2016 to 2020.

CONCLUSION

The 2020 season saw little to no standing water. It took very long time for the pools to prime due to the scarcity of rain events and higher than usual temperature. The completely dry and warm February dried the pools completely in the mid-winter. Although we did not monitor hydrology of the pools after mid-March due to Covid-19 restrictions, it is highly unlikely that the pools supported any VPTS and CTS breeding activity. It is very well documented that hydroperiod, the length of inundation, is the predominant factor in structuring temporary wetland communities (Schneider & Frost, 1996; Zokan & Drake, 2015, O’Neill 2016) and affects the abundance of VPTS (Kneitel et.al. 2017) as well as the reproductive activity and success of CTS (Ford et al. 2013). Year 2020 was one of the years with the lowest presence of our focal aquatic species in the last nine years of monitoring at Warm Springs Unit. While both of the species have evolved to tolerate dry years and they can have “boom” and “bust” years, the climate change we experience and which is characterized by higher frequency of extreme weather events could be an added stressor to these two species. Therefore, long term monitoring programs that assess the trend of species through direct or indirect measures of abundance are becoming even more important to better understand the effects of these new weather conditions and lead management decisions accordingly. Our rating system for the indicators we use to assess the status of CTS and VPTS on the site show that the rating remains “Very good” for VPTS (Figure 4) but for CTS dropped to “good” from last year’s “very good” rating (Figure 5).

Table 3. The number of pools containing VPTS and CTS from 2012-2020 (a total of 58 pools sample). When all pools with VPTS and/or CTS present did not have a hydroperiod long enough to complete the life cycle for VPTS (>54 days) and/or for CTS metamorphosis to occur (>100 days), the number in parenthesis shows how many pools met both conditions (i.e. focal species presence AND adequate hydroperiod).

	2012	2013	2014	2015	2016	2017	2018	2019	2020
VPTS	2	43	0	50	36 (34)	51	3 (1)	47	0
CTS	1	31	0	31	12	32	1	29(27)	0

Table 4. Viability ranks for the CTS breeding activity and VPTS presence indicators used in the San Francisco Bay NWR Complex NRMP. Indicators are used to assess the health of the vernal pool grassland ecosystem at Warm Springs and measuring progress in meeting management goals and objectives.

Indicator	Poor	Fair	Good	Very Good	Current Measure	Current Rating	Current Measure Year
Number of pools (of 58 that are monitored in Warm Springs Unit) with CTS larvae present AND hydroperiod adequate to allow for metamorphosis to occur (typically 100 days continuous inundation)	<12 pools with CTS AND hydroperiod >100 days	12-19 pools with CTS AND hydroperiod >100 days	20-26 pools with CTS AND hydroperiod >100 days	>27 pools with CTS AND hydroperiod >100 days	24 pools	Good	2016-2020, 3 best years average in the 5 last years
Number of pools (of 58 that are monitored in Warm Springs Unit) with VPTS present and hydroperiod adequate to allow for completion of breeding cycle (typically 54 days).	<18 pools with VPTS AND hydroperiod >54 days	19-31pools with VPTS AND hydroperiod >54 days	32-39 pools with VPTS AND hydroperiod >54 days	>40 pools with VPTS AND hydroperiod >54 days	44 pools	Very Good	2016-2020, 3 best years average in the 5 last years

Figure 4. VPTS presence index at Warm Springs for years 2016-2020. The index is calculated as the rolling average of the three highest VPTS indicator values that occurred in the last five years. VPTS indicator is defined as the number of pools (of 58 that are monitored in Warm Springs Unit) with CTS larvae present and hydroperiod adequate to allow for completion of breeding cycle (typically 54 days).

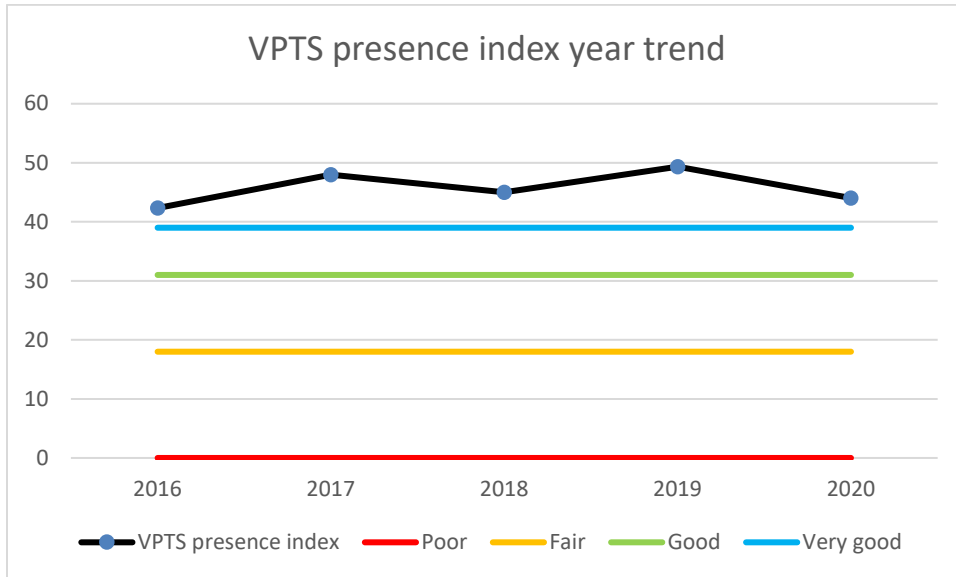
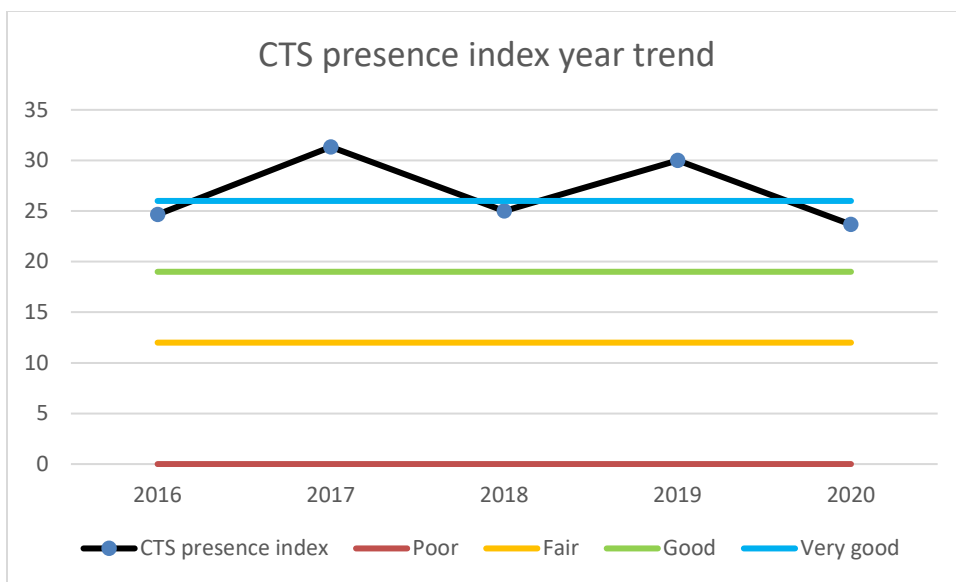


Figure 5. CTS presence index at Warm Springs for years 2016- 2020 based on data collected from 2012-2020. The index is calculated as the rolling average of the three highest CTS presence indicator values that occurred in the last five years. CTS indicator is defined as the number of pools (of 58 that are monitored in Warm Springs Unit) with CTS larvae present and hydroperiod adequate to allow for metamorphosis to occur (typically 100 days continuous inundation)



REFERENCES

- Helm, B. 1998. The biogeography of eight large branchiopods endemic to California. Pp. 124-139 In C.W. Witham, E. Bauder, D. Belk, W. Ferren, and R. Ornduff (eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California
- NOAA National Centers for Environmental Information, State of the Climate: Synoptic Discussion for February 2020, published online March 2020, retrieved on December 10, 2020 from <https://www.ncdc.noaa.gov/sotc/synoptic/202002>.
- NOAA National Centers for Environmental Information, State of the Climate: Synoptic Discussion for March 2020, published online April 2020, retrieved on December 10, 2020 from <https://www.ncdc.noaa.gov/sotc/synoptic/202003>.
- O'Neill, B.J., 2016. Community disassembly in ephemeral ecosystems. *Ecology*, 97(12), pp.3285-3292.
- Schneider, D.W. and Frost, T.M., 1996. Habitat duration and community structure in temporary ponds. *Journal of the North American Benthological Society*, 15(1), pp.64-86.
- U.S. Fish and Wildlife Service. 2019. Natural Resource Management Plan for the San Francisco Bay National Wildlife Refuge Complex. National Wildlife Refuge System, Pacific Southwest Region, Sacramento, CA.
- WRA, Inc. 2012. Biological Monitoring Plan, Warm Springs Unit, Don Edwards San Francisco Bay National Wildlife Refuge, Fremont, Alameda County, California. 32pp. plus appendices.
- Zokan, M. and Drake, J.M., 2015. The effect of hydroperiod and predation on the diversity of temporary pond zooplankton communities. *Ecology and evolution*, 5(15), pp.3066-3074.

2021 ACTIVITIES INVOLVING VERNAL POOL TADPOLE SHRIMP AND THE CALIFORNIA TIGER SALAMANDER AT DON EDWARDS SAN FRANCISCO BAY NWR

Contact: Ivette Loreda, USFWS Refuge Specialist
29 December 2021

INTRODUCTION

Vernal pools are precipitation-filled topographic depressions that alternate between periods of inundation in the winter and desiccation in the summer. These ephemeral wetlands provide habitat for a variety of rare and endemic flora and fauna. California's vernal pool ecosystems have been significantly fragmented and reduced in size by anthropogenic habitat alterations including urbanization, agricultural conversion, unsuitable grazing regimes, and non-native plant invasion. As a result, many of the endemic species that inhabit these vanishing wetlands are experiencing population declines. Two such species that reside in Warm Springs' vernal pools are the federally endangered vernal pool tadpole shrimp and federally threatened California tiger salamander. These species were first found to exist on the Refuge in a 1993 survey of biodiversity on the site conducted by a conservation biology class at San Jose State University. The Don Edwards San Francisco Bay NWR (Refuge) has been monitoring the presence of these species at the Warm Springs Unit since 1997.

