Findings of Fact
of the
California Department of Fish and Game
Under the California Environmental Quality Act
(Pub. Resources Code, § 21000 et seq.)

For The
Incidental Take Permit
(ITP No. 2081- 2008 – 001-00)
And
Master Streambed Alteration Agreement
(MSAA No. 1600-2008-0001-0000-HQ)
Issued to
The Pacific Gas and Electric Company

In Connection With
The San Joaquin Valley
Operations and Maintenance Habitat Conservation Plan
And Errata
(December 2006)

(Cal. Code Regs., tit. 14, § 783.5, subd. (d)(5).)

May 5, 2008

CEQA FINDINGS ADDRESSING THE ISSUANCE OF AN INCIDENTAL TAKE PERMIT AND A MASTER STREAMBED AGREEMENT UNDER FISH AND GAME CODE SECTIONS 2081(b) AND 1605, RESPECTIVELY, ASSOCIATED WITH THE PACIFIC GAS & ELECTRIC COMPANY'S SAN JOAQUIN VALLEY OPERATIONS AND MAINTENANCE PROGRAM HABITAT CONSERVATION PLAN

I. INTRODUCTION

The California Department of Fish and Game (Department) has prepared these findings to comply with the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.). The Department is obligated to comply with CEQA as part of its review of an application by the Pacific Gas and Electric Company (PG&E) for an Incidental Take Permit (ITP) under section 2081(b) of the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.). PG&E seeks an ITP from the Department to cover various activities associated with operation and maintenance (O&M) of its natural gas and electric transmission and distribution system (including limited minor expansion of certain facilities) in a 276,350-acre plan area covering nine counties in central California's San Joaquin Valley. PG&E's application for the ITP consists of the Final Pacific Gas & Electric Company San Joaquin Valley Operations and Maintenance Habitat Conservation Plan dated December 2006 (SJVHCP), among other information considered by the Department. The Department has worked for a number of years with PG&E to develop the SJVHCP, exercising its independent judgment and discretion to conduct the lead agency review required by CEQA (see Cal. Code Regs., tit. 14, § 783.2, subd. (b).). The Department adopts these findings against this backdrop in connection with the approval and issuance of an ITP to PG&E based on the SJVHCP. The ITP will authorize take of certain species protected by CESA where the take is incidental to PG&E's otherwise lawful O&M activities in the plan area (Pub. Resources Code, § 21081; CEQA Guidelines, § 15091; Cal. Code Regs., tit. 14, § 783.2, subd. (d)(5); see also Fish & G. Code, §§ 86, 2081, subd. (b).). [1]

The Department also adopts these findings under CEQA in connection with the related approval of a Master Streambed Alteration Agreement (MSAA) # 1600-2008-0001-0000-HQ, requested by PG&E (*Id.*, § 1605.). As approved, the MSAA will cover specific activities by PG&E in the SJVHCP plan area that may affect the trust resources protected by the "streambed" provisions of the Fish and Game Code (See *Id.*, § 1600 et seq.). The Department adopts these findings, as a result, in connection with its approval of the PG&E SJVHCP MSAA (Pub. Resources Code, § 21081; CEQA Guidelines, § 15091.).

[1] The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

The Department conducted the required environmental review of the proposed SJVHCP ITP and MSAA as a lead agency under CEQA (see generally Pub. Resources Code, § 21067; CEQA Guidelines, § 15367.). The Department is a lead agency because, compared to any other state or local agency, it has the greatest responsibility to review and approve the proposed ITP and MSAA, and to oversee implementation of the activities subject to those approvals. The Department is also a lead agency because issuance of the ITP and execution of the MSAA is an approval of a discretionary project subject to CEQA. In addition, no other state or local agency has taken action to carry out or approve a discretionary project related to the ITP, MSAA, or PG&E's O&M activities in the San Joaquin Valley (CEQA Guidelines, § 15051).

With respect to the SJVHCP ITP specifically, the Department's lead agency obligations are governed by a certified regulatory program (CRP) under CEQA. (CEQA Guidelines, § 15251, subd. (o); Pub. Resources Code, § 21080.5.) The CRP is found in Title 14 regulations governing Department permitting under CESA. (See generally Cal. Code Regs., tit. 14, § 783.0 et seq.) The CRP provides a functional equivalent process for the Department to conduct required CEQA review of proposed ITPs under CESA, but it does not exempt the Department from other substantive and procedural obligations under CEQA (Pub. Resources Code, 21080.5, subd. (c); see also Cal. Code Regs., tit. 14, §§ 783.3, subd. (b), 783.5, subd. (d).).

The Department fulfilled its CEQA obligations relative to the PG&E SJVHCP ITP by complying with the CRP in its CESA implementing regulations, along with other applicable provisions of CEQA and the CEQA Guidelines. No CRP exists, in contrast, for PG&E's related MSAA; no CRP exists for Department CEQA review of proposed streambed alteration agreements. In this respect, the Department conducted required lead agency review of the MSAA pursuant to CEQA and the CEQA Guidelines.

To meet its lead agency obligations under CEQA the Department prepared an environmental impact statement/environmental impact report analyzing the potentially significant environmental impacts that may result from approval and implementation of the PG&E ITP and MSAA, along with the O&M and other activities that may result from those approvals (collectively, the Proposed Project). (See Pacific Gas & Electric Company San Joaquin Valley Operations and Maintenance Program Habitat Conservation Plan Final Environmental Impact Statement/Environmental Impact Report December 2006 (SCH #2004042009) (Joint EIS/EIR).). The Department prepared and circulated the Joint EIS/EIR in coordination with the Fish and Wildlife Service (Service) of the U.S. Department of the Interior, the federal lead agency considering the proposed SJVHCP under the National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 et seq.) The Department sought input regarding the nature and scope of required environmental review under CEQA, circulated a draft of the Joint EIS/EIR for public review, prepared written responses to comments received by the Department regarding the Joint EIS/EIR, and completed the final Joint EIS/EIR as part of its consideration and approval of the PG&E ITP and MSAA. The EIS/EIR analyzes the potentially significant environmental impacts that might result from the Department's approval of the Proposed Project. Likewise, the EIS/EIR analyze a reasonable range of alternatives,

and, where appropriate, identifies potentially feasible mitigation measures to avoid or minimize significant environmental impacts associated with approval and implementation of the Proposed Project. In so doing, the Department as the lead agency considered the effects, both individual and collective, of all activities involved in the Proposed Project (Pub. Resources Code, § 21002.1, subd. (d).). The Department finds, as a result, that the Joint EIS/EIR has been completed in compliance with CEQA; that the information in the Joint EIS/EIR reflects the Department's independent judgment; that the Department review and considered the Joint EIS/EIR prior to approving the Joint ITP and MSAA; and that the Joint EIS/EIR reflects the Department's independent judgment and analysis (CEQA Guidelines, § 15090, subd. (a).).

These findings, as set forth below and hereby adopted, constitute the findings the Department is required to adopt under CEQA in connection with certification of the Joint EIS/EIR and approval of the SJVHCP ITP and MSAA.

II. FINDINGS REQUIRED BY CEQA

CEQA requires all public agencies to adopt findings before approving a project for which an EIR was prepared. These findings are intended to insure compliance with CEQA's mandate that no public agency shall approve or carry out a project for which an EIR has been certified which identifies one or more significant effects unless the agency finds:

1. Changes or alterations have been required in, or incorporated into, the project which mitigate or avoid the significant effects on the environment;

2. Those changes or alterations are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency; or

3. Economic, legal, social, technological, or other considerations, including considerations for the provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or alternatives identified in the EIR.

(Pub. Resources Code, § 21081, subd. (a); CEQA Guidelines, § 15091, subd. (a).)

Findings adopted under CEQA must be supported by substantial evidence in the agency's administrative record or proceedings, as well as accompanied by a brief explanation of the rationale for each finding (*Id.*, § 15091, subds. (a), (b); see also Discussion following CEQA Guidelines, § 15091). To that end, the findings set forth below in Section V below provide the written, specific reasons supporting the Department's decisions under CEQA as they relate to approval of the Proposed Project. The findings are also made in the context of the Department's CRP governing review and approval of proposed ITPs under CESA (see Cal. Code Regs., tit. 14, § 783.5, subd. (d)(5).).

III. ADMINISTRATIVE RECORD OF PROCEEDINGS

For purposes of these findings and the Department's related approval of the PG&E ITP and MSAA, the administrative record of proceedings consists, at a minimum, of all non-privileged public records in the Department's possession related to the Proposed Project (see generally Pub. Resources Code, § 21167.6, subd. (e).).

The Department custodian of the administrative record of proceedings for the SJVHCP ITP and MSAA is the Habitat Conservation Division (HCD) of the California Department of Fish and Game, located on the 12th Floor at 1416 9th Street, Sacramento, CA 95814. HCD can be contacted at (916) 653-4875, and other information about the Department is available via the internet at www.dfg.ca.gov.

IV. LESS THAN SIGNIFICANT ENVIRONMENTAL IMPACTS

CEQA requires lead agencies to include a statement in an EIR briefly indicating the reasons for determining that various effects on the environment of a project are not significant and consequently have not been discussed in detail in the environmental impact report (Pub. Resources Code, § 21100, subd. (c); CEQA Guidelines, § 15128). The Department's CRP includes a similar requirement (Cal. Code Regs., tit. 14, § 783.3, subd. (b).). The EIS/EIR for the Proposed Project includes statements to that effect and the Department hereby affirms those determination with the adoption of these findings.

Effects of the Proposed Project found to be less than significant by the Department are identified in the bulleted list below. Individual less-than-significant impacts in specific resource categories are identified, along with cross-references to the pertinent more detailed discussion in the EIS/EIR. The Department's determination that these impacts are less than significant is based on that discussion, among other substantial evidence in the Department's administrative record of proceedings.

- Land Use Planning LUP1-LUP6 (Ch. 3, pp. 3-1 through 3-12);
- Agricultural Resources AG1-AG3 (Ch. 4, pp. 4-1 through 4-15);
- Biological Resources BIO5, BIO6 (Ch. 5, pp. 5-1 through 5-39);
- Aesthetics AES1-AES6 (Ch. 6, pp. 6-1 through 6-13);
- Geology and Soils GEO1-GEO7 (Ch. 7, pp. 7-1 through 7-19);
- Water Quality: WR3, WR4, WR6 (Ch. 8, pp. 8-1 through 8-27);
- Cultural Resources CR1-CR3 (Ch. 9, pp. 9-1 through 9-19);
- Transportation and Circulation TR1-TR5 (Ch. 11, pp. 11-1 through 11-11);
- Noise and Vibration N1,N2 (Ch. 12, pp. 12-1 through 12-12);
- Air Quality AIR1 (Ch. 13, pp. 13-1 through 13-17);

- Public Health and Environmental Hazards PH1-PH5 (Ch. 14, pp. 14-1 through 14-12); and
- Recreation REC1-REC6 (Ch. 15, pp. 15-1 through 15-12).

For the impacts identified above, please see the referenced portion of the EIS/EIR for a discussion and explanation of the Department's determination that the impacts are less than significant.

V. POTENTIALLY SIGNIFICANT EFFECTS AND MITIGATION

CEQA's substantive mandate requires the Department to conduct meaningful environmental review of the SJVHCP ITP, MSAA, and the related O&M activities. Meaningful review is required to inform public decision making by the Department relative to the Proposed Project. Likewise, the Department has an affirmative obligation under CEQA's substantive mandate to mitigate significant environmental impacts caused by the Proposed Project to the extent feasible (see generally Pub. Resources Code, § 21002.).