On June 1, 2012, the Refuge took over management of the adjacent mitigation lands formerly known as the "Pacific Commons Preserve", totaling 444 acres (Fig. 1). This additional acreage brought the Warm Springs Unit to 719 acres. A new monitoring program was initiated in 2012 based on methods outlined in the Biological Monitoring Plan for Warm Springs ("2012 Monitoring Plan"), a collaborative effort of WRA, Inc and the USFWS (WRA Inc., 2012). The plan outlines monitoring protocols and specifies which pools will be monitored over the entire expanded unit (Fig. 2). 2020 is the ninth year under this monitoring program and the eighth year that the Refuge reported activities over the entire 719 acres (WRA reported for the Pacific Commons Preserve in 2012).

Site Description

The vernal pools at Warm Springs occur within a 719-acre vernal pool grassland located at 37° 29' N and 122° 57' 30" W in the USGS Milpitas Quadrangle in Fremont, Alameda County, California. The site is located on Pescadero and Willows Clay soils, both of which have sufficiently low permeability that fresh water vernal pools are supported despite the absence of a distinct hardpan. The vegetation is comprised primarily of European annual grasses with interspersed stands of native perennial grasses and forbs. The climate is Mediterranean, characterized by warm, dry summers and moist, mild winters. Rainfall averages 13.97 inches annually, falling mainly during November-April.

Figure 1. Warm Springs Unit of Don Edwards San Francisco Bay NWR

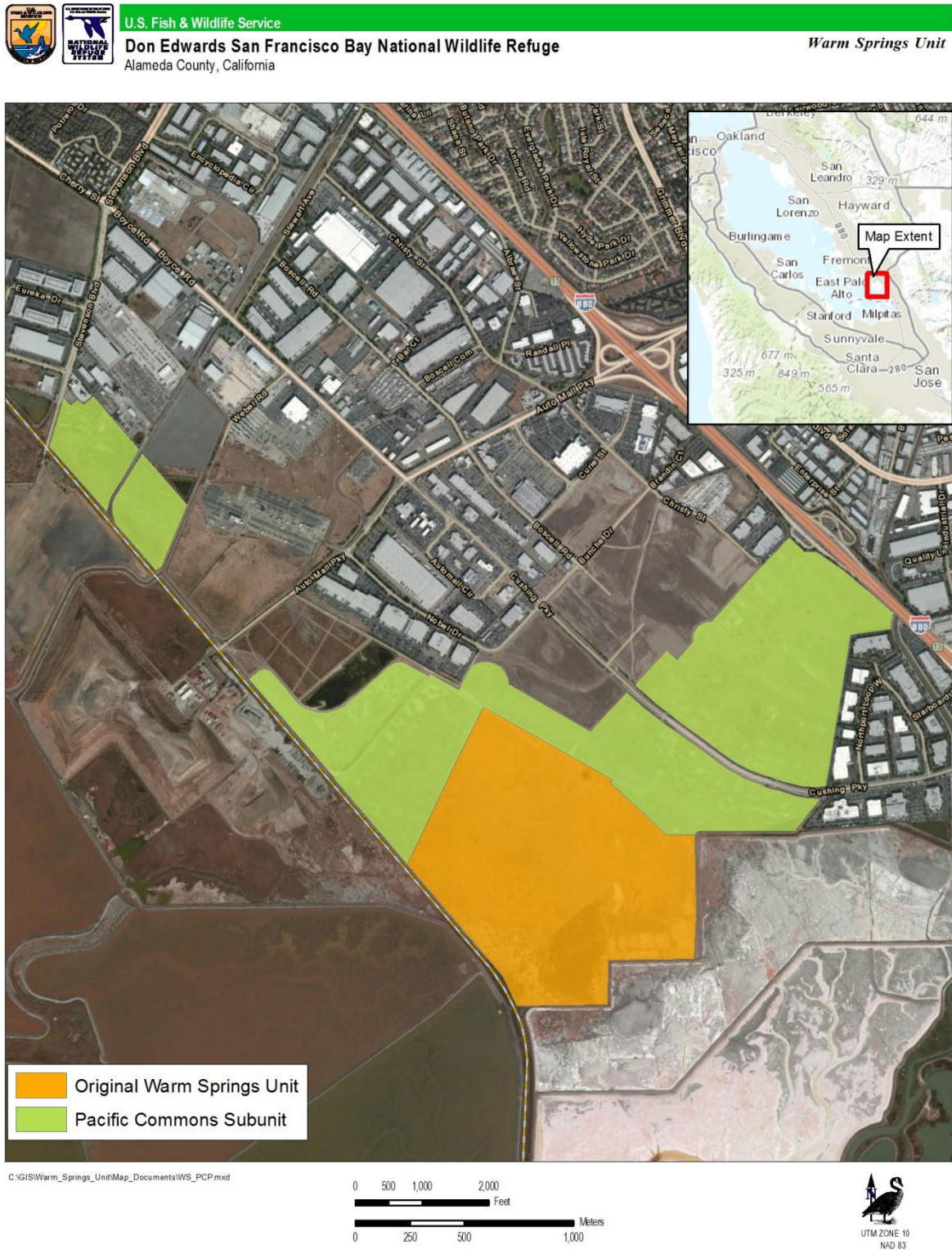


Figure 2. Monitored Pools at Warm Springs



Vernal Pool Tadpole Shrimp

The endangered vernal pool tadpole shrimp (*Lepidurus packardii*) (VPTS) is endemic to California and found primarily in the Central Valley. Its range extends from Shasta County south to Tulare County, bordered on the east by the Sierra Nevada and Cascade foothills and extending west into Solano and Alameda Counties. It is found sporadically throughout its range in areas bearing suitable vernal pool habitat. The Warm Springs Seasonal Wetland Unit (Warm Springs), an offsite parcel of the Don Edwards San Francisco Bay NWR in Alameda County, supports one of only two known populations found outside the Central Valley.

VPTS have adapted to the vernal pool environment by producing many drought resistant cysts (eggs) each winter that remain viable in the soil until hatching conditions are favorable. As the winter rains fill the pools, the VPTS cysts hatch and can reach sexual maturity in as little as three weeks. After VPTS mate, females deposit eggs on vegetation, rocks, or other objects on the bottom of pools. If annual precipitation is sufficient, these eggs can hatch and breed during the

same winter season, but in a dry year they will hatch the following winter. Embedded in the top layer of vernal pool soil sediments, VPTS cysts can remain dormant and viable for at least 10 years. The cysts are dispersed among pools by migrating and breeding waterfowl or during very wet years when many pools interconnect.

California Tiger Salamander

The Central Valley population of California tiger salamander (*Ambystoma californiense*) (CTS) was listed as federally threatened in August 2004. CTS inhabit large ephemeral pools and their surrounding grasslands throughout the Central Valley as well as adjacent foothill and coastal grasslands. It is the only tiger salamander species known to occur in its range. It is estimated that 75 percent of the original CTS habitat is now lost due to anthropogenic impacts and that 55-58 percent of documented historic breeding sites has been eliminated. Warm Springs is a remnant vernal pool grassland that supports one of the remaining CTS populations.

CTS survive in California's Mediterranean climate consisting of cool, moist winters and hot, dry summers. They breed in ephemeral pools that fill during the winter months. After the first storms of the winter, male and juvenile CTS migrate to the breeding pools where they spend approximately six weeks. Female CTS are found in pool sites for a short while (a few days to a two weeks), during which they breed and lay between 400-1300 eggs. Eggs are attached singly or in groups of 2-3 to vegetation at the edge of pools or objects on the bottom if there is little to no vegetation. Eggs take an average of 20 days to hatch and larvae require approximately 3 months to complete metamorphosis. Pool duration is the principal factor determining CTS persistence and survival. A longer period of inundation allows the metamorphs to grow larger and increases their chance of survival.

During the summer months, CTS persist in open grasslands, using ground squirrel and pocket gopher burrows, as well as deep cracks or holes in the ground. Burrows range in depth from 20 cm to one meter. Dispersal distances from pool breeding sites to upland burrows depend on local topography and vegetation, the distribution of burrows, and climatic conditions.

METHODS

Presence of VPTS and CTS within the Warm Springs vernal pools are assessed using sampling methods outlined in the 2012 Monitoring Plan. Given the large number of pools present in Warm Springs, a representative subset of 58 vernal pools is now monitored annually. There are two associated monitoring surveys, which are included in the San Francisco Bay National Wildlife Complex Inventory and Monitoring Plan as Vernal Pool Hydroperiod survey (FF08RSFB00-027) and as California Tiger Salamander and Vernal Pool Tadpole Shrimp Survey (FF08RSFB00-029). Monitoring of hydrology, VPTS, and CTS occur in the same 58 pools.

To determine presence of VPTS, CTS, and macroscopic invertebrates in each vernal pool, an 80-µm mesh size dip net is swept along the length of the pool and new organisms are recorded as present. Representative portions of the pool/swale bottom, edges, and vertical water column are sampled. The number of dips varied with the size of the pool. In pools where VPTS or CTS are not observed, a greater proportion of the pool is sampled to confirm negative findings. Beginning

in late March, staff switches to surveying pools using seine nets in pools holding enough water. One to three short passes are used.

Pools need to have held water continuously for approximately 4 weeks and need to be at least 5 cm deep in order to conduct aquatic sampling. The 2021 season was characterized by severe drought and this resulted to very short inundation periods of the pools that did not meet the surveying criteria.