The Department is complying with CEQA's mandate in the present case with the preparation, review and certification of the Joint EIS/EIR; the review, consideration, and issuance of the SJVHCP ITP and MSAA; and the adoption of these findings (Pub. Resources Code, § 21081, subd. (a); CEQA Guidelines, § 15091, subd. (a); Cal. Code Regs., tit. 14, § 783.5, subd. (d)(5).).

A. BIOLOGICAL RESOURCES

Impact BIO-1 Potential Disturbance Or Loss Of Natural Vegetation

Impact: Issuance of the 2007 SJVHCP ITP and MSAA to PG&E could result in disturbance or loss of natural vegetation.

Finding: Changes or alterations have been required in, or incorporated into the Proposed Project that avoid or mitigate the potential for disturbance or loss of natural vegetation to below a level of significance (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).).

Explanation: The majority of covered O&M activities will be conducted on existing facilities and infrastructure, so the potential for disturbance or loss of natural vegetation is expected to be low (see Joint EIS/EIR, Chapter 5 (list and description of natural vegetation types in the plan area); and SJVHCP, Chapter 3, Analysis of Habitat Disturbance for Covered Species.). Minor new construction (including substation expansion) has the potential for causing the permanent and temporary loss of natural vegetation. The exact locations and acreage amounts of potential impacts to natural vegetation associated with minor new construction are not known. To estimate potential impacts associated with covered activities PG&E based estimates of permanent and

temporary disturbances and/or losses on existing infrastructure locations and records of historical operations and maintenance activities.

Potential direct and indirect adverse impacts to natural vegetation associated with operations, maintenance and minor new construction activities could be potentially significant. Tables 5-5 and 5-6 of the Joint EIS/EIR summarize estimated impacts to natural vegetation, including riparian vegetation, and related mitigation that will be brought to bear in the PG&E MSAA are identified in the Joint EIS/EIR Chapter 5, at pages 5-5 through 5-11, and 5-15 through 5-17. Potential impacts and mitigation measures for riparian areas are covered in the 2007 SJVHCP Master Streambed Alteration Agreement.

Based on analysis presented in Chapter 3 of the SJVHCP (see Joint EIS/EIR, Appendix B), routine O&M activities and minor construction are expected to result in the permanent loss of up to 1 acre and temporary loss of 196 acres of natural vegetation annually over the 30-year life of the proposed action.

Direct and indirect impacts to natural vegetation will be mitigated through habitat compensation (Joint EIS/EIR page 5-16). The actual amount of habitat compensation acreage required to mitigate effects on special-status species habitat will be identified based on a combination of documented and projected habitat losses, as described under Environmental Commitments Enacted by the Proposed Joint EIS/EIR (Chapter 2, pp. 2-18 through 2-50). Permanent loss of natural vegetation (other than wetlands) will be mitigated at a 3:1 ratio (3 acres replaced for every acre impacted), and temporary losses of suitable habitat will be mitigated at a ratio of 0.5:1 (one-half acre replaced for every acre impacted).

The SJVHCP ITP and MSAA, and related IA executed by the Department, USFWS, and PG&E identify a habitat compensation hierarchy that will be used to guide PG&E through the habitat acquisition process (see also below). In order of importance the habitat acquisition mechanisms are: purchase of high-quality natural lands (particularly those that support particular species), purchase of credits from existing mitigation banks, purchase of conservation easements from willing sellers, and establishment of conservation easements on existing PG&E lands. Permanent and temporary loss of wetlands, including vernal pools, will be compensated at a 3:1 ratio using existing mitigation banks. Department approval will be required for all habitat compensation proposals (Joint EIS/EIR pp. 2-44 through 2-48).

In addition to habitat compensation, direct and indirect losses of natural vegetation will be minimized by limiting minor new construction (including substation expansion) to ≤ 0.5 acre and electrical transmission and gas pipeline construction to ≤ 1-mile (Joint EIS/EIR page 2-3).

Potential adverse direct and indirect impacts to natural vegetation will be mitigated in various ways as discussed above. PG&E's existing biological resources program and new mitigation measures implemented through the SJVHCP will help in avoiding and

minimizing significant impacts to natural vegetation. For unavoidable impacts, habitat compensation will be provided for impacts to natural vegetation (that provides sensitive species habitat) in five-year increments so that habitat will be acquired and protected in advance of impacts. Permanent impacts will be mitigated at 3:1 and temporary impacts at 0.5:1 (Joint EIS/EIR pp. 5-15 through 5-17). The Department finds that with the implementation of the 2007 SJVHCP, 2007 SJVHCP IA, and SJVHCP MSAA, potential adverse impacts to natural vegetation have been reduced to levels less than significant.

Impact BIO-2 Potential Disturbance Or Loss Of Vernal Pool Habitat

Impact: Issuance of the 2007 SJVHCP ITP and MSAA to PG&E could potentially result in disturbance or loss of vernal pool habitat.

Finding: Changes or alterations have been required in, or incorporated into the project that avoid or mitigate the potential for disturbance or loss of vernal pool habitat to below levels of significance (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).).

Explanation: O&M activities will be conducted on existing infrastructure within existing ROW's. However, where existing infrastructure is located within or near vernal pool grasslands operations and maintenance activities could result in potentially significant direct and indirect adverse impacts to vernal pool grasslands. Furthermore, minor new construction activities conducted within or near vernal pool grasslands could also cause potentially significant direct and indirect adverse impacts.

Dust and the spread of invasive weeds are two potentially significant indirect impacts. Covered activities would generate dust that could potentially settle in vernal pools causing the degradation of water quality through increased sedimentation. This potentially significant indirect impact would be mitigated by implementation of best management practices (BMP's), avoidance and minimization measures (AMM's) including dust control and construction exclusion zones (Joint EIS/EIR 5-17 through 5-18). The spread of invasive weeds could (at some point after covered activities are complete) outcompete native vegetation and adversely impact vernal pool grasslands. To mitigate this potential impact, PG&E will implement an environmental awareness program and implement BMP's and AMM's to prevent the establishment and propagation of invasive weeds (Joint EIS/EIR pp. 5-17 through 5-18).

Potential direct and indirect impacts are permanent and temporary habitat loss. Permanent loss of habitat is estimated as 0.58 acre/year (17.4 acres/30years) and temporary loss as 0.29 acre/year (8.7 acres/30years). PG&E will mitigate permanent and temporary loss of habitat by implementing BMP's, AMM's (Joint EIS/EIR Chapter 2, Tables 2-5 and 2-9) and providing habitat compensation. BMP's and AMM's will assist in limiting work areas so that potential habitat loss and disturbances are minimized. Where habitat impacts can not be avoided PG&E will provide habitat compensation at a 3:1 ratio using mitigation banks (Joint EIS/EIR page 2-45).

With implementation of the SJVHCP, SJVHCP ITP, and SJVHCP IA the Department finds that the potential adverse impacts to vernal pool habitats has been mitigated to levels less than significant.

Impact BIO-3 Potential Disturbance Or Loss Of Covered Special-Status Plant Species And Their Habitat

Impact: Issuance of the 2007 SJVHCP ITP and MSAA to PG&E could result in disturbance or loss of covered special-status plant species and their habitat.

Finding: Changes or alterations have been required in, or incorporated into the project that avoid or mitigate the potential for disturbance or loss of covered special-status plant species and their habitat to below a level of significance (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).).

Explanation: Most O&M activities will occur on existing infrastructure on existing ROW's. However, operation, maintenance and minor new construction have the potential to cause significant adverse direct and indirect impacts to covered special-status plant species and/or their habitat. There are 42 special-status plant species covered under the 2007 SJVHCP and 2007 SJVHCP ITP (18 plants are listed as threatened or endangered under CESA).

Direct adverse impacts would occur as a result of operations, maintenance and minor new construction activities. Potential direct impacts to covered special-status plant species and/or their habitats would be caused as a result of the covered activities and would occur at the same time as these proposed actions. Potential direct take of covered species could occur; furthermore, temporary habitat loss for 27 of the covered species is expected. Habitat impacts are estimated at between 4 and 30 acres over 30 years (Joint EIS/EIR, page 5-18).

Potential adverse indirect impacts could also be caused by operations, maintenance and minor new construction. Indirect impacts in the form of erosion, reduced reproductive rate or spread of invasive or noxious species are possible impacts that could affect covered plant species and their habitats at some point after covered activities are complete (Joint EIS/EIR page 5-18).

Potential adverse indirect impacts will be mitigated by BMP's, and AMM's (Joint EIS/EIR Chapter 2, Tables 2-5 and 2-9). These measures include, environmental awareness training, erosion control, work area limits, preactivity surveys, construction monitoring, and weed control (Joint EIR/EIS, Chapter 2 pp 2-18 through 2-50). Potential adverse impacts to habitat will be mitigated to levels less than significant by providing habitat compensation at 3:1 for permanent and 0.5 :1 for temporary impacts (Joint EIS/EIR page 2-45).

The Department finds that with the aforementioned mitigation measures implemented through the 2007, SJVHCP, 2007 SJVHCP IA, 2007 SJVHCP MSAA, potentially

adverse direct and indirect impacts to special status covered plant species and their habitats have been mitigated to levels less than significant.

Impact BIO-4 Potential Disturbance Or Loss Of Covered Special-Status Wildlife Species And Their Habitat

Impact: Issuance of the 2007 SJVHCP ITP and MSAA to PG&E could result in potentially significant impacts to fully protected birds and their habitats.

Finding: Changes or alterations have been required in, or incorporated into the project that avoid or mitigate the potential for disturbance or loss of fully protected bird species and their habitats to below a level of significance. (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).)

Explanation: Operations, maintenance and minor construction activities may result in potentially significant impacts to the 23 special status wildlife species (including fully protected birds) covered by the SJVHCP (Joint EIS/EIR page 5-19 and 5-20). Direct impacts could include loss or disturbance of habitat. Habitat losses are estimated as 196 (estimate includes 105 grassland acres) acres of temporary disturbance and 1 acre of permanent loss annually for 30 years. Indirect impacts include habitat degradation, erosion, and reduced reproductive success of covered species (Joint EIS/EIR page 5-19).

To mitigate potentially significant direct and indirect impacts to the 23 covered wildlife species, PG&E will implement species and habitat specific BMP's and AMM's (Joint EIR/EIS, Chapter 2 pp 2-18 through 2-50) designed to avoid and/or minimize potential impacts to covered species and habitats. Significant direct and indirect impacts to state listed species habitat will be mitigated by habitat compensation at a ratio of 3:1 for permanent impacts and 0.5:1 for temporary impacts. Habitat compensation will be purchased in five year increments in advance of estimated impacts (Joint EIS/EIR page 2-45).

With implementation of mitigation measures in the 2007 SJVHCP, IA, ITP, and MSAA the Department finds that potential disturbance or loss of covered special-status wildlife species and their habitat is reduced to levels less than significant.

Impact BIO-7 Potential Effects On Aquatic Habitat As A Result Of In-channel Work

Impact: Issuance of the 2007 SJVHCP ITP and MSAA to PG&E could result in adverse effects to aquatic habitat as a result of in-channel work.

Finding: Changes or alterations have been required in, or incorporated into the project that avoid or mitigate the potential for adverse impacts to aquatic habitat as a result of inchannel work to below a level of significance (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).).