RESULTS

Climate

Rainfall patterns affect pool inundation periods and timing, as well as maximum pool depths. Therefore, reproductive success of aquatic breeding organisms and germination of vernal pool plants are greatly affected by rainfall patterns and amounts. Prior to 2018, monthly precipitation data was collected using a rain logger onsite. However, due to major malfunction of the logger in 2018 and consistent failures in the previous years, we decided to use precipitation data from the National Oceanic and Atmospheric Administration's Newark weather station (NCDC #6144), located approximately 4 miles west of Warm Springs (Retrieved from: <https://www.ncdc.noaa.gov/cdo-web/datasets/GHCND/stations/GHCND:USC00046144/detail>). Unfortunately data from this station (NCDC#6144) stopped being available after January 19, 2021. To fulfill our need for precipitation records from January 20 to September 30, 2021 we use data reports from the Fremont Station (FREMONT, CA US USC00043244, retrieved from: <https://www.ncdc.noaa.gov/cdo-web/datasets/GHCND/stations/GHCND:USC00043244/detail>). Rainfall monthly summary data are presented in Table 1.

Precipitation received from November through April is the most effective at influencing vernal pool inundation; precipitation received before or after these months is typically less influential with regards to pool inundation because of high evapotranspiration demand in comparison to the very small amounts of precipitation normally received. However, in recent years, there was often a forward shift of the wet season with a high abundance of the precipitation in May, which was critical in prolonging the inundation period of the pools. Therefore, since 2019, we decided to include the rain data for May in our assessment and reports.

Water year 2021 (October 1, 2020 through September 30, 2021) was the second driest year in record for the state of California (CDWR, 2021) and succeeded another record dry drought year (2021 was the fifth driest year in record for the state of California). The only month that received precipitation close to average normal was the month of January, with most rainfall occurring in the last week of the month. The January circulation pattern was strongly modulated by the phase of the Pacific/North American pattern (PNA), which was positive during the first half of the month and strongly negative during the final week of January. As part of the positive PNA wavetrain, a ridge extended from the tropical Pacific to across Canada.

The pattern in January was particularly exceptional because of the ongoing La Niña event and a strongly negative phase of the Arctic Oscillation (AO). Both typically favor cool anomalies for the Northern Plains. However, the ridge was too strong and persistent to allow for the typical

cold air outbreaks. This particular La Niña event has also been shifted farther west than most years, which may also have favored these warmer temperatures (NOAA 2021).

The rest of the months were exceptionally dry with such an immense effect of drought that from April to July a series of state emergency proclamations for drought were issued to cover 50 counties in California.

The seasonal rainfall amount is the most important variable affecting pool hydrology. The timing of the storm activity and its strength are also important factors determining the inundation pattern at the pools. For our site, the total precipitation in 2021 was well below average noting a new record low (Table 1 and Figures 3).

Vernal Pool Hydrology

Pool inundation was first observed in the last week of January for 30 of the 58 pools we monitor and was generally shorter than four weeks (Table 2). The very low precipitation in the month was not enough to sustain their inundation and as a result water depth remained very shallow and most of the pools were dry by beginning of March. The scarcity of strong storm events and the observed inundation regime of the pools for the most part could not support the Completion of the VPTS and CTS breeding cycle. According to our protocol, we initiate dip netting sampling of the pools after four weeks of continuous inundation of the pools and a depth over 5cm. Apart from pool 3-35 that noted a hydroperiod of 118 days, no other pool met the criteria to initiate dip net surveying.

Table 1. Monthly rainfall for Warm Springs between 1999 and 2021. For the years between 1999 and 2017 data came from a rain logger installed onsite Warm Springs with occasional gaps in the data set filled with data from nearby weather stations including Newark (NCDC #6144) and Union City (CIMIS #171). From 2018 to end of December 2020 we used data from the Newark water station (NCDC#6144). Because data was not available for the Newark Water Station for the months January through May, for these months we used data from the nearby station of Fremont (NCDC#3244). The mean normal was calculated over the period of thirty years from 1981-2010 and was provided by the National Centers for Environmental Information

	Nov	Dec	Jan	Feb	Mar	April	Total
1999	2.00	0.82	2.33	3.89	1.71	1.30	12.05
2000	0.78	0.14	4.12	5.02	1.48	0.62	12.16
2001	0.84	0.42	2.25	3.72	1.58	1.40	10.21
2002	3.02	4.88	0.77	0.9	1.54	0.36	11.47
2003	1.6	5.97	0.5	1.98	0.84	3.00	13.89
2004	1.62	2.94	1.64	3.23	0.36	0.06	9.85
2005	.85	3.98	2.24	3.69	2.76	1.55	15.07
2006	0.72	4.86	2.49	0.96	5.45	2.83	17.31
2007	1.30	1.88	0.82	3.19	0.2	1.53	8.92
2008	0.51	1.58	5.18	2.30	.09	.03	9.69
2009	1.09	1.84	1.16	3.78	1.9	0.34	10.11
2010	0.32	1.62	5.31	2.14	2.26	3.28	14.93
2011	1.69	3.34	0.79	2.61	4.45	0.09	12.97
2012	1.54	0.18	1.72	0.72	2.59	2.14	8.89
2013	3.56	4.99	0.29	0.46	0.81	0.22	10.33
2014	1.15	0.24	0.05	2.96	2.18	1.18	7.76
2015	1.34	8.95	0	1.65	0.38	1.56	13.88
2016	2.12	2.24	3.78	0.68	2.68	1.38	12.88
2017	1.08	2.51	5.59	5.18	2.21	1.34	17.91
2018	2.03	0.06	3.47	0.49	2.08	1.46	9.59
2019	1.6	1.27	2.09	4.95	3.91	0.35	14.17
2020	1.07	1.88	1.07	0	1.39	1.25	6.66
2021	0.05	0.93	2.89	0.64	1.23	0.05	5.79
Mean normal	1.7	2.56	2.95	2.92	2.34	1.02	13.49

Figure 3: Water year 2021 Monthly Rainfall Totals Compared to Average. Data for November and December comes from Newark NOAA Weather Station (NCDC #6144). For the rest of months we used data from Fremont NOAA Weather Station (NCDC #3244) The mean normal was calculated over the period of thirty years from 1981-2010 and was provided by the National Centers for Environmental Information.

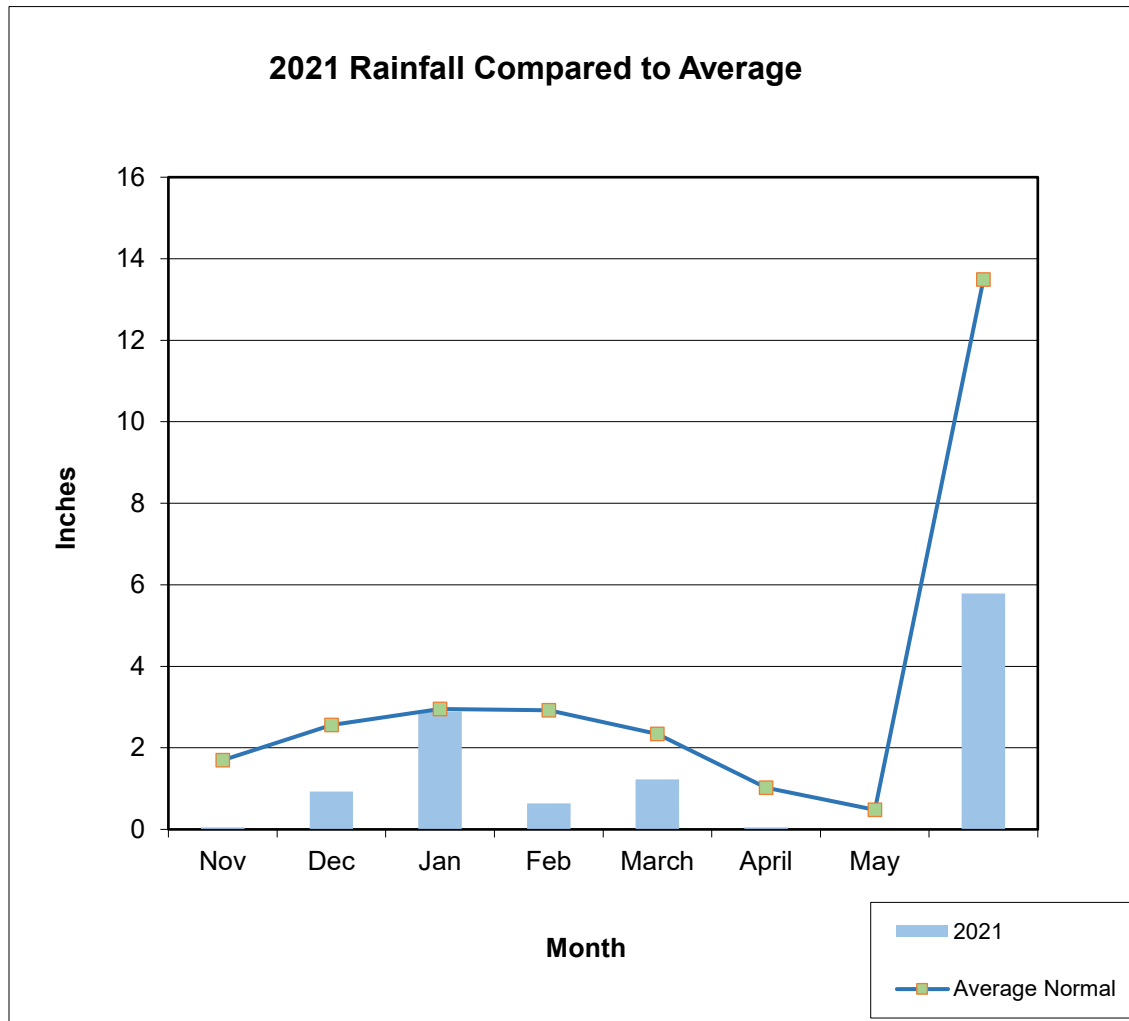


Table 2. Warm Springs monitored pools inundation period for 2021. The maximum hydroperiod is reported in the last column where green denotes inundation longer than 99 days, yellow longer than 54 but less than 100 days, and pink less than 54 days.

Pool #	Nov				Dec				Jan				Feb				Mar				Apr				May				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
1-1																												31	
1-2A																												21	
1-2B																												21	
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8-13																												21	
9-6																												21	
10-1A																												17	
10-1B																												17	
10-1D																												32	

Vernal Pool Tadpole Shrimp

The data from the vernal pool hydroperiod survey combined with field observations support that in 2021, in our pool monitoring sample, no vernal pool had long enough hydroperiod to sustain the complete cycle of the VPTS. We dip netted in pool 3-35, the only pool that met the conditions to initiate dip netting, but we were not able to find any VPTS. Although year 2021 was a dry year with absent recruitment of VPTS, long period trends might be more informative on the status of the species. Table 3 shows annual presence of VPTS in the sampled Warm Springs pools from 2012 to 2021. In the Complex Natural Resources Management Plan (NRMP) (USFWS 2019), the indicator of VPTS presence at Warm Springs Unit is calculated as the rolling average of the best three of the last five years number of pools with VPTS presence and hydroperiod long enough to support completion of VPTS breeding cycle. The index value for year 2021 is 31 pools and based on the ranking system we established for the NRMP (Table 4), the rating is “good”. Our goal is a “very good” rating. Figure 4 presents the trend of the indicator index value from 2016 to 2021, using data from 2012 to 2021 to calculate index values.

California Tiger Salamander

We dip netted in pool 3-35, the only pool that met the conditions to initiate dip netting and the only pool with inundation over 100 days, but we were not able to find any CTS. Because of the sparsity of strong storm events and the paucity of rain in February, it is very likely that CTS were not triggered to initiate breeding. CTS is known as a boom-and-bust species and 2021 for the Warm Springs CTS population was a bust year. Table 3 show the number of the pools that supported CTS breeding effort from 2012 to 2021. In the Complex NRMP we use as an indicator of CTS breeding effort an index that considers the number of the pools (from the 58 pools monitored) with CTS presence and hydroperiod long enough to complete metamorphosis. The index is calculated by averaging the three highest numbers of pools with CTS in the last five years. The value of the index in 2020 was 19 pools and according to the ranking system we established for the NRMP (Table 4), the rating is “good”. Our goal is a “very good” rating. Figure 5 presents the trend of the indicator index value from 2016 to 2021, using data from 2012 to 2021 to calculate index values.

CONCLUSION

The 2021 was one of the driest years in the history of California following another extreme dry year. Pools at Warm Springs held shallow water for short periods. According to the California Department of Water Resources annual summary (CDWR 2021) the two-year dry period continues the aridity theme California has been experiencing in the 21st century and it seems that California’s hydrologic conditions resemble those that have been experienced in the Colorado River Basin this century, where predominantly dry conditions are interspersed with an occasional wet year. It is very well documented that hydroperiod, the length of inundation, is the predominant factor in structuring temporary wetland communities (Schneider & Frost, 1996; Zokan & Drake, 2015, O’Neill 2016) and affects the abundance of VPTS (Kneitel et.al. 2017) as well as the reproductive activity and success of CTS (Ford et al. 2013). Year 2021 was the year with the lowest presence of our focal aquatic species in the last ten years of monitoring at Warm Springs Unit. While both species have evolved to tolerate dry years and they can have “boom” and “bust” years, the climate change we experience, and which is characterized by higher

frequency of extreme dry weather could be an added stressor to these two species. Our rating system for the indicators we use to assess the status of CTS and VPTS on the site show a rating of “Good” for VPTS (Figure 4) and CTS (Figure 5). It is notable that while the index value for each species has been fluctuating over the years, 2021 was the first year that the VPTS indicator dropped to “good” status from previous years’ “very good” ratings (Figure 4). For CTS we see a dramatic drop of the 2021 indicator value as well. While management can use several tools to improve site hydrological conditions, the low reproductive activity of CTS and VPTS due to extreme scarcity of precipitation and other climate change factors cannot be averted with traditional management tools. Long term monitoring programs that assess the trend of species through direct or indirect measures of abundance are becoming even more important to better understand the effects of these new weather conditions and lead management decisions accordingly.

Table 3. The number of pools containing VPTS and CTS from 2012-2021 (a total of 58 pools sample). When all pools with VPTS and/or CTS present did not have a hydroperiod long enough to complete the life cycle for VPTS (>54 days) and/or for CTS metamorphosis to occur (>100 days), the number in parenthesis shows how many pools met both conditions (i.e. focal species presence AND adequate hydroperiod).

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
VPTS	2	43	0	50	36 (34)	51	3 (1)	47	0	0
CTS	1	31	0	31	12	32	1	29(27)	0	0

Figure 4. VPTS presence index at Warm Springs for years 2016-2021. The index is calculated as the rolling average of the three highest VPTS indicator values that occurred in the last five years. VPTS indicator is defined as the number of pools (of 58 that are monitored in Warm Springs Unit) with CTS larvae present and hydroperiod adequate to allow for completion of breeding cycle (typically 54 days).

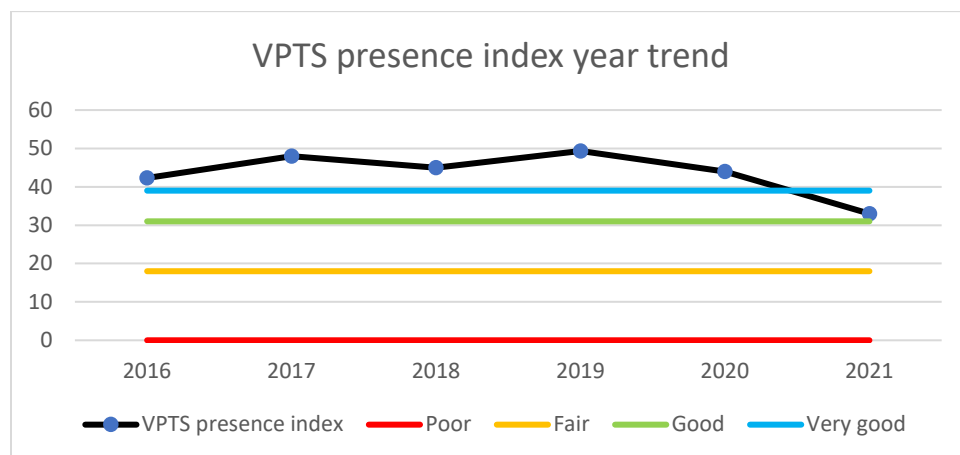


Figure 5. CTS presence index at Warm Springs for years 2016- 2021 based on data collected from 2012- 2021. The index is calculated as the rolling average of the three highest CTS presence indicator values that occurred in the last five years. CTS indicator is defined as the number of pools (of 58 that are monitored in Warm Springs Unit) with CTS larvae present and hydroperiod adequate to allow for metamorphosis to occur (typically 100 days continuous inundation)

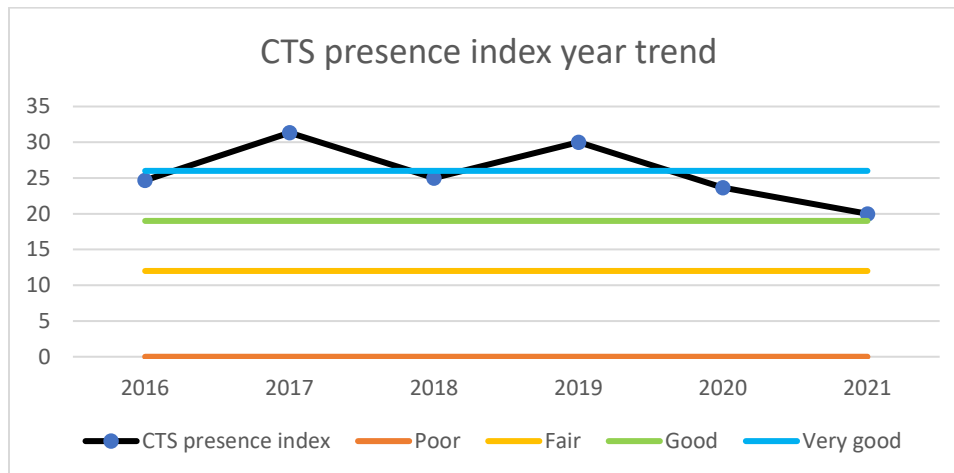


Table 4. Viability ranks for the CTS breeding activity and VPTS presence indicators used in the San Francisco Bay NWR Complex NRMP. Indicators are used to assess the health of the vernal pool grassland ecosystem at Warm Springs and measuring progress in meeting management goals and objectives.