Explanation: PG&E will conduct from 5 to15 stream crossing projects annually (over 30 years) with the potential to impact approximately 0.10 to 0.50 acre of aquatic habitat per project. The exact number and location for in-channel activities has not been determined. PG&E and the Department will execute a MSAA. The MSAA will serve as an individual project notification/description for operations, maintenance, and minor new construction activities proposed for areas of aquatic habitat (Joint EIS/EIR page 5-26).

In addition to project specific mitigation measures required by the Department, PG&E will apply AMM's and BMP's (Joint EIR/EIS, Chapter 2, pp 2-18 through 2-50, 5-26) to prevent siltation, erosion and degradation potentially resulting from in-channel work.

With implementation of the 2007 SJVHCP, ITP, IA, MSAA and PG&E AMM's and BMP's the Department concludes that potential impacts to aquatic habitats as a result of inchannel work have been reduced to levels less than significant.

Impact BIO-8 Potential Disturbance Or Loss Of Common Wildlife Species And Their Habitats

Impact: Issuance of the 2007 SJVHCP ITP and MSAA to PG&E could potentially result in disturbance or loss of common wildlife species and their habitat.

Finding: Changes or alterations have been required in, or incorporated into the project that avoid or mitigate the potential for disturbance of loss of common wildlife species to below a level of significance (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).).

Explanation: Operations and maintenance will be conducted on existing infrastructure. Minor new construction is limited to no more than 0.5 acres for substation expansion and 1 mile or less for new transmission and gas lines. Therefore, it is not expected that large areas of common wildlife habitat will be disturbed or lost (Joint EIS/EIR page 2-3).

PG&E will employ AMM's and BMP's (Joint EIR/EIS, Chapter 2, pp 2-18 through 2-50, 5-27) to avoid and minimize the disturbance and loss of common wildlife and habitats. In addition to the AMM's and BMP's, the Department has included general protection measures for common wildlife species as part of the SJVHCP ITP and MSAA.

The Department concludes that with implementation of the 2007 SJVHCP, ITP and MSAA, the potential for significant disturbance or loss of common wildlife species and their habitats has been reduced to levels less than significant.

Impact BIO-9 Spread Of Invasive Non-native Plant Species

Impact: Issuance of the 2007 SJVHCP ITP and MSAA to PG&E could result in the spread of invasive non-native plant species.

Finding: Changes or alterations have been required in, or incorporated into the project that avoid or mitigate the potential for the spread on nonnative plant species to below a

level of significance (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).).

Explanation: Conducting operation, maintenance and minor construction activities could spread invasive non-native plant species. These species could be spread by the transport of seeds by construction equipment or through the competitive advantage provided by areas disturbed by construction activities (Joint EIS/EIR page 5-27).

To minimize potential impacts PG&E will implement AMM's (including AMM10 (Joint EIS/EIR page 5-27) and BMP's (Joint EIS/EIR pp 2-18 through 2-50). These measures include inspecting and cleaning vehicles and clothing to ensure that invasive plant seeds are not spread to different areas.

The Department concludes that implementing AMM's and BMP's will help minimize the spread of invasive nonnative plants, and with the implementation of the 2007 SJVHCP, ITP, IA, and MSAA the potential for spread on invasive nonnative plants has been reduced to levels less than significant.

B. WATER RESOURCES

Impact WR-1 Potential To Divert, Obstruct, Or Change The Natural Flow Or The Bed, Channel, Or Bank Of Any River, Stream, Or Lake

Impact: Issuance of the 2007 SJVHCP ITP and MSAA to PG&E could result in potential adverse effects by diverting, obstructing, or changing the bed, channel or bank of any river, stream or lake.

Finding: Changes or alterations have been required in, or incorporated into the project that avoid or mitigate the potential adverse impacts of diverting, obstructing, or changing the bed, channel or bank of any river, stream or lake to below a level of significance (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).).

Explanation: Some operations, maintenance and minor new construction activities could potentially divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake. It is expected that 5-15 activities impacting from 0.10 to 0.50 acre for each activity will be conducted annually for 30 years (Joint EIR/EIS page 8-15). To mitigate potentially significant impacts PG&E will execute an MSAA with the Department (Joint EIS/EIR page 5-26).

The exact locations and potential impacts are not yet known; however, the 2007 SJV MSAA includes a process for individual project notification/description. Potential impacts will be evaluated on a project specific basis and the Department will propose mitigation measures accordingly. In addition PG&E will implement measures included in a Water Quality Protection Program (Joint EIR/EIS, pp 2-28 through 2-31).

The Department concludes that with implementation of the 2007 SJVHCP MSAA and Water Quality Protection Program the potential to adversely divert, obstruct, or change the natural flow or the bed, channel of bank of any river, stream, or lake has been mitigated to levels less than significant.

Impact WR-2 Other Alteration Of Existing Drainage Patterns, Increasing flood risk And/Or Erosion And Siltation

Impact: Issuance of the 2007 SJVHCP ITP and MSAA to PG&E could result in adverse alteration of existing drainage patterns, increasing flood risk, and/or erosion and siltation.

Finding: Changes or alterations have been required in, or incorporated into the project that avoid or mitigate the potential risks of adverse alteration of existing drainage patterns, increasing flood risk, and/or erosion and siltation potential to below a level of significance (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).).

Explanation: Replacing electrical towers, pipeline lowering, anode bed replacement, pipeline replacement and minor new construction activities have the potential to adversely impact existing drainage patterns, increasing flood risk and/or erosion and siltation potential. Excavation, fill, and grading associated with aforementioned activities could result in adverse altered drainage patterns, flooding and/or erosion and siltation (Joint EIS/EIR pp 8-16 and 8-17).

To minimize potential for adverse impacts PG&E will return temporary work areas to original grade once activities are complete, implement BMP's for erosion control and stream protection (Joint EIS/EIR pp. 2-28 through 2-31, 8-17, 8-19) and design and construct infrastructure to the most current engineering standards for civil works (California Building Code, Uniform Building Code-Chapter 33, Appendix 33; California Public Utilities Commission-General Orders 95, 112).

The Department finds that with implementation of AMM's, BMP's, the PG&E Water Quality Program, the 2007 SJVHCP and ITP, and adherence to relevant engineering standards the potential for adverse alteration of existing drainage patterns, increasing flood risk and/or erosion and siltation has been reduced to levels less than significant.

Impact WR-5 Use Of Streambed Materials

Impact: Issuance of the 2007 SJVHCP ITP and MSAA to PG&E could potentially result in adverse use of streambed materials.

Finding: Changes or alterations have been required in, or incorporated into the project that avoid or mitigate the potential adverse impact associated with the use of streambed materials to below a level of significance (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).).

Explanation: Operations, maintenance and minor construction activities could result in significant adverse use of streambed materials. It is anticipated that approximately 5 to 15 potential streambed crossings will be needed annually over 30 years. These crossings could result in inappropriate use of onsite streambed materials (Joint EIS/EIR page 8-20). However to ensure that no significant adverse use of streambed materials occur, PG&E will implement its Water Quality Program (Joint EIS/EIR pp 2-28 through 2-31)and has entered into a MSAA with the Department that includes general and project specific protection measures to mitigate the potential for significant adverse use of streambed materials (Joint EIS/EIR page 8-20).

With implementation of the 2007 SJVHCP, ITP, the PG&E Water Quality Program and MSAA the Department concludes that the potential for adverse use of streambed materials has been mitigated to levels less than significant.

Impact WR-7 Temporary Degradation Of Surface Water Quality As A Result Of Ground Disturbance during O&M Activities (Including Limited Minor Expansion Of Certain Facilities)

Impact: Issuance of the 2007 SJVHCP, ITP and MSAA to PG&E could result in temporary degradation of surface water quality as a result of ground disturbance during O&M and minor construction activities.

Finding: Changes or alterations have been required in, or incorporated into the project that avoid or mitigate the potentially significant temporary degradation of surface water quality as a result of ground disturbance during O&M and minor construction activities to below a level of significance (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).).

Explanation: Ground disturbances associated with the covered activities have the potential to temporarily degrade surface water quality. Ground disturbances associated with covered activities provide a source of sediment or other debris to surface waters in the action area. Discharge of sediment or other materials into surface waters could significantly impact aquatic life and water quality (Joint EIS/EIR page 8-21).

For activities that could impact waters of the U.S., PG&E would be required to consult with the U.S. Army Corp of Engineers (USACE) for compliance with Section 404 of the Clean Water Act. Consultations with the appropriate Regional Water Quality Control Board (Regional Board) would also be required. In addition, the 2007 SJVHCP MSAA also contains measures to prevent the temporary degradation of some surface waters in the Plan Area. AMM's and BMP's including limiting construction areas, implementing erosion control measures, and limiting vehicle access and measures included in a Water Quality Protection Program (Joint EIR/EIS, pp. 2-28 through 2-50) will help prevent the temporary degradation of surface water quality.

The Department concludes that with implementation of the 2007 SJVHCP, ITP, MSAA, Water Quality Protection Program and any necessary consultations with the USACE

and the Regional Board, potential degradation of surface water quality as a result of ground disturbance during O&M and construction activities has been reduced to below a level of significance.

Impact WR-8 Temporary Degradation Of Surface Water Quality And Wetland Habitat As A Result Of O&M Activities In Aquatic Environments

Impact: Issuance of the 2007 SJVHCP ITP and MSAA to PG&E could result in temporary degradation of surface water quality as a result of in-channel work.

Finding: Changes or alterations have been required in, or incorporated into the project that avoid or mitigate the potentially significant temporary degradation of surface water quality as a result of in-channel work to below a level of significance (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).).

Explanation: PG&E will be conducting activities in aquatic environments. PG&E could conduct from 5 to 15 stream crossings per year (over 30 years) with each crossing potentially impacting 0.10 to 0.50 acre. Constructing these crossings could cause significant temporary degradation of surface water quality and wetland habitat through increased sedimentation. Work conducted in wetland habitats will likely require consultations with the USACE and Regional Board for compliance with Section 404 of the Clean Water Act (Joint EIS/EIR page 8-23).

PG&E will implement AMM's and BMP's and a Water Quality Protection Program (Joint FEIR/FEIS, pp. 2-28 through 2-50) to prevent surface water quality impacts. The Water Quality Program, AMM's and BMP's include limits for vehicle access, habitat protection zones, and installation of erosion control features. Habitat compensation is required for significant impacts to wetland habitat (Joint EIS/EIR page 2-45).

The Department finds that with implementation of the 2007 SJVHCP, ITP, MSAA, Water Quality Program, AMM's, BMP's and consultations with the USACE, Regional Board and USFWS, the potential for temporary degradation of surface water quality and wetland habitat as a result of work in aquatic environments has been mitigated to below a level of significance.

Impact WR-9 Degradation Of Surface and Groundwater Quality As A Result Of Hazardous Materials Spills Or Releases

Impact: Issuance of the 2007 SJVHCP ITP and MSAA to PG&E could result in degradation of surface and groundwater quality as a result of hazardous materials spills or releases.

Finding: Changes or alterations have been required in, or incorporated into the project that avoid or mitigate the potentially significant degradation of surface and groundwater quality as a result of hazardous materials spills or releases to below a level of significance (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, §15091, subd. (a)(1).).

Explanation: While conducting covered activities, PG&E will use hazardous materials (paint, gasoline, oil, herbicides etc.) that could potentially degrade surface and groundwater quality as a result of spills or releases (Joint EIR/EIS page 8-24).