Indicator	Poor	Fair	Good	Very Good	Current Measure	Current Rating	Current Measure Year
Number of pools (of 58 that are monitored in Warm Springs Unit) with CTS larvae present AND hydroperiod adequate to allow for metamorphosis to occur (typically 100 days continuous inundation)	<12 pools with CTS AND hydroperiod >100 days	12-19 pools with CTS AND hydroperiod >100 days	20-26 pools with CTS AND hydroperiod >100 days	>27 pools with CTS AND hydroperiod >100 days	20 pools	Good	2017-2021, 3 best years average in the 5 last years
Number of pools (of 58 that are monitored in Warm Springs Unit) with VPTS present and hydroperiod adequate to allow for completion of breeding cycle (typically 54 days).	<18 pools with VPTS AND hydroperiod >54 days	19-31pools with VPTS AND hydroperiod >54 days	32-39 pools with VPTS AND hydroperiod >54 days	>40 pools with VPTS AND hydroperiod >54 days	34 pools	Good	2017-2021, 3 best years average in the 5 last years

REFERENCES

- Helm, B. 1998. The biogeography of eight large branchiopods endemic to California. Pp. 124-139 In
- California Department of Water Resources. 2021. Water Year 2021: An Extreme Year. California Natural Resources Agency report published on October 2021, retrieved on January 3, 2022 from https://water.ca.gov/-/media/DWR-Website/Web-Pages/Water-Basics/Drought/Files/Publications-And-Reports/091521-Water-Year-2021-broch_v2.pdf
- NOAA National Centers for Environmental Information, State of the Climate: Synoptic Discussion for January 2021, published online February 2021, retrieved on January 4, 2022 from <https://www.ncdc.noaa.gov/sotc/synoptic/202101>.
- O'Neill, B.J., 2016. Community disassembly in ephemeral ecosystems. *Ecology*, 97(12), pp.3285-3292.
- Schneider, D.W. and Frost, T.M., 1996. Habitat duration and community structure in temporary ponds. *Journal of the North American Benthological Society*, 15(1), pp.64-86.
- U.S. Fish and Wildlife Service. 2019. Natural Resource Management Plan for the San Francisco Bay National Wildlife Refuge Complex. National Wildlife Refuge System, Pacific Southwest Region, Sacramento, CA.
- Witham, C.W., E. Bauder, D. Belk, W. Ferren, and R. Ornduff (eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California
- WRA, Inc. 2012. Biological Monitoring Plan, Warm Springs Unit, Don Edwards San Francisco Bay National Wildlife Refuge, Fremont, Alameda County, California. 32pp. plus appendices.
- Zokan, M. and Drake, J.M., 2015. The effect of hydroperiod and predation on the diversity of temporary pond zooplankton communities. *Ecology and evolution*, 5(15), pp.3066-3074.

2022 ACTIVITIES INVOLVING VERNAL POOL TADPOLE SHRIMP AND THE CALIFORNIA TIGER SALAMANDER AT DON EDWARDS SAN FRANCISCO BAY NWR

Contact: Ivette Loreda, USFWS Refuge Specialist
18 January 2023

INTRODUCTION

Vernal pools are precipitation-filled topographic depressions that alternate between periods of inundation in the winter and desiccation in the summer. These ephemeral wetlands provide habitat for a variety of rare and endemic flora and fauna. California's vernal pool ecosystems have been significantly fragmented and reduced in size by anthropogenic habitat alterations including urbanization, agricultural conversion, unsuitable grazing regimes, and non-native plant invasion. As a result, many of the endemic species that inhabit these vanishing wetlands are experiencing population declines. Two such species that reside in Warm Springs' vernal pools are the federally endangered vernal pool tadpole shrimp and federally threatened California tiger salamander. These species were first found to exist on the Refuge in a 1993 survey of biodiversity on the site conducted by a conservation biology class at San Jose State University. The Don Edwards San Francisco Bay NWR (Refuge) has been monitoring the presence of these species at the Warm Springs Unit since 1997.

On June 1, 2012, the Refuge took over management of the adjacent mitigation lands formerly known as the "Pacific Commons Preserve", totaling 444 acres (Fig. 1). This additional acreage brought the Warm Springs Unit to 719 acres. A new monitoring program was initiated in 2012 based on methods outlined in the Biological Monitoring Plan for Warm Springs ("2012 Monitoring Plan"), a collaborative effort of WRA, Inc and the USFWS (WRA Inc., 2012). The plan outlines monitoring protocols and specifies which pools will be monitored over the entire expanded unit (Fig. 2).

Site Description

The vernal pools at Warm Springs occur within a 719-acre vernal pool grassland located at 37° 29' N and 122° 57' 30" W in the USGS Milpitas Quadrangle in Fremont, Alameda County, California. The site is located on Pescadero and Willows Clay soils, both of which have sufficiently low permeability that fresh water vernal pools are supported despite the absence of a distinct hardpan. The vegetation is comprised primarily of European annual grasses with interspersed stands of native perennial grasses and forbs. The climate is Mediterranean, characterized by warm, dry summers and moist, mild winters. Rainfall averages 14.09 inches annually, falling mainly during November-April.

Figure 1. Warm Springs Unit of Don Edwards San Francisco Bay NWR

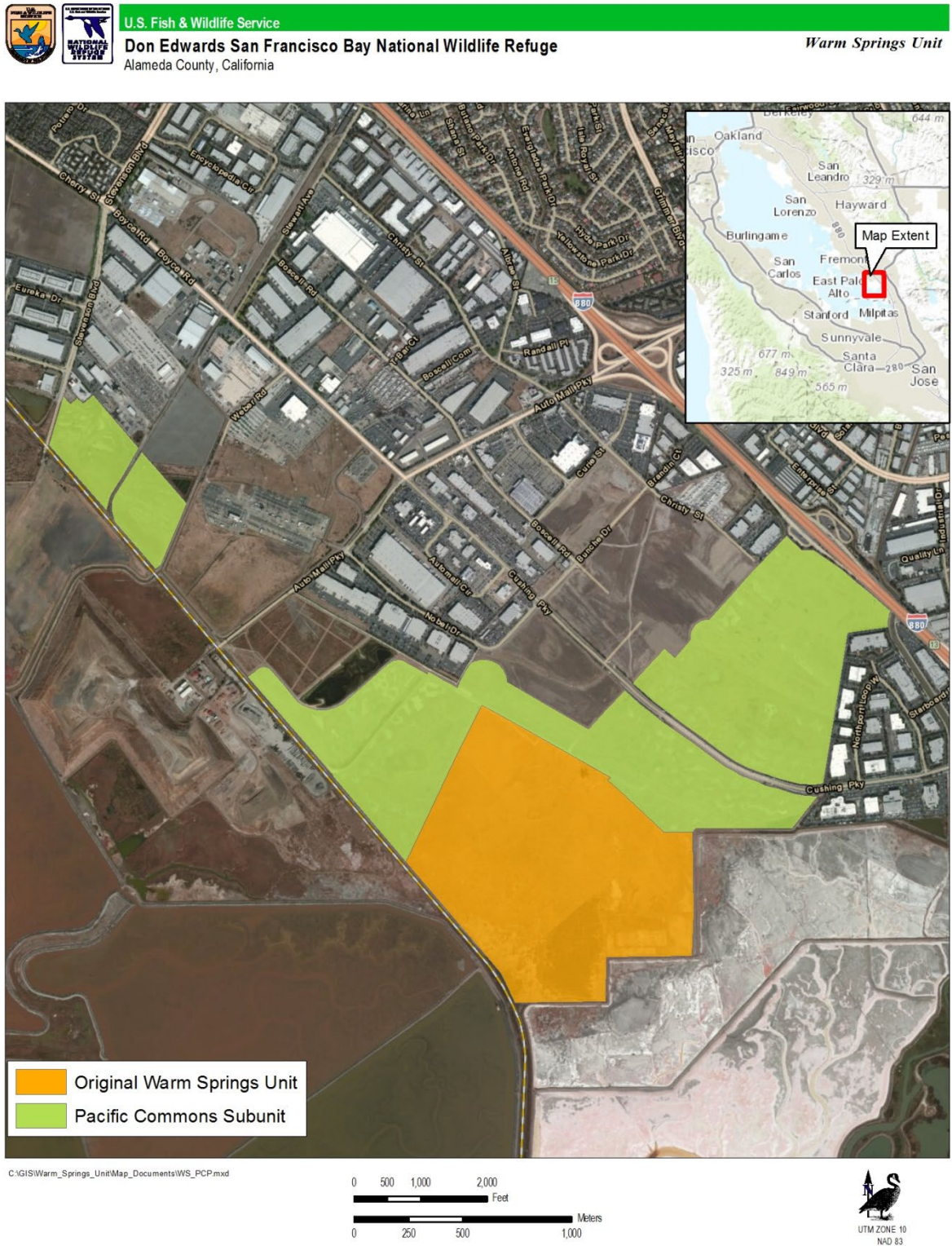


Figure 2. Monitored Pools at Warm Springs



Vernal Pool Tadpole Shrimp

The endangered vernal pool tadpole shrimp (*Lepidurus packardii*) (VPTS) is endemic to California and found primarily in the Central Valley. Its range extends from Shasta County south to Tulare County, bordered on the east by the Sierra Nevada and Cascade foothills and extending west into Solano and Alameda Counties. It is found sporadically throughout its range in areas bearing suitable vernal pool habitat. The Warm Springs Seasonal Wetland Unit (Warm Springs), an offsite parcel of the Don Edwards San Francisco Bay NWR in Alameda County, supports one of only two known populations found outside the Central Valley.

VPTS have adapted to the vernal pool environment by producing many drought resistant cysts (eggs) each winter that remain viable in the soil until hatching conditions are favorable. As the winter rains fill the pools, the VPTS cysts hatch and can reach sexual maturity in as little as three weeks. After VPTS mate, females deposit eggs on vegetation, rocks, or other objects on the bottom of pools. If annual precipitation is sufficient, these eggs can hatch and breed during the

same winter season, but in a dry year they will hatch the following winter. Embedded in the top layer of vernal pool soil sediments, VPTS cysts can remain dormant and viable for at least 10 years. The cysts are dispersed among pools by migrating and breeding waterfowl or during very wet years when many pools interconnect.

California Tiger Salamander

The Central Valley population of California tiger salamander (*Ambystoma californiense*) (CTS) was listed as federally threatened in August 2004. CTS inhabit large ephemeral pools and their surrounding grasslands throughout the Central Valley as well as adjacent foothill and coastal grasslands. It is the only tiger salamander species known to occur in its range. It is estimated that 75 percent of the original CTS habitat is now lost due to anthropogenic impacts and that 55-58 percent of documented historic breeding sites has been eliminated. Warm Springs is a remnant vernal pool grassland that supports one of the remaining CTS populations.

CTS survive in California's Mediterranean climate consisting of cool, moist winters and hot, dry summers. They breed in ephemeral pools that fill during the winter months. After the first storms of the winter, male and juvenile CTS migrate to the breeding pools where they spend approximately six weeks. Female CTS are found in pool sites for a short while (a few days to a two weeks), during which they breed and lay between 400-1300 eggs. Eggs are attached singly or in groups of 2-3 to vegetation at the edge of pools or objects on the bottom if there is little to no vegetation. Eggs take an average of 20 days to hatch and larvae require approximately 3 months to complete metamorphosis. Pool duration is the principal factor determining CTS persistence and survival. A longer period of inundation allows the metamorphs to grow larger and increases their chance of survival.

During the summer months, CTS persist in open grasslands, using ground squirrel and pocket gopher burrows, as well as deep cracks or holes in the ground. Burrows range in depth from 20 cm to one meter. Dispersal distances from pool breeding sites to upland burrows depend on local topography and vegetation, the distribution of burrows, and climatic conditions.

METHODS

Presence of VPTS and CTS within the Warm Springs vernal pools are assessed using sampling methods outlined in the 2012 Monitoring Plan. Given the large number of pools present in Warm Springs, a representative subset of 58 vernal pools is now monitored annually. There are two associated monitoring surveys, which are included in the San Francisco Bay National Wildlife Complex Inventory and Monitoring Plan as Vernal Pool Hydroperiod survey (FF08RSFB00-027) and as California Tiger Salamander and Vernal Pool Tadpole Shrimp Survey (FF08RSFB00-029). Monitoring of hydrology, VPTS, and CTS occur in the same 58 pools.

To determine presence of VPTS, CTS, and macroscopic invertebrates in each vernal pool, an 80-µm mesh size dip net is swept along the length of the pool and new organisms are recorded as present. Representative portions of the pool/swale bottom, edges, and vertical water column are sampled. The number of dips varied with the size of the pool. In pools where VPTS or CTS are not observed, a greater proportion of the pool is sampled to confirm negative findings. Beginning

in late March, staff switches to surveying pools using seine nets in pools holding enough water. One to three short passes are used.

Pools need to have held water continuously for approximately 4 weeks and need to be at least 5 cm deep in order to conduct aquatic sampling. The 2022 season was characterized by long dry spells and this resulted to a limited number of pools that met the surveying criteria. The first survey session started on January 20 and by January 27 we had surveyed 34 pools. The second session of the survey lasted from February 14 to February 15 and monitored 9 pools that were meeting the surveying criteria of inundation depth.

RESULTS

Climate

Rainfall patterns affect pool inundation periods and timing, as well as maximum pool depths. Therefore, reproductive success of aquatic breeding organisms and germination of vernal pool plants are greatly affected by rainfall patterns and amounts. Prior to 2018, monthly precipitation data was collected using a rain logger onsite. However, due to major malfunction of the logger in 2018 and consistent failures in the previous years, we decided to use precipitation data from the National Oceanic and Atmospheric Administration's Newark weather station (NCDC #6144), located approximately 4 miles west of Warm Springs (Retrieved from: <https://www.ncdc.noaa.gov/cdo-web/datasets/GHCND/stations/GHCND:USC00046144/detail>). Unfortunately data from this station (NCDC#6144) stopped being available after January 19, 2021. To fulfill our need for precipitation records from January 20 to September 30, 2021 we use data reports from the Fremont Station (FREMONT, CA US USC00043244, retrieved from: <https://www.ncdc.noaa.gov/cdo-web/datasets/GHCND/stations/GHCND:USC00043244/detail>). Rainfall monthly summary data are presented in Table 1.

Precipitation received from November through April is the most effective at influencing vernal pool inundation; precipitation received before or after these months is typically less influential with regards to pool inundation because of high evapotranspiration demand in comparison to the very small amounts of precipitation normally received. However, in recent years, there was often a forward shift of the wet season with a high abundance of the precipitation in May, which was critical in prolonging the inundation period of the pools. Therefore, since 2019, we decided to include the rain data for May in our assessment and reports. We also decided to include October because it can be important for the priming of the pools and because Climate change has brought unusual patterns of precipitation distribution and intensity.

Water year 2022 (October 1, 2021, through September 30, 2022) was another extremely dry year for the state of California (CDWR, 2022) although it was not as extreme in terms of temperature and precipitation as was water year 2021. Regardless, 2022 exhibited how climate change is expressed not only through the intensity of the weather phenomena, but also through the unusual timing of the phenomena and their annual distribution. Specifically, this water year started with an October Category 5 atmospheric river storm in northern California, an event both uncommonly large and uncommonly early in the wet season (CDWR, 2022). Another wet period came in late December. The wet end of the calendar year 2021 was followed by California's driest period of January through April on record. During the middle of January (2022), a ridge

developed along the West Coast and the trough shifted southeastward (NOAA 2022a). The ridge was associated with warm and dry conditions for the High Plains and the West Coast while the cold anomalies occurred along the East Coast under the trough. The ridge in the West strengthened in the last part of January and precipitation was suppressed, while warmer than usual temperatures prevailed. In mid-February, this system shifted eastward and broadened the ridge in the West, which in turn brought abnormally warm temperatures (NOAA 2022b). As a result, a lot of the inundated pools at Warm Springs Unit dried up faster than anticipated. The seasonal rainfall amount is the most important variable affecting pool hydrology. The timing of the storm activity and its strength are also important factors determining the inundation pattern at the pools. For our site, the total precipitation in 2022 was well below average (Table 1 and Figures 3).

Vernal Pool Hydrology

Pool inundation was first observed in the last week of October for 21 pools of the 58 we monitor in total (Table 2). However, except for four pools, the rest dried up by mid to late November. The strong storm system in December resulted in inundation of most of the pools we monitor. All but two of the monitored pools were inundated in the second week of December. However, the very low precipitation in the following months paired with unusually warm temperatures in February, prevented the pools from staying inundated and, as a result, most of the pools were dry by the beginning of March. Our vernal pool hydrology data (Table 2) show that only three of our monitored pools held water long enough to potentially support the completion of the CTS breeding cycle. In addition, only 24 of the 58 monitored pools were inundated for at least 54 days and therefore could potentially support the completion of VPTS breeding cycle.

Table 1. Monthly rainfall for Warm Springs between 1999 and 2022. For the years between 1999 and 2017 data came from a rain logger installed onsite Warm Springs with occasional gaps in the data set filled with data from nearby weather stations including Newark (NCDC #6144) and Union City (CIMIS #171). From 2018 to end of December 2020 we used data from the Newark water station (NCDC#6144). Because data was not available for the Newark Water Station for the months January through May, for these months we used data from the nearby station of Fremont (NCDC#3244). The mean normal was calculated over the period of thirty years from 1991-2020 and was provided by the National Centers for Environmental Information

	Nov	Dec	Jan	Feb	Mar	April	Total
1999	2.00	0.82	2.33	3.89	1.71	1.30	12.05
2000	0.78	0.14	4.12	5.02	1.48	0.62	12.16
2001	0.84	0.42	2.25	3.72	1.58	1.40	10.21
2002	3.02	4.88	0.77	0.9	1.54	0.36	11.47
2003	1.6	5.97	0.5	1.98	0.84	3.00	13.89
2004	1.62	2.94	1.64	3.23	0.36	0.06	9.85
2005	.85	3.98	2.24	3.69	2.76	1.55	15.07
2006	0.72	4.86	2.49	0.96	5.45	2.83	17.31
2007	1.30	1.88	0.82	3.19	0.2	1.53	8.92
2008	0.51	1.58	5.18	2.30	.09	.03	9.69
2009	1.09	1.84	1.16	3.78	1.9	0.34	10.11
2010	0.32	1.62	5.31	2.14	2.26	3.28	14.93
2011	1.69	3.34	0.79	2.61	4.45	0.09	12.97
2012	1.54	0.18	1.72	0.72	2.59	2.14	8.89
2013	3.56	4.99	0.29	0.46	0.81	0.22	10.33
2014	1.15	0.24	0.05	2.96	2.18	1.18	7.76
2015	1.34	8.95	0	1.65	0.38	1.56	13.88
2016	2.12	2.24	3.78	0.68	2.68	1.38	12.88
2017	1.08	2.51	5.59	5.18	2.21	1.34	17.91
2018	2.03	0.06	3.47	0.49	2.08	1.46	9.59
2019	1.6	1.27	2.09	4.95	3.91	0.35	14.17
2020	1.07	1.88	1.07	0	1.39	1.25	6.66
2021	0.05	0.93	2.89	0.64	1.23	0.05	5.79
2022	0.25	4.93	0.05	0.02	0.67	1.13	7.05
Mean normal	1.38	2.76	2.77	2.82	2.17	1.07	12.97

Figure 3: Water year 2022 Monthly Rainfall Totals Compared to Average. Data comes from Fremont NOAA Weather Station (NCDC #3244). The mean normal was calculated over the period of thirty years from 1991-2020 and was provided by the National Centers for Environmental Information.