To minimize the risk of hazardous material spills or releases, PG&E will implement a Water Quality Program, AMM's and BMP's including: designated vehicle fueling, parking and cleaning areas, and designated access routes (Joint EIS/EIR pp 2-28 through 2-50). Further reducing the potential for significant degradation of surface and groundwater quality is the requirement that activities disturbing areas greater than one-acre need a SWPP approved by the Regional Board. The SWPP would likely require measures to protect surface and groundwater. (Joint EIS/EIR page 8-25).Additionally the SJVHCP MSAA includes measures for the safe storage and use of chemicals and herbicides.

With implementation of the 2007 SJVHCP, Water Quality Protection Program, ITP, MSAA and applicable agency consultations, the Department finds that the potential for degradation of surface and groundwater quality as a result of hazardous materials spills or releases is mitigated to below a level of significance.

C. PALEONTOLOGICAL RESOURCES

Impact PAL-1 Damage To Paleontological Resources

Impact: Issuance of the 2007 SJVHCP ITP and MSAA to PG&E could result in damage to paleontological resources.

Finding: Changes or alterations have been required in, or incorporated into the project that avoid or mitigate the potentially significant damage to paleontological resources to below a level of significance (Pub. Resources Code, § 21081, subd. (a)(1); CEQA Guidelines, § 15091, subd. (a)(1).).

Explanation: Ground disturbances associated with the covered activities could damage paleontological resources in the action area. Important paleontological areas include the Moreno and Temblor Formations, and the Pleistocene Alluvial Units. Because most O&M would be associated with existing infrastructure it is unlikely that new resources would be discovered or impacted. However, because minor new construction activities could be conducted in undisturbed areas, the potential for significant damage to paleontological resources exists (Joint EIS/EIR pp. 10-5 through 10-9).

For minor new construction activities that require the preparation of a site specific geotechnical investigation PG&E will have a state-registered geologist or qualified professional paleontologist conduct a pre-construction assessment of the site. If the assessment indicates sensitive paleontological resources are present, measures to avoid or minimize damage will be recommended. If substantial fossil remains are discovered during O&M or minor new construction work will stop until a state registered geologist or professional paleontologist can recommend appropriate action (Joint EIS/EIR, pp.10-9 and 10-10). If paleontological resources are discovered while

conducting emergency repairs PG&E will have a state-registered geologist or professional paleontologist evaluate the site and develop a remedial treatment plan if necessary (Joint EIS/EIR, page 10-10).

Sensitive paleontological resources could be adversely affected by activities covered under the 2007 SJVHCP. However, the Department finds that with implementation of PAL 1.1-1.3 (Joint EIS/EIR, pp. 10-9 to 10-10) the potential for damage has been reduced to below a level of significance.

VI. ALTERNATIVES

Where a lead agency determines that, even after the adoption of all feasible mitigation measures, a project as proposed will still cause one or more significant environmental effects that cannot be substantially lessened or avoided, the agency, prior to approving the project as mitigated, must first determine whether, with respect to such impacts, there remain any project alternatives that are both environmentally superior and feasible within the meaning of CEQA. (See, e.g., *Citizens for Quality Growth v. City of Mt. Shasta* (1988) 198 Cal.App.3d 433, 445).

As demonstrated above in Sections V, the Department's approval of the Proposed Project will not result in any unavoidable, significant environmental effects. As a result, the Department need not adopt findings as to the feasibility of the various alternatives identified in the Joint EIS/EIR for the Proposed Project.

VII. STATEMENT OF OVERRIDING CONSIDERATIONS

Because the Department's approval of the project will not result in any adverse environmental impacts that remain significant and unavoidable, the Department is not adopting a Statement of Overriding Considerations under CEQA.

VIII. CERTIFICATION OF THE SJVHCP EIS/EIR, ADOPTION OF A MITIGATION MONITORING AND REPORTING PROGRAM, AND ADOPTION OF FINDINGS UNDER CEQA

The Department finds that the draft and final Joint EIS/EIR has been completed in compliance with CEQA and the Department's CRP, that the Department reviewed and considered the SJVHCP prior to approval of the Proposed Project, and that the final EIR reflects the Department's independent judgment and analysis under CEQA as it relates to the SJVHCP ITP, MSAA, and PG&E's related O&M activities in the project area.

The Department, accordingly, hereby certifies the Joint EIS/EIR, adopts the SJVHCP and SJVHCP MSAA MMRP's, and adopts these findings under CEQA in connection with the issuance of the SJVHCP ITP and MSAA to PG&E.

AS APPROVED AND ADOPTED:

Signed: _____ Date: 5 MAY 2008

Kevin Hunting,
Deputy Director, Regional Operations

U.S. Fish & Wildlife Service
California Department of Fish and Game

December 2006

Final Environmental Impact Statement/ Environmental Impact Report

Pacific Gas & Electric Company
San Joaquin Valley Operations and Maintenance Program
Habitat Conservation Plan

Jones & Stokes

Final
Environmental Impact Statement/ Environmental Impact Report

Pacific Gas & Electric Company
San Joaquin Valley
Operations and Maintenance Program
Habitat Conservation Plan

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December 2006

This document should be cited as: U.S. Fish and Wildlife Service and California Department of Fish and Game. 2006. *Final Environmental Impact Statement/Environmental Impact Report—Pacific Gas & Electric Company San Joaquin Valley Operations and Maintenance Program Habitat Conservation Plan*. (December.) Prepared with technical assistance by Jones & Stokes, San Jose, CA.

Summary

Final EIS/EIR: Pacific Gas and Electric Company San Joaquin Valley Operations and Maintenance Program Habitat Conservation Plan

This document is an environmental impact statement/environmental impact report (EIS/EIR) analyzing the effects of issuing state and federal incidental take permits and entering into a streambed alteration agreement to enable the Pacific Gas and Electric Company to continue its San Joaquin Valley operations and maintenance programs[1] in conformity with the requirements of federal and state endangered species laws and the California Fish and Game Code. It has been prepared in compliance with the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA), and is intended to disclose potential environmental effects and enable the public and regulatory agencies to comment on the proposed program of activities and alternative approaches. The U.S. Fish and Wildlife Service (USFWS) is serving as the lead agency for NEPA compliance and the California Department of Fish and Game (DFG) is the lead agency for CEQA compliance.

This document is the final EIS/EIR for the proposed action. The draft EIS/EIR was circulated for a 90-day public and agency review period that ended September 28, 2006. All comments received during the review period appear in Appendix D, along with lead agency responses. Changes and updates made in the text of this EIS/EIR as a result of comments received appear in underline (insertions) and strikeout (deletions). Additional information on the review and comment process is provided in *Public and Agency Involvement* below.

Background

The Pacific Gas and Electric Company (PG&E) is the largest publicly traded electric and gas utility in the United States, serving more than 4.8 million electricity customers and 4 million natural gas customers in 48 of California's 58 counties. Statewide, PG&E owns more than 5,700 miles of high-pressure natural gas transmission pipelines; 59 compressors at 17 stations; and more than 35,000

[1] Throughout this document, the terms *operations and maintenance program, O&M program, O&M, O&M activities* are used to include both operations and maintenance activities *per se*, as well as certain types of very limited minor construction activities. More information on the nature of the activities analyzed, including the scope of the minor construction activities, is provided in *Overview of Proposed Action and Alternatives* below.

miles of gas distribution pipelines. PG&E's electrical system comprises a total of about 18,450 miles of interconnected transmission lines; about 105,500 miles of distribution lines; and 1,014 substations.

Almost one-third of PG&E's 70,000–square mile service area lies within nine San Joaquin Valley counties: San Joaquin, Stanislaus, Merced, Fresno, Kings, Kern, Mariposa, Madera, and Tulare. Consequently, much of the company's electricity and gas transmission infrastructure is within this nine-county area, including approximately 1,550 linear miles of natural gas transmission pipeline; 8,326 miles of natural gas distribution pipeline; 4,588 miles of electric transmission lines; 20,549 miles of overhead electric distribution lines; and 3,987 miles of underground electric distribution lines.

PG&E's natural gas and electrical infrastructure requires a regular program of maintenance to ensure reliable delivery of service. Some of the company's operations and maintenance (O&M) activities have the potential to result in disturbance, injury, or mortality of wildlife listed as endangered or threatened under the federal and/or state Endangered Species Acts (ESAs), and such "take" of listed species is strictly regulated. To date, O&M activities have not been substantially constrained by ESA restrictions; however, because additional species continue to be listed as threatened or endangered, thus becoming subject to ESA protections, PG&E has entered into discussions with USFWS to develop an approach that will allow its essential O&M activities to continue while maintaining the program in full compliance with the federal and state ESAs.

Provisions of Section 10[a][1][b] of the federal ESA establish a process through which businesses and individuals can apply for a permit allowing take of federally listed species under certain, restricted circumstances (to be permissible, take must occur as a corollary of otherwise lawful activities, and may not be the purpose of the activities; this is referred to as *incidental take*). The permit is issued by the USFWS and/or National Marine Fisheries Service (NFMS), depending on the species involved. A key requirement for issuance of a Section 10[a][1][b] permit is preparation of a conservation plan, commonly referred to as a *habitat conservation plan* or HCP. The HCP must fully analyze the effects of the proposed take, and describe the measures that will be taken to avoid, minimize, and compensate for it.

PG&E began informal consultation about its O&M program with USFWS in the mid-1990s. This effort was inconclusive, and discussion was reinitiated in 2001. Based on the outcome of these conversations, PG&E has been working with USFWS to prepare an HCP covering its San Joaquin Valley O&M activities. The draft HCP document was circulated for public review ~~is currently available for public review, and is included~~ as Appendix B of ~~this~~ the draft EIS/EIR. A revised final HCP is included as Appendix B of this final EIS/EIR. When ~~it~~ the HCP is finalized, PG&E hopes to obtain a Section 10 permit authorizing take of listed species as a corollary of its San Joaquin Valley O&M program.[2] The

[2] The HCP includes analysis of potential effects on migratory birds, and the federal incidental take permit, if issued, will also be used to request a Special Purpose Permit consistent with Section 21.27 of the federal Migratory Bird Treaty Act (see additional discussion under *Regulatory Context* in Chapter 5).

USFWS decision regarding issuance of a Section 10 permit to PG&E will constitute a federal action subject to the provisions of NEPA, which requires that federal agencies consider and disclose the environmental consequences of their actions, including permitting and funding the activities of other entities. Where those consequences may be significant, NEPA requires preparation of an EIS.

PG&E also plans to use the HCP to apply for a state take permit under Section 2081 of the California Fish and Game Code, which regulates take of species listed under the California ESA; and to support its application for a streambed alteration agreement under Section 1602 of the California Fish and Game Code, to ensure authorization of any O&M activities that may affect the bed or banks of natural watercourses.[3] Much like NEPA, CEQA requires that state agencies analyze and disclose the environmental impacts of their discretionary activities, specifically calling for the preparation of an EIR when impacts may be significant; CEQA compliance is required because DFG will exercise discretionary (decision-making) authority in reviewing PG&E's applications for a Section 2081 permit and master streambed alteration agreement.

Joint Compliance Approach

This document has been prepared as a combined EIS/EIR for "joint" compliance with NEPA and CEQA. When a project is subject to review under both NEPA and CEQA, state and local agencies are encouraged to cooperate with federal agencies in the preparation of joint environmental documents. Joint environmental documents must fulfill the procedural and content requirements of both NEPA and CEQA; an important advantage of joint compliance is that it streamlines the environmental review process by satisfying both laws with a single document, while providing full opportunity for the public and agencies to comment on the proposed activities.