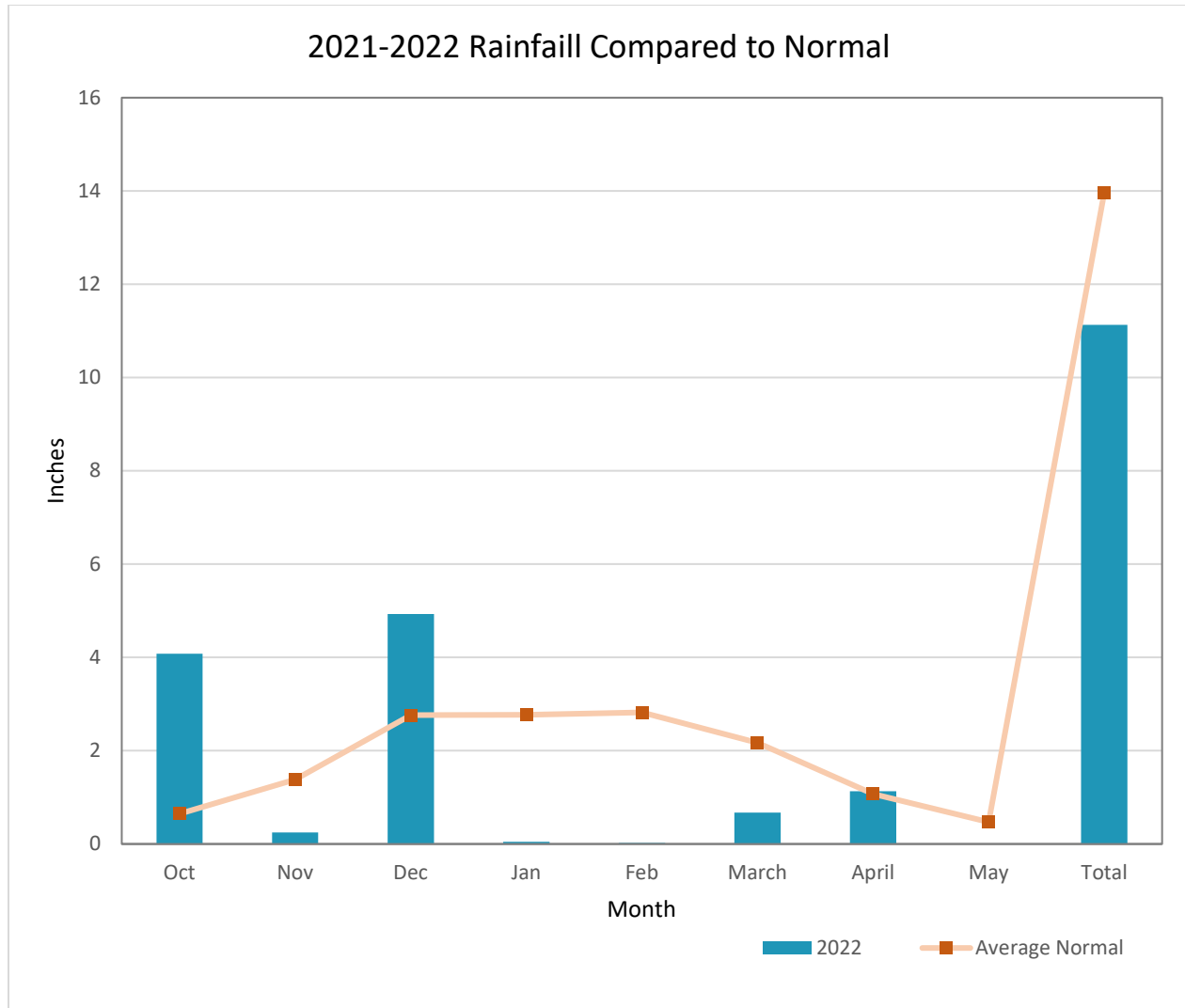


Table 2. Warm Springs monitored pools inundation period for 2022. The maximum hydroperiod is reported in the last column where green denotes inundation longer than 99 days, yellow longer than 54 but less than 100 days, and white less than 54 days.

Pool #	Oct				Nov				Dec				Jan				Feb				Mar				Apr				May				Max Hydro-period
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4					
1-1																													84				
1-2A																													84				
1-2B																													74				
1-3A																													37				
1-4A																													27				
1-5A																													37				
1-5B																													73				
1-6A																													26				
1-6B																													18				
1-7																													39				
1-8																													80				
1-10																													44				
1-12																													61				
3-7																													26				
3-17																													69				
3-21																													86				
3-25																													44				
3-27																													14				
3-30																													0				
3-35																													152				
4-2																													37				
4-10																													20				
4-14																													13				
4-15																													13				
5-6																													20				
5-10																													80				
5-14																													55				
5-20B																													72				
5-25																													16				
5-27																													31				
5-33																													73				
5-34																													62				
5-38																													15				
5-39																													20				
5-41																													31				
5-42																													44				
6-1C																													0				
6-3C																													34				
6-4A																													21				
6-4D																													21				
6-4F																													54				
6-4I																													77				
6-5B																													34				
6-11																													60				
7-2																													35				

7-5										96
7-10										7
7-12A										132
7-18B										14
7-27										30
7-35										28
7-42										42
8-6										51
8-13										57
9-6										54
10-1A										66
10-1B										73
10-1D										147

Vernal Pool Tadpole Shrimp

We found VPTS present in 28 pools, however only 19 of these pools had inundation long enough to support the completion of the VPTS breeding cycle (Table 3 & 4). Year 2022 is the first year we experienced such a high deviation between the number of pools with VPTS presence and the number of pools that was inundated long enough for them to complete their cycle.

In the Complex Natural Resources Management Plan (NRMP) (USFWS 2019), the indicator of VPTS presence at Warm Springs Unit is calculated as the rolling average of the best three of the last five years number of pools with VPTS presence and hydroperiod long enough to support completion of VPTS breeding cycle. The index value for year 2022 is 22 pools and based on the ranking system we established for the NRMP (Table 4) the rating is “fair”. Our goal is a “very good” rating. Figure 4 presents the trend of the indicator index value from 2016 to 2022, using data from 2012 to 2022 to calculate index values. We use this index to consider that despite “boom and bust” years, VPTS populations may stay healthy over years. However, by definition, this index is sensitive when extended periods with extreme drought and /or untimely inundation of the pools dominate the 5-year period the index considers calculating average.

California Tiger Salamander

During the 2022 survey effort, CTS larvae was observed in 12 pools. However, only one of these pools stayed inundated enough to support their metamorphosis. Like the case with VPTS, year 2022 is the first year we experienced such a high deviation between the number of pools with CTS presence and the number of pools that was inundated long enough for them to metamorphose. It appears the storms in December triggered CTS breeding effort, which unfortunately was unsuccessful due to the lack of precipitation and abnormally high temperatures in January through February which caused pools to dry early before larvae could metamorphose. CTS is known as a boom-and-bust species and 2022 for the Warm Springs CTS population was a bust year, for the third year in a row. Table 3 show the number of the pools that supported CTS breeding effort from 2012 to 2022 and Table 4 lists the pools with CTS presence in 2022. Overall, we captured 95 larvae over the course of two survey sessions. After we measured the length of salamander larvae, we released them back to their natal pool. From the larvae we

captured, there was not indication that they would finish their metamorphosis before the pool dry. For example, legs were not developed and the maximum lengths recorded were in the range of 28-36 mm.

In the Complex NRMP we use as an indicator of CTS breeding effort an index that considers the number of the pools (from the 58 pools monitored) with CTS presence and hydroperiod long enough to complete metamorphosis. The index is calculated by averaging the three highest numbers of pools with CTS present and hydroperiod more than 100 days in the last five years. The value of the index in 2022 was 10 pools and according to the ranking system we established for the NRMP (Table 4), the rating is “poor”. Our goal is a “very good” rating. Figure 5 presents the trend of the indicator index value from 2016 to 2022, using data from 2012 to 2022 to calculate index values.

CONCLUSION

The 2022 water year was the third year in a row of extreme drought in California. Unusually early strong storm systems in October and then later in December, primed and inundated the pools early and triggered reproductive effort for both VPTS and CTS. However, the subsequent lack of precipitation and unusually high temperatures in January through February, dried the pools at Warm Springs Unit much earlier than what would be ideal for VPTS and CTS breeding success. It is very well documented that hydroperiod, the length of inundation, is the predominant factor in structuring temporary wetland communities (Schneider & Frost, 1996; Zokan & Drake, 2015, O’Neill 2016) and affects the abundance of VPTS (Kneitel et.al. 2017) as well as the reproductive activity and success of CTS (Ford et al. 2013). Year 2022 illustrated the high deviation in the amount of precipitation from the average, especially when considering the monthly amounts of precipitation. This variability is becoming increasingly extreme due to climate change. While both species have evolved to tolerate dry years and they can have “boom” and “bust” years, the climate change we experience, which is characterized by higher frequency of extreme dry weather, could be an added stressor to these two species. The effect of drought may be more strongly negative when precipitation patterns trigger our focal species to initialize breeding, but they do not adequately sustain pool hydroperiods to allow for breeding success. While we need focused studies to explore potential conservation risks under various scenarios, repeated occurrence of years like 2022 with abnormal distribution of precipitation could exhaust the cyst bank of VPTS at Warm Springs and/or decrease the reproductive fecundity and even vigor of CTS.

For year 2022, our rating system for the indicators we use to assess the status of CTS and VPTS on the site show a rating of “Fair” for VPTS and “Poor” for CTS (Table 5). It is notable that while the index value for each species has been fluctuating over the years, 2022 was the year with the worst ratings and a dramatic drop of the index value, a trend that continued from 2021. While management can use several tools to improve site hydrological conditions, the low reproductive activity of CTS and VPTS due to extreme scarcity of precipitation and other climate change factors cannot be averted with traditional management tools: vegetation management and/or construction of pools with various depths. Pools will not fill if there is no rain, and we cannot stop the drying of pools when weather conditions like those experienced in 2022 prevail. Therefore, we need to consider different approaches for climate adaptation solutions. Long term monitoring programs that assess the trend of species through direct or indirect measures of

abundance are becoming even more important to better understand the effects of these new weather conditions and lead management decisions accordingly. Further studies may be needed to better understand the population dynamics of VPTS and CTS on the site. The Refuge should consider more active restoration methods if these studies indicate great risks for the population viability of these two species due to weather events attributed to climatic change.

Table 3. The number of pools containing VPTS and CTS from 2012-2022 (a total of 58 pools sample). When all pools with VPTS and/or CTS present did not have a hydroperiod long enough to complete the life cycle for VPTS (>54 days) and/or for CTS metamorphosis to occur (>100 days), the number in parenthesis shows how many pools met both conditions (i.e. focal species presence AND adequate hydroperiod).