For simplicity, this document uses NEPA terminology; Table S-1 shows the correspondence between key federal (NEPA) and state (CEQA) terms.

Table S-1. Correspondence Between Key National Environmental Policy Act and California Environmental Quality Act Terms

NEPA Term (Federal)	CEQA Term (California)
Lead Agency	Lead Agency
Cooperating Agency	Responsible Agency

[3] DFG anticipates that the streambed alteration agreement will take the form of a program-scale master agreement extending for the 30-year duration of the HCP and permit term and covering all O&M and minor construction activities enabled under the proposed action. The term *master streambed alteration agreement* is accordingly used in this EIS/EIR. DFG is currently revising the draft streambed alteration agreement to reflect the latest updates to the California Fish and Game Code.

NEPA Term (Federal)	CEQA Term (California)
Environmental Assessment	Initial Study
Finding of No Significant Impact	Negative Declaration
Environmental Impact Statement	Environmental Impact Report
Notice of Intent	Notice of Preparation
Notice of Availability	Notice of Completion
Record of Decision	Findings
Proposed Action	Proposed Project
No Action Alternative	No Project Alternative
Environmentally Preferable Alternative	Environmentally Superior Alternative
Purpose and Need	Project Objectives
Environmental Consequences	Environmental Impacts
Affected Environment, Existing Conditions	Environmental Setting

Purpose, Need, Goals, and Objectives for Proposed Action

NEPA requires an EIS to briefly describe the underlying purpose and need for a proposed federal action. CEQA embodies a similar requirement for an EIR to contain a statement of the goals and objectives a project is proposed to meet. The following paragraphs present the NEPA purpose and need and CEQA goals and objectives for the proposed action, as identified by USFWS and DFG.

The **purpose** of the proposed action is to respond to PG&E's application for federal and state incidental take permits under Section 10[a][1][B] of the federal Endangered Species Act, Section 2081 of the California Endangered Species Act, and all implementing regulations and policies for 42 wildlife and plant species that are state- or federally listed as threatened or endangered and 23 additional species that are not yet listed, but that may become listed during the term of the permit, collectively referred to as the *covered species*.

Activities proposed by PG&E for the operation and maintenance of their existing gas and electrical facilities throughout the San Joaquin Valley could result in the take of individuals belonging to covered species. In the absence of a permit—and the conservation planning entailed by the permit review process—take would violate the federal and California Endangered Species Acts. **Thus, the proposed action is needed to ensure compliance with the federal and California Endangered Species Acts,** as well as NEPA, CEQA, and other applicable federal and state laws and regulations, while allowing PG&E to continue a program of O&M activities essential to the reliable delivery of electricity and gas service to some 4 million customers in their California service area.

Consistent with the identified need, **the goal** of the proposed action is to review PG&E's permit applications under the federal and California Endangered Species Acts and make a permitting decision, in order to protect, conserve, and enhance the covered species and their habitats for the continuing benefit of the people of the United States. **Specific objectives include the following.**

- Provide a means and take steps to conserve the ecosystems depended on by covered species.
- Ensure the long-term survival of the covered species through protection and management of the species and their habitats.
- Ensure that take of covered species is avoided and minimized to the maximum extent feasible and is fully compensated for by appropriate mitigation measures.

Lead, Cooperating, and Responsible Agencies for NEPA and CEQA Compliance

As identified above, USFWS is the lead agency for NEPA compliance and DFG is the lead agency for CEQA compliance for the proposed action.

The following agencies have been identified as *cooperating agencies* under NEPA—that is, additional federal agencies with legal jurisdiction over the project and/or expertise regarding its potential environmental effects.

- Bureau of Land Management.
- Department of Housing and Urban Development.
- ~~Environmental Protection Agency.~~
- NMFS.
- U.S. Army Corps of Engineers.

Responsible agencies under CEQA—additional agencies with approval or funding responsibility for the proposed action—include the following.

- CPUC.
- Central Valley Regional Water Quality Control Board.
- Counties of Fresno, Kern, Kings, Madera, Mariposa, Merced, San Joaquin, Stanislaus, and Tulare.
- California Department of Transportation, Districts 6 and 10.
- Native American Heritage Commission.
- San Joaquin Valley Air Pollution Control District, Kern County Air Pollution Control District, and Mariposa County Air Pollution Control District.

Required Permits and Approvals

CPUC Jurisdiction

The California Constitution vests in the California Public Utilities Commission (CPUC) exclusive power and authority with respect to "all matters cognate and germane to the regulation of public utilities" (Cal. Const., Art. XII, Sec. 5; *Pacific Telephone & Telegraph v. Eshleman* [1913] 166 Cal. 640, 652–660). The California Public Utilities Commission (CPUC) thus has sole authority over the siting, design, operation, and maintenance of PG&E facilities.

Natural gas infrastructure is regulated under CPUC General Order 112-E, which is intended to augment federal Pipeline Safety Regulations by providing further 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 and in liquefied natural gas facilities to safeguard life or limb, health, property and public welfare and to provide that adequate service will be maintained by gas utilities operating under the jurisdiction of the commission [CPUC].

Electrical utility facilities are regulated under General Order 131-D, which is similarly aimed at ensuring safety and reliability of service, and establishes several avenues for project review and approval, depending on the nature of the project.

The California Constitution (Art. XII, Sec. 8) explicitly prohibits municipalities from regulating "matters over which the Legislature grants regulating power to the Commission [CPUC]." As a result, CPUC's jurisdiction preempts the discretionary[4] authority of local jurisdictions over gas and electrical facilities. However, all projects subject to General Orders 112-E and 131-D are required to comply with local ministerial[5] permitting requirements, along with all relevant state and federal regulations and permitting requirements.

[4] As defined in Section 15357 of the state's CEQA Guidelines, a *discretionary* decision is one that requires a public agency to exercise judgment or deliberation in deciding to approve or disapprove a proposed activity, as distinguished from situations where the agency only needs to determine whether a proponent has complied or conformed with applicable statutes, ordinances, or regulations. Examples of discretionary decisions include passage of new laws and ordinances; approval and revision of planning documents such as General Plans, Specific Plans, HCPs, Timber Harvest Plans, etc.; and approval of proposals for new public facilities and many private developments.

[5] As defined in Section 15369 of the state's CEQA Guidelines, a *ministerial* decision is one that is mandated by existing laws, regulations, statutes, or procedures, and thus involves little or no personal, subjective judgment by public officials or agencies. Examples include issuing automobile registrations, dog licenses, and marriage licenses. A grading or building permit is ministerial if the ordinance requiring the permit limits the public official to determining whether zoning allows the structure to be built in the requested location, whether the structure would meet applicable building codes, and whether the applicant has paid the required fee.

Additional State and Federal Regulatory Framework

In addition to the provisions of the federal and state Endangered Species Acts, the California Fish and Game Code, NEPA, and CEQA, the activities analyzed in this EIS/EIR may be subject to a wide range of other environmental compliance requirements. Briefly, these include the following.

- The federal Migratory Bird Treaty Act.
- Requirements of the federal Clean Water Act regarding discharge of stormwater from construction sites.
- Federal Clean Water Act stipulations regarding placement of fill materials in jurisdictional waters of the United States.
- Requirements of local jurisdictions' grading and construction permitting processes (note that issuance of grading and building permits is typically a ministerial action).
- Federal and state protection of cultural and paleontological resources, including the National Historic Preservation Act and Native American Graves Protection and Repatriation Act, and Executive Orders regarding tribal assets.
- Federal environmental justice regulations.
- Federal and state air quality regulations.

USFWS is also subject to the federal Administrative Procedure Act, which mandates uniformity and openness in federal agencies' procedures; and the Federal Advisory Committee Act, which governs the initiation and operation of advisory committees in the executive branch of the federal government.

Individual regulations, codes, and standards are described in detail in Chapters 3 through 15, which discuss the proposed action's effects on specific resources.

Public and Agency Involvement

Public disclosure and dialogue are priorities under both NEPA and CEQA. Both laws mandate specific periods during the compliance process when public and agency comments on the proposed action and draft EIS (or EIR) document are solicited: during the scoping comment period, during the review period for the draft document, and during the release of the final EIS/EIR document. Lead agencies are also encouraged to hold public meetings or hearings to review the draft version of the document. Brief descriptions of these milestones are provided below, as they apply to this document.

Scoping Comment Period

Scoping refers to the public outreach process used under NEPA and CEQA to determine the coverage and content of an EIS or EIR. The scoping comment period offers an important opportunity for public review and comment in the early phases of project development. Scoping contributes to the selection of a range of alternatives to be considered, and can also help to establish methods of analysis, identify the environmental effects that will be considered in detail, and develop mitigation measures[6] to avoid or compensate for adverse effects. The scoping process for an EIS is initiated by publication of the Notice of Intent (NOI) required by NEPA, which is a formal announcement to the public and to interested agencies and organizations that an EIS is in preparation; similarly, CEQA requires the lead agency to issue a Notice of Preparation (NOP) announcing the beginning of the EIR process. During the scoping period, agencies and the public are invited to comment on the proposed action, the approach to environmental analysis, and any issues of concern.

USFWS published the NOI for this document in the Federal Register on March 25, 2004 and DFG submitted the corresponding NOP to the State Clearinghouse on March 26, 2004, initiating the 30-day public scoping period required by NEPA and CEQA. Consistent with NEPA and CEQA requirements, the NOI and NOP provided information on the background and purpose of the proposed action; announced preparation of and requested public comment on the EIS/EIR; and provided information on the public scoping meetings to be held in support of the EIS/EIR. Appendix A contains the full text of both notices.

USFWS and DFG held two public scoping meetings for the proposed action in April 2004. To maximize public access to the meetings, one meeting was held in Stockton and the other in Fresno. Both meetings were advertised in local newspapers (the *Fresno Bee* and *Stockton Record*) and via direct mailing to interested parties.

The scoping meetings used an informal workshop format with informational handouts and personnel available to discuss the proposed action and alternatives with attendees. Attendees were greeted on arrival and asked to sign an attendance record form listing their name, address, and affiliation, and indicating whether they would like to be added to a project mailing list. Each guest was also given the option to provide written comments or concerns s/he would like addressed in the EIS/EIR and was provided with a comment form; attendees had

[6] This EIS/EIR document uses the term "mitigation" consistent with Section 15126.4[a][1][A] of the State of California's CEQA Guidelines, which requires that an EIR "distinguish between measures which are proposed by project proponents to be included in the project, and other measures proposed by the lead … agency … and not included in the project." The proposed HCP's Conservation Strategy (see HCP Chapter 4), (including the requirement to preserve suitable habitat to offset potential species effects of O&M–related habitat disturbance and loss), is included in the project (i.e. is part of the Proposed Action), and is referred to as "compensation" in this EIS/EIR. The lead agencies have proposed "other measures" only for potential project impacts to the paleontological resources identified in Chapter 10 of this EIS/EIR. This document also uses mitigation in the general sense, referring to the process of avoiding, reducing, or compensating for impacts (for example, in discussing the use of mitigation sites or use of existing mitigation banks).

the option of completing the form at the meeting or mailing it to USFWS prior to the close of the scoping period (April 26, 2004).