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
VPTS	2	43	0	50	36 (34)	51	3 (1)	47	0	0	28 (19)
CTS	1	31	0	31	12	32	1	29 (27)	0	0	12 (1)

Table 4. List of 58 monitored pools with maximum inundation period and monitoring results on the presence/absence of VPTS and CTS. Green indicates pools with inundation long enough (>100 days) to support CCTS metamorphosis. Yellow indicates pools with hydroperiod long enough to support completion of the VPTS cycle (>54 days) but less than 100 days.

Pool ID	Max inundation (days)	VPTS Presence	VPTS viable	CTS presence	CTS Viable
1-1	84	x	x	x	
1-2A	84	x	x	x	
1-2B	74	x	x	x	
1-3A	37	x			
1-4A	27	x			
1-5A	37				
1-5B	73	x	x		
1-6A	26				
1-6B	18				
1-7	39	x		x	
1-8	80	x	x	x	
1-10	44	x		x	
1-12	61	x	x		
3-7	26				
3-17	69	x	x		
3-21	86	x	x	x	

3-25	44	x			
3-27	14				
3-30	0				
3-35	152	x	x	x	x
4-2	37	x			
4-10	20				
4-14	13				
4-15	13				
5-6	20				
5-10	80	x	x	x	
5-14	55	x	x		
5-20B	72	x	x		
5-25	16				
5-27	31	x			
5-33	73	x	x	x	
5-34	62	x	x		
5-38	15				
5-39	20				
5-41	31				
5-42	44				
6-1C	0				
6-3C	34				
6-4A	21				
6-4D	21				
6-4F	54	x	x		
6-4I	77	x	x		
6-5B	34	x		x	
6-11	60	x	x		
7-2	35				
7-5	96	x	x	x	
7-10	7				
7-12A	132	x	x		
7-18B	14				
7-27	30				
7-35	28				
7-42	42	x			
8-6	51				
8-13	57				
9-6	54				
10-1A	66				
10-1B	73				
10-1D	147				

Figure 4. VPTS presence index at Warm Springs for years 2016-2022 based on data collected from 2012-2022. The index is calculated as the rolling average of the three highest VPTS indicator values that occurred in the last five years. VPTS indicator is defined as the number of pools (of 58 that are monitored in Warm Springs Unit) with CTS larvae present and hydroperiod adequate to allow for completion of breeding cycle (typically 54 days).

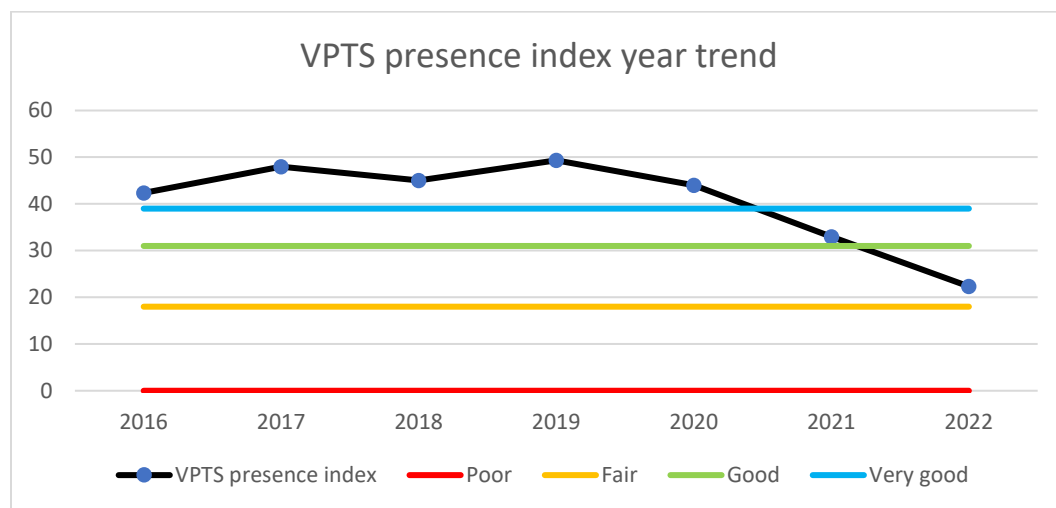


Figure 5. CTS presence index at Warm Springs for years 2016- 2022 based on data collected from 2012-2022. The index is calculated as the rolling average of the three highest CTS presence indicator values that occurred in the last five years. CTS indicator is defined as the number of pools (of 58 that are monitored in Warm Springs Unit) with CTS larvae present and hydroperiod adequate to allow for metamorphosis to occur (typically 100 days continuous inundation)

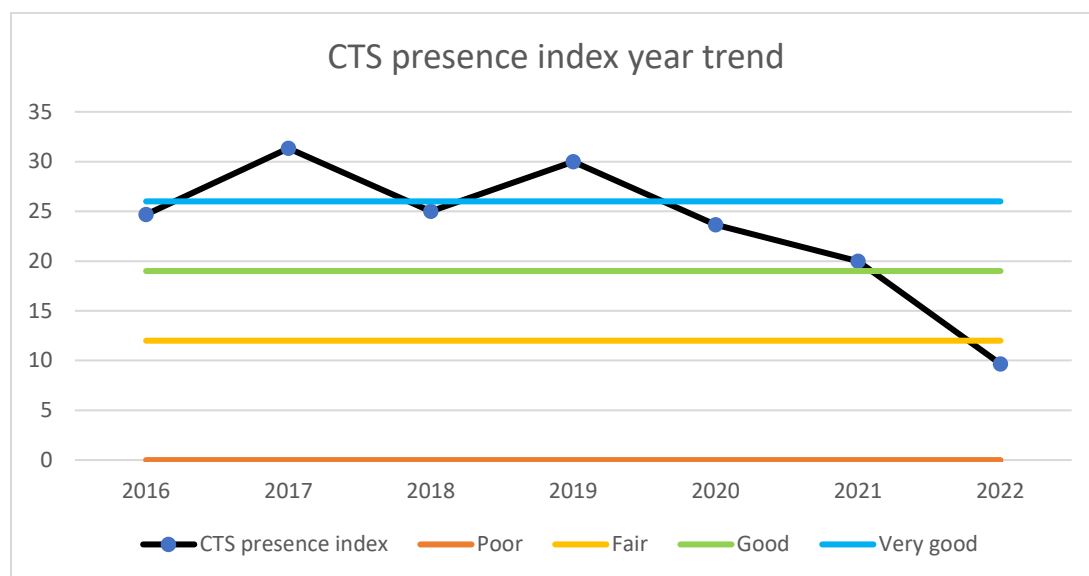


Table 5. Viability ranks for the CTS breeding activity and VPTS presence indicators used in the San Francisco Bay NWR Complex NRMP. Indicators are used to assess the health of the vernal pool grassland ecosystem at Warm Springs and measuring progress in meeting management goals and objectives.

Indicator (rolling average of the best three year values in the last 5 years)	Poor	Fair	Good	Very Good	Current Measure	Current Rating	Current Measure Year
Number of pools (of 58 that are monitored in Warm Springs Unit) with CTS larvae present AND hydroperiod adequate to allow for metamorphosis to occur (typically 100 days continuous inundation)	<12 pools with CTS AND hydroperiod >100 days	12-19 pools with CTS AND hydroperiod >100 days	20-26 pools with CTS AND hydroperiod >100 days	>27 pools with CTS AND hydroperiod >100 days	10 pools	Poor	Period of 2018-2022, 3 best years 2018, 2019, 2022
Number of pools (of 58 that are monitored in Warm Springs Unit) with VPTS present and hydroperiod adequate to allow for completion of breeding cycle (typically 54 days).	<18 pools with VPTS AND hydroperiod >54 days	19-31 pools with VPTS AND hydroperiod >54 days	32-39 pools with VPTS AND hydroperiod >54 days	>40 pools with VPTS AND hydroperiod >54 days	22 pools	Fair	Period of 2018-2022, 3 best years 2018, 2019, 2022

REFERENCES

Helm, B. 1998. The biogeography of eight large branchiopods endemic to California. Pp. 124-139 In

California Department of Water Resources. 2022. Water Year 2022: The Drought Continues. California Natural Resources Agency report published on October 2022, retrieved on January 10, 2022 from https://water.ca.gov/-/media/DWR-Website/Web-Pages/Water-Basics/Drought/Files/Publications-And-Reports/Water-Year-2022-Brochure_ay11.pdf

NOAA National Centers for Environmental Information, Monthly Synoptic Discussion for January 2022, published online February 2022, retrieved on January 17, 2023 from <https://www.ncei.noaa.gov/access/monitoring/monthly-report/synoptic/202201>.

NOAA National Centers for Environmental Information, Monthly Synoptic Discussion for February 2022, published online March 2022, retrieved on January 17, 2023 from <https://www.ncei.noaa.gov/access/monitoring/monthly-report/synoptic/202202>.

- O'Neill, B.J., 2016. Community disassembly in ephemeral ecosystems. *Ecology*, 97(12), pp.3285-3292.
- Schneider, D.W. and Frost, T.M., 1996. Habitat duration and community structure in temporary ponds. *Journal of the North American Benthological Society*, 15(1), pp.64-86.
- U.S. Fish and Wildlife Service. 2019. Natural Resource Management Plan for the San Francisco Bay National Wildlife Refuge Complex. National Wildlife Refuge System, Pacific Southwest Region, Sacramento, CA.
- Witham, C.W., E. Bauder, D. Belk, W. Ferren, and R. Ornduff (eds.). Ecology, Conservation, and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California
- WRA, Inc. 2012. Biological Monitoring Plan, Warm Springs Unit, Don Edwards San Francisco Bay National Wildlife Refuge, Fremont, Alameda County, California. 32pp. plus appendices.
- Zokan, M. and Drake, J.M., 2015. The effect of hydroperiod and predation on the diversity of temporary pond zooplankton communities. *Ecology and evolution*, 5(15), pp.3066-3074.