Public and Agency Review of EIS/EIR

Once a draft EIS or EIR is complete, the lead agency is required to notify agencies and the public that it is available for review. The official notification is referred to as a Notice of Availability (NOA) under NEPA and a Notice of Completion (NOC) under CEQA. The NOA is sent to the U.S. Environmental Protection Agency for publication in the *Federal Register*. The NOC is sent to the State Clearinghouse; CEQA also requires that the lead agency provide written notice of the draft document's availability to the County Clerk's office for posting, as well as publishing it in a general-circulation newspaper, posting it on and off the project site, or mailing it to residents of properties adjacent to the project site. Issuance of the NOA/NOC initiates a public review period, during which the lead agency receives and collates public and agency comments on the proposed action and the document.

USFWS and DFG ~~are now circulating this~~circulated the draft EIS/EIR for a 90-day public review and comment period, which ended September 28, 2006. Two public meetings were held during the review period, to present the draft HCP and ~~and will also conduct a public hearing to present~~ the results of the EIS/EIR analyses and solicit comments in person. The first meeting was held in Stockton on August 1, 2006, and the second meeting was held in Fresno on August 2, 2006.

The purpose of public circulation and the public hearing ~~is~~ was to provide agencies and interested individuals with opportunities to comment on or express concerns regarding the contents of the draft EIS/EIR. A total of seven comment letters were received on the draft document. There were no attendees at the Stockton public meeting, and one attendee at the Fresno public meeting. No comments were received during the public meetings.

Preparation of Final EIS/EIR and Public Hearing

Before the lead agency can approve a proposed action, it must prepare a final EIS/EIR that addresses all comments received on the draft document. This is the final EIS/EIR for the proposed action.

The final EIS/EIR ~~must~~ is required to include a list of all individuals, organizations, and agencies that provided comments, and must contain copies of all comments received during the public review period, along with the lead agency's responses. Please see Appendix D for these materials. In addition, as indicated above, some changes and updates have been made in the text of this EIS/EIR to address points raised in the comments. These appear in underline (insertions) and strikeout (deletions). ~~The final EIS/EIR is expected to be available in mid-2006.~~

Issues Identified in Scoping Comments

As discussed above, one of the purposes of the scoping process under both NEPA and CEQA is to identify any areas of controversy or public concern related to a proposed project. Both CEQA and NEPA require that an EIR/EIS identify issues of known controversy, if any exist. However, despite the premeeting outreach conducted by USFWS and DFG, attendance at the scoping meetings for the proposed action was sparse, and very few comments were received during the scoping period (see Appendix A). The single comment letter received stressed the breadth and complexity of the conservation effort entailed by the proposed action, the number of species and diversity of habitats involved, and the need to ensure that PG&E's conservation planning is consistent with existing recovery plans for species covered by the HCP. No other areas of specific public or agency concern ~~have been identified at this time.~~ were identified during the scoping process.

Overview of Proposed Action and Alternatives

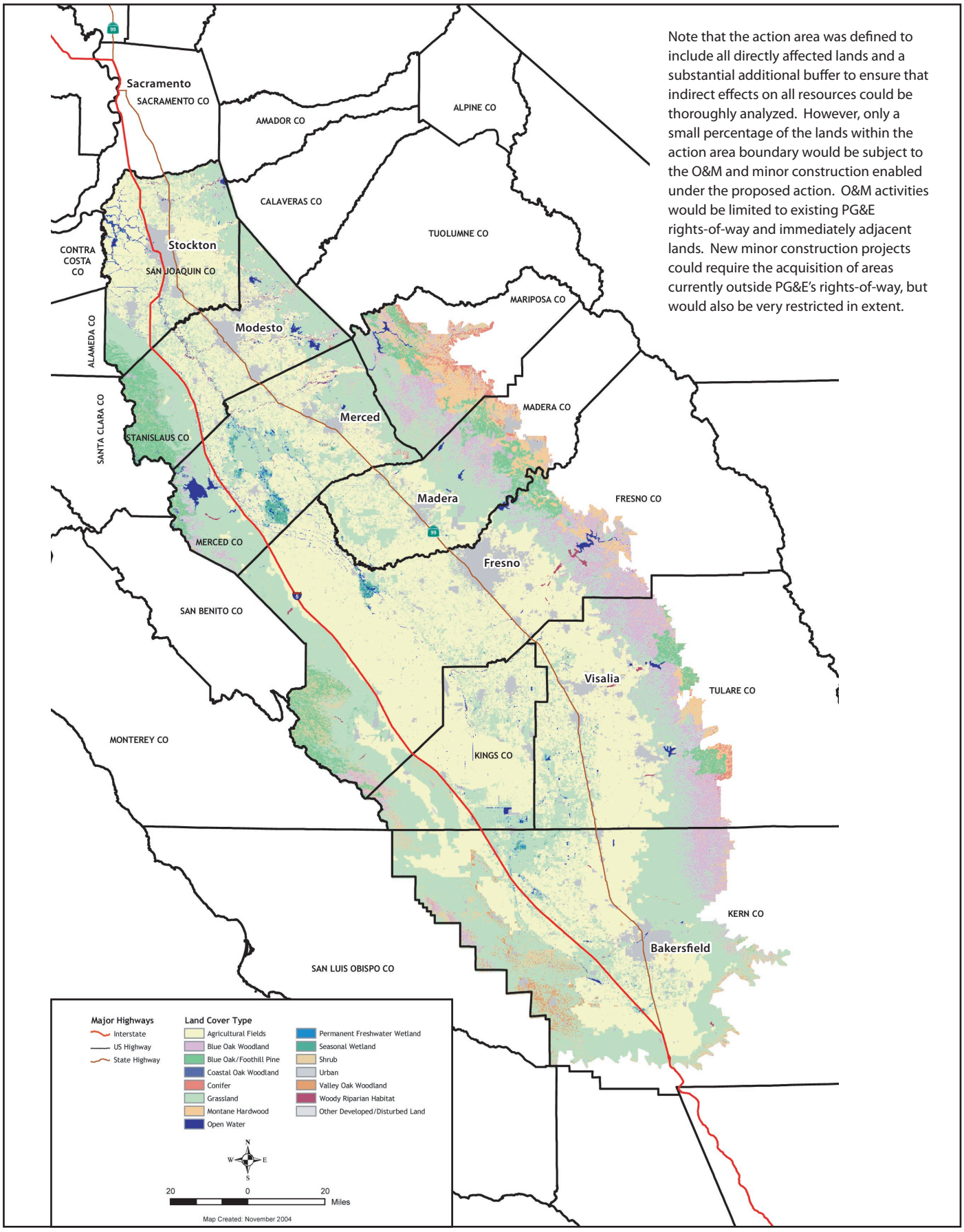
The proposed action and alternatives would all be implemented within the same area, shown in Figure S-1 and referred to in this document as the *action area*. No activities would take place outside the action area. The action area comprises all or part of nine San Joaquin Valley counties: San Joaquin, Stanislaus, Merced, Fresno, Kings, Kern, Mariposa, Madera, and Tulare. However, only a small portion of the lands within the action area boundary would actually be subject to O&M and minor construction activities enabled under the proposed action. O&M activities would be limited to existing PG&E rights-of-way (ROWs) and immediately adjacent lands. Minor construction activities could require the acquisition of additional small acreages of ROW, but would also be very restricted in extent.

The following sections describe activities and conservation commitments under the proposed action and alternatives.

Proposed Action

Overview of Components—Proposed Action

PG&E proposes to use the HCP it is currently developing to apply for federal and state permits authorizing take of listed species as a result of its San Joaquin Valley O&M program. PG&E also intends to use the HCP to support the development of a master streambed alteration agreement with California Department of Fish and Game (DFG) to regulate O&M activities that may affect the bed or banks of natural drainages.



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Jones & Stokes

Figure S-1
Extent of Action Area, Showing County Boundaries and Land Cover Types

The U.S. Fish and Wildlife Service (USFWS) has full discretionary authority over the issuance of Section 10 permits, and, having consulted with PG&E and reviewed the HCP, could choose not to approve it, in which case no Section 10 permit would be issued. Similarly, following its review, DFG could elect to deny a state take permit and/or streambed alteration agreement, or could decide not to approve the HCP implementation agreement. In order to fully analyze the potential environmental outcomes, this EIS/EIR assumes that the HCP will be approved, federal and state take permits will be issued, and a master streambed alteration agreement will be enacted. However, this document uses the language "proposed action" to emphasize the discretionary nature of the key federal and state approvals as well as the need to complete the NEPA and CEQA review processes.

Based on the assumptions above, the proposed action would include the following components.

- Federal components:
  - approval of HCP and HCP implementation agreement,
  - issuance of incidental take permit.
- State components:
  - approval of HCP implementation agreement,
  - issuance of Section 2081 incidental take permit,
  - entry into master streambed alteration agreement with PG&E.

Activities Analyzed Under Proposed Action

Together, assuming that PG&E's applications for take permits and a master streambed alteration agreement are approved, the federal and state components of the proposed action would enable PG&E to continue its existing program of O&M activities in compliance with federal and state Endangered Species Acts and the California Fish and Game Code. They would also implement the HCP and commit PG&E to a program of environmental and conservation measures to avoid, minimize, and mitigate the effects of incidental take. Accordingly, this EIS/EIR analyzes two categories of activities under the proposed action:

1. PG&E's ongoing O&M and minor construction activities; and
2. activities included in new environmental commitments and mitigation measures required under the terms of the HCP and the HCP implementation agreement.

Note that, for brevity, the terms *O&M program, O&M, O&M activities* are used to include both O&M and minor construction activities throughout this document; the two types of activities are only distinguished where there is a difference for environmental outcomes.

O&M and Minor Construction Activities

The proposed action would enable three types of activities under the aegis of the San Joaquin Valley O&M program, as follows.

- *Operation activities*, which include inspecting, monitoring, testing, and operating valves, reclosures, switches, etc. To perform these activities, personnel work at existing facilities and typically use existing access roads.
- *Maintenance activities*, which include ongoing and emergency repairs to facilities, structures, and access roads; replacement of facilities, structures, and roads, as needed; and vegetation management, including tree trimming and construction of firebreaks.
- *Minor construction activities*, which include installing new or replacement structures to upgrade facilities or to extend service to new customers. Minor construction is limited to installation of 1 mile or less of new electric or gas line (per project), and/or new permanent facilities with an average maximum footprint of 5 acres (per project).[7]

Table S-2 lists the operation, maintenance, and minor construction activities that would be permitted through the proposed action.[8]

Table S-2. Operation, Maintenance, and Minor Construction Activities Under Proposed Action

O&M Activities	
Natural Gas System	***Electrical System***
Patrols	Patrols
Facilities Inspections	Inspections
Pipeline Remedial Maintenance	Electrical Insulator Washing
Compressor Station Maintenance	Electric Substation Maintenance
Pipeline Electric Test System Installation	Electrical System Outage Repair
Pipeline Valve Replacement	Facility Installations (Shoo-Flies)
Pipeline Cathodic Protection Maintenance	Electrical System Tower Replacement or Repair

[7] The length of service extension allowed under minor new construction is understood as a total length of 1 mile from the current terminus of an existing line. Multiple consecutive (end-to-end) extensions with a total length exceeding 1 mile would not be covered under the proposed HCP. Multiple 1-mile extensions in different geographic areas would be covered, but each would be treated as a separate activity. The size of a minor construction project would be estimated as the total footprint, expressed in acres. Both linear and acreage estimates will be required to address the entirety of a proposed project; consistent with the requirements of federal and state environmental review, the HCP will not allow segmentation of proposed construction to obtain coverage under the HCP.

[8] The analyses conducted for the proposed HCP identified the extent of disturbance associated with various types of O&M and minor construction activities: large disturbance (>0.5 acre), medium disturbance (between 0.5 and 0.1 acre), small disturbance (<0.1 acre), and "other disturbance" (activities that do not result in habitat disturbance or loss but that in some cases may nonetheless have the potential to result in take of covered species). These distinctions are discussed in more detail in this final EIS/FEIR as they relate to the proposed HCP compensation strategy, but are otherwise identified only where they are material to the lead agencies' findings regarding need for mitigation and/or level of significance under CEQA. However, all analyses of the effects of O&M and minor construction in this EIS/EIR have considered the O&M and minor construction program in its entirety, including the combined effect of all large-, medium-, small-, and "other disturbance" activities.

Pipeline Lowering	Electrical System Pole and Equipment Replacement and Repair
Pipeline Coating Replacement	Electric Line Reconductoring
Pipeline Valve Recoating	Vegetation Management and Access Road Maintenance
Pipeline Replacement	Wood Transmission Pole Test and Treat
Pipeline Telecommunication Site Maintenance	
Vegetation Management and Access Road Maintenance	
Minor Construction Activities	
Natural Gas System	***Electrical System***
Construction of Pipeline Pressure Limiting Stations	Electrical Tower Line Construction (Transmission Lines)
Pipeline Valve Installation	Wood Pole Line Construction/Relocation (Distribution Lines)
New Pipeline Installation	Minor Substation Expansion
	Underground Transmission and Distribution Line Construction

PG&E's Existing Environmental Programs and Practices

In general, the California Public Utilities Commission (CPUC) requires PG&E to provide reliable energy to the public in a way that avoids or substantially lessens the related environmental impacts. PG&E has a wide range of procedures, commitments, and programs in place to ensure that work is conducted safely and adverse environmental effects are avoided or minimized. The company's annual environmental awareness training program is attended by as many as 6,000–8,000 company staff. Contractors retained by PG&E are normally trained by their respective companies, but like PG&E employees, the company's contractors are held responsible for complying with all applicable environmental laws and regulations while working under contract, and with implementing any additional environmental protection measures established by PG&E. Both PG&E employees and contractors also receive site-specific "tailboard" briefings for activities requiring environmental compliance.

PG&E's environmental programs address the following concerns.

- Land use and planning issues, including land use compatibility and aesthetic concerns.
- Biological resources.
- Geologic hazards and geotechnical engineering.
- Water quality.
- Cultural resources.
- Traffic flow and safety.
- Construction and operational noise.
- Air quality.

- Hazardous materials.
- Environmental justice.

In addition to these programs, PG&E has a continuing commitment to ensure that all work is performed in accordance with federal, state, and local regulations for safety and protection. Where applicable, work is also conducted in accordance with landowner agreements.

Environmental Commitments Enacted by the Proposed HCP

Table S-3 lists the 42 special-status plant species and 23 wildlife species covered by the proposed San Joaquin Valley O&M HCP.

Table S-3. Species Covered by San Joaquin Valley O&M Habitat Conservation Plan—Proposed Action

Wildlife	Plants	
Vernal pool fairy shrimp	Large-flowered fiddleneck	Legenere
Midvalley fairy shrimp	Lesser saltscale	Panoche pepper-grass
Vernal pool tadpole shrimp	Bakersfield smallscale	Congdon's lewisia
Valley elderberry longhorn beetle	Big tarplant	Mason's lilaeopsis
California tiger salamander	Mariposa pussypaws	Mariposa lupine
Limestone salamander	Tree-anemone	Showy madia
California red-legged frog	Succulent owl's-clover	Hall's bush mallow
Blunt-nosed leopard lizard	California jewelflower	San Joaquin woollythreads
Giant garter snake	Hoover's spurge	Pincushion navarretia
Swainson's hawk	Slough thistle	Colusa grass
White-tailed kite	Mariposa clarkia	Bakersfield cactus
Golden eagle	Merced clarkia	San Joaquin Valley Orcutt grass
Bald eagle	Springville clarkia	Hairy Orcutt grass
Western burrowing owl	Vasek's clarkia	Hartweg's golden sunburst
Bank swallow	Hispid bird's-beak	San Joaquin adobe sunburst
Tricolored blackbird	Palmate-bracted bird's-beak	Keck's checkerbloom
Buena Vista Lake shrew	Kern mallow	Oil neststraw
Riparian brush rabbit	Congdon's woolly sunflower	Greene's tuctoria
Riparian (San Joaquin Valley) woodrat	Delta button-celery	King's gold
Tipton kangaroo rat	Striped adobe-lily	
Giant kangaroo rat	Bogg's Lake hedge-hyssop	
San Joaquin (Nelson's) antelope squirrel	Pale-yellow layia	
San Joaquin kit fox	Comanche Point layia	

The proposed HCP's conservation strategy uses three mechanisms to address the potential effects of O&M activities on these species and their habitat, as follows.

- General measures to avoid and minimize impacts ("avoidance and minimization measures," or **AMMs**).
- **Surveys** to assess potential impacts on particular species, when warranted.
- **Compensation** for impacts that cannot be avoided.

This strategy was developed in keeping with eight guiding principles.

1. The highest priority is to avoid and minimize adverse effects; AMMs should be implemented to the fullest extent practicable before compensation is undertaken. To that end, general AMMs are implemented on all projects. The need for additional AMMs is identified based on survey results.
2. Compensation should be coordinated with and incorporated into other regional conservation efforts.
3. Preserving habitat on site and in kind is preferable to mitigating or preserving habitat off site.
4. Preserving a small number of large, contiguous habitat areas is preferable to preserving a greater number of small, discrete areas. Habitat should be preserved at sites that are surrounded by compatible land uses.
5. Compensation should satisfy applicable state and federal goals, policies, and standards for wetlands.
6. Land management activities must maintain habitat quality for covered species.
7. Monitoring provides the feedback loop to support the adaptive management component of the conservation strategy.
8. Adaptive management continually assesses, evaluates, and adapts management prescriptions to achieve the HCP's biological goals and objectives.

O&M activities affect the environment to varying degrees, depending on what is involved—for instance, whether there is surface disturbance or vegetation removal—whether the activity takes place in an existing ROW or not, and which species are likely to be present in the area. As discussed in Chapters 3 and 4 of the proposed HCP (see Appendix B of this final EIS/EIR), the HCP analysis of effects identified four levels of disturbance associated with O&M activities and minor construction, as follows.

- ***Small disturbance*** results from activities that typically disturb less than 0.1 acre per event and that are considered to have a very low potential for effects or would only have very limited effects.
- ***Medium disturbance*** results from activities that typically disturb more than 0.1 acre but less than 0.5 acre, and are considered to have a potential for minor or greater effects.

- ***Large disturbance*** could result from activities that typically disturb 0.5 acre or more and that are considered to have a potential for greater effects.
- ***"Other disturbance"*** results from activities that do not cause habitat loss but may nonetheless have the potential to result in take in some situations.

The appropriate conservation response to each type of activity depends on the anticipated level of effect, as summarized in Table S-4.

Table S-4. Level of Effect and Conservation Approach—Proposed Action

Level of Effect	Definition	Conservation Approach Under Proposed Action
Small disturbance	Activity disturbs less than 0.1 acre per event and has a very low potential to result in adverse effects on habitat, or would result in very limited adverse effects. Includes vegetation management activities, which disturb habitat by removing or reducing vegetation, but do not result in ground disturbance.	PG&E's existing environmental programs and commitments apply.[a]
		Preactivity surveys required in a few cases, based on potential for take and species' biological susceptibility.[b]
		General AMMs required. Additional species-specific AMMs may be required in some cases.
		Compensation required in natural vegetation; compensation acreage is based on presumption of take.
Medium disturbance	Activity disturbs 0.1–0.5 acre per event, on average, and could result in minor or greater adverse effects on habitat.	PG&E's existing environmental programs and commitments apply.
		Preactivity surveys required.
		General AMMs required.
		Additional, more comprehensive (species-specific) AMMs required.
		Compensation required in natural vegetation.
Large disturbance	Activity disturbs more than 0.5 acre per event and has the potential for greater adverse effects on habitat.	PG&E's existing environmental programs and commitments apply.
		Preactivity surveys required.
		General AMMs required.
		Additional, more comprehensive (species-specific) AMMs required.
		Compensation required in natural vegetation.
Other disturbance	Activity does not result in habitat loss.	PG&E's existing environmental programs and commitments apply.
		No preactivity surveys required.
		General AMMs required.
		No compensation necessary.

[a] See *PG&E's Existing Environmental Programs and Practices* above for a ~~description~~ summary of the training and best management practices (BMPs) entailed.

[b] Additional information on when preactivity surveys are required for small disturbance activities is provided in the following section. See Chapter 4 (*Conservation Strategy*) of the proposed HCP, presented as Appendix B of this EIS/EIR, for additional information.

Where impacts cannot be avoided, the proposed HCP provides a systematic process to ensure that they are compensated for. Compensation will be proposed in 5-year increments. As activities occur over the 5-year period subsequent to advanced compensation, PG&E will track actual impact acreages, and any compensation surpluses will be addressed by adjusting the compensation requirement during the subsequent 5-year compensation period. Toward the end of each 5-year period, the amount of available advance compensation will decline. If it appears that the amount of compensation required will exceed the amount remaining in that 5-year increment, PG&E will either purchase the next 5-year increment early, or purchase sufficient compensation so that project compensation stays ahead of impacts. By providing compensation in 5-year increments and purchasing additional compensation lands early if it appears that they will run out of excess compensation, PG&E will stay ahead of project impacts.

There is some uncertainty with respect to actual effects for very limited distribution wildlife and very rare plants. The HCP is written to avoid, minimize, and mitigate effects to all covered species, but pre-activity surveys for the rarest wildlife species (i.e., riparian brush rabbit, Buena Vista lake shrew, riparian woodrat, and limestone salamander) will ultimately determine if there is the potential for an effect and if a particular activity needs to be mitigated; in these instances, ~~mitigation~~ compensation must occur in advance of the impact. Potential effects for the very rare plant species will need to be similarly determined. In instances where the rarest of plants could be affected, substantial efforts will be made to avoid and minimize effects, and if this is not possible, the effects will be mitigated as soon as possible within 2 years of the effect.

Under the proposed HCP, all permanent losses of habitat suitable for one or more of the species covered in the HCP (*suitable habitat*) will be compensated at a 3:1 ratio (3 acres created, restored, or conserved for every acre lost), and temporary losses of suitable habitat will be compensated at a ratio of 0.5:1.[9] Loss of wetlands, including vernal pools, will be compensated at a 3:1 ratio (3 acres preserved for each acre directly affected) using existing mitigation banks. Temporary effects on agricultural ~~fields~~ lands (including orchards, vineyards, cultivated croplands, and fallow fields) and developed or ruderal lands ~~are excluded from compensation~~would not be compensated, because such areas offer very low habitat value for most covered species, and are regularly disturbed as a result of agricultural activities, such that ~~, and~~ the effects of intermittent, short-term O&M activities are expected to be consistent with existing conditions, including agricultural disturbance. Note however that temporary effects on grazed lands (including irrigated pasture), which are considered grassland habitat rather than agricultural land, will be compensated when suitable habitat for covered species is present.

Compensation will be required both for temporary disturbance of habitat and for permanent habitat loss. As a result, it will involve a larger area than the habitat actually lost. Over the long term, the net area of habitat available will increase

[9] The rationale for the proposed compensation ratio is discussed in more detail on pages 4-15 and 4-16 of the HCP (see Appendix B of this EIS/EIR).

further, because the majority if not all of the temporary disturbance associated with O&M activities is expected to fully recover within several years.

For activities with the potential to disturb 0.1 acre or more (medium and large disturbance activities), habitat losses will be projected based on information collected during the required preactivity surveys. For activities that disturb less than 0.1 acre (small disturbance activities), and for medium disturbance activities that are not preceded by a survey (for example, emergency activities), the total area of disturbance will be calculated based on the typical acreage affected per event and the number of events expected to occur. To estimate the portion of the total disturbed area representing habitat suitable for a particular covered species—i.e., the area of habitat requiring compensation—the total disturbed area will be multiplied by the percentage of disturbed habitat identified as suitable for that species by biologists conducting preactivity surveys for other activities in the same area. The required compensation acreage will then be calculated based on the estimated habitat loss, using the compensation ratios presented in the preceding section (except for losses of Valley elderberry longhorn beetle habitat, which follow specific procedures outlined by USFWS, as described in the proposed HCP, included as Appendix B of this EIS/EIR).

Compensation lands will be required to offer habitat characteristics similar to those of the lands disturbed or lost as a result of O&M activities. Depending on the species and habitat requiring compensation, it may be sufficient to provide suitable habitat; in other cases, habitat that is known to be occupied may be required. Selection of compensation lands will be subject to USFWS and DFG approval.

PG&E proposes several approaches to providing appropriate compensation lands:

- purchase of conservation lands,
- purchase of mitigation credits from existing mitigation banks,
- establishment of conservation easements on lands currently in PG&E ownership, and
- purchase of conservation easements on non–PG&E lands.

Other options include donations to conservation organizations, and using habitat enhancement as compensation. PG&E expects to emphasize purchase of compensation lands, purchase of credits from mitigation banks, and use of existing PG&E lands.

Requirements of Master Streambed Alteration Agreement—Proposed Action

The proposed action would include development of a streambed alteration agreement between PG&E and DFG, pursuant to Section 1602 of the California Fish and Game Code. As identified above, DFG is currently revising the draft agreement to reflect the latest updates to the California Fish and Game Code.

However, DFG anticipates that it will be a long-term, program-scale agreement that extends for the lifespan of the proposed HCP and permits. For convenience, this ~~draft~~ EIS/EIR refers to a *master streambed alteration agreement*.

The master streambed alteration agreement is expected to cover all O&M and minor construction activities enabled under the proposed action. Thus, it would cover the variety of operations-, maintenance-, and construction-related activities that take place within the bed, bank, and channel of intermittent and permanent waterways. Some examples include installations that require excavation or trenching in the bed, bank, or channel of a waterway; removal of riparian vegetation; temporary or permanent vehicle crossings; stream diversions; use of rip-rap; and jack and bore operations.

The purpose of the master streambed alteration agreement will be to describe procedures to which PG&E has committed to avoid and minimize the potential effects of O&M and minor construction activities on habitat in watercourses with a defined bed and bank geomorphology, and the fish and wildlife that rely on these resources. As the agreement is developed, it will identify the jurisdictional waters that could be affected under the proposed action, and which are therefore covered by the agreement. The master agreement is envisioned as an "umbrella" document embodying a set of provisions that would be implemented as a condition of working within the bed, bank, or stream of any covered water body. DFG anticipates that it will include a range of provisions and requirements generally similar to the following. Additional types of measures may also be developed for inclusion.

- Vehicle access to rivers, streams, and lakes will be limited to a predetermined ingress and egress corridor on existing roads. New access routes will be limited to the number and width required for safe operation for that location. Vehicle corridors will be flagged. All other natural areas will remain off-limits to vehicles.
- All fill will be limited to the minimal amount necessary to accomplish the activity. Excess material will be removed from the project site and disposed of in a legal manner.
- No native soil may be pushed into the watercourse's high flow channel. If grading of the banks is required, all material will be graded away from the watercourse.
- Grading of the bed and bank will be kept to a minimum to install facilities.
- The bank and streambed will be restored to near original condition as soon as appropriate upon completion of the stream zone activity.
- If the watercourse channel has been altered during the operations, its low flow channel will be returned as nearly as possible to its preactivity state, including its shape and gradient. If necessary, low-flow shape and gradient may be modified in order to maintain low flow.
- Discharge of sediment will be avoided to the maximum extent practicable. In no case will the discharge of sediment result in amounts deleterious to fish.

- If prolonged turbidity may be created, the flow will be diverted around the work area.
- If it is necessary to move equipment across a flowing watercourse, such operations will be conducted without causing a prolonged visible increase in watercourse turbidity. For repeated crossings, a bridge, culvert, or rock-lined crossing will be installed.
- Equipment may be operated in the channel of flowing watercourses only as may be necessary to construct crossings; install palisades; or install grout mats or any other protective structure.
- Temporary diversion structures used to isolate work areas will be constructed in a manner that prevents seepage from the work area. Said structures will be constructed of nonerodible materials. The structures, including any fill or trapped sediments, will be removed when the activity is complete.
- All wet fords will have unarmored portions of the approaches rocked with at least 4 inches compacted depth of rock, or will be paved or otherwise armored from the edge of the watercourse for a minimum of 25 feet, or to the nearest waterbar, to prevent tracking of soil into the crossing.
- Staging areas for equipment, materials, fuels, lubricants, and solvents will be located outside the stream channel and banks and away from all preserved aquatic resources. All stationary equipment—such as motors, pumps, generators, compressors, and welders—that must be within the stream zone will be positioned over drip pans.
- Equipment entering the stream zone will be inspected daily for leaks that could introduce deleterious materials into the watercourse.

A project-specific notification process will likely be set up to ensure that DFG concurs that a proposed activity is covered by the agreement. DFG may also use the notification process to incorporate any additional site-specific measures identified as appropriate.

Alternatives to the Proposed Action

NEPA and CEQA Requirements

NEPA and its implementing regulations require that an EIS evaluate a reasonable range of feasible alternatives to the proposed action. Although the No Action Alternative is not the baseline for evaluating environmental effects, the EIS must also evaluate the No Action Alternative, to allow decision makers to compare the effects of approving the proposed action with the effects of not approving it. Alternatives must be evaluated in the same level of detail provided for the proposed action (40 CFR 1502.14).

CEQA requires that an EIR consider alternatives that would avoid or reduce one or more of the significant impacts identified for the proposed project. Under the state's CEQA Guidelines, the EIR does not need to consider all possible

alternatives; rather, the alternatives considered should be limited to a reasonable range that would meet the project objectives, appear to be feasible, and would avoid or substantially lessen at least one of the project's significant environmental effects. Like NEPA, CEQA requires analysis of the No Project Alternative to allow decision makers to assess the effects of not moving forward with the proposed project. CEQA does not require the alternatives to be evaluated in the same level of detail as the proposed project. However, EIRs are required to include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project or program (CEQA Guidelines Sec. 15126[d], 15126.6[a], 15126.6[f]).

Approach to Developing Alternatives

Under the federal and state Endangered Species Acts, PG&E must ensure that if take of state- or federally listed species occurs as a consequence of any its activities, such take is minimized to the extent feasible and is fully compensated for by appropriate mitigation measures—and hence, that take will not endanger the long-term viability of any listed species or its habitat. This is the core of the purpose and need identified for the proposed action: to provide for the long-term conservation of threatened and endangered species and their habitats while allowing PG&E to continue a program of essential O&M activities that enable reliable delivery of natural gas and electricity service, as required by the company's CPUC mandate.

Consistent with the identified purpose and need, alternatives development focused on alternate strategies to ensure conservation of special-status species with the potential to be affected by the O&M program. Primary screening addressed conservation efficacy. Secondary screening addressed feasibility. Following are the screening criteria used to select approaches for EIS/EIR analysis; only alternatives meeting all three criteria were advanced.

1. The alternative would provide for the long-term conservation of threatened and endangered species with the potential to be affected by the O&M program.
2. The alternative has the potential to be feasibly implemented.
3. The alternative would support an effective and fiscally responsible O&M program.

Alternatives Analyzed in this EIS/EIR

In addition to the proposed action, this EIS/EIR analyzes the following "action" alternatives.

- Alternative 1—HCP with Reduced Take.
- Alternative 2—HCP with Enhanced Compensation.

- Alternative 3—HCP with Reduced Number of Covered Species.

As required by both NEPA and CEQA, this EIS/EIR also analyzes the No Action Alternative. Additional alternatives considered during the screening process but not carried forward for detailed EIS/EIR analysis are discussed in *Alternatives Eliminated from Further Consideration* below.

Alternative 1—HCP with Reduced Take

Overview of Components—Alternative 1

Like the proposed action, Alternative 1 would entail development of an HCP (referred to in this document as the Alternative 1 HCP) to support applications for federal and state permits and a master streambed alteration agreement.

As discussed above, USFWS has full discretionary authority over the issuance of Section 10 permits, and, having consulted with PG&E and reviewed the Alternative 1 HCP, could choose not to approve it, in which case no Section 10 permit would be issued. Similarly, following its review, DFG could elect to deny a state take permit and/or streambed alteration agreement. In order to fully analyze the potential environmental outcomes of Alternative 1, this EIS/EIR assumes that the Alternative 1 HCP would be approved, federal and state take permits would be issued, and a master streambed alteration agreement would be enacted.

Based on these assumptions, Alternative 1 would include the following components.

- Federal components:
  - approval of Alternative 1 HCP and implementation agreement,
  - issuance of incidental take permit,
- State components:
  - issuance of Section 2081 incidental take permit,
  - entry into master streambed alteration agreement with PG&E.

As with the proposed action, approval of the Alternative 1 HCP, issuance of federal and state take permits, and adoption of the streambed alteration agreement would enable PG&E to continue its San Joaquin Valley O&M program, including all current BMPs, methods, and techniques. PG&E would also be committed to new environmental measures and protections enacted under the HCP; differences in these measures are the key distinction between the proposed action and Alternative 1—HCP with Reduced Take.

Activities Analyzed Under Alternative 1

Ongoing Operations and Maintenance Activities

PG&E's program of O&M and minor construction activities would be the same under Alternative 1 as that described above for the proposed action. In addition, as described for the proposed action, all of PG&E's standard methods, techniques, and procedures, including existing environmental programs and practices and BMPs, would continue to apply.

New Environmental Commitments Enacted by Alternative 1 HCP—Provisions for Reduced Take

Like the proposed action, Alternative 1 would enact new environmental commitments. The conservation strategy embodied by the Alternative 1 HCP would be very similar to that described above for the proposed HCP, incorporating measures to avoid and minimize impacts; preactivity surveys to assess the potential level and nature of impact resulting from O&M activities, where warranted; and compensation for impacts that cannot be avoided. As with the proposed action, compensation would represent a last resort—the Alternative 1 HCP's conservation approach would emphasize the need to avoid and minimize impacts to the fullest extent possible.

The AMMs implemented under Alternative 1 would be the same as those described above for the proposed HCP, but they would be implemented more comprehensively. As with the proposed action, all activities except those in the "other disturbance" category would be required to implement general AMMs. However, where the proposed HCP requires additional species-specific AMMs for certain activities in the small disturbance effect category and for all activities in the moderate and large disturbance categories, the Alternative 1 HCP would require their application for all small, moderate, and large disturbance activities, as summarized in Table S-5. This additional level of stringency, intended to reduce take below the level anticipated with the proposed action, is the key distinction between Alternative 1 and the proposed action.

Table S-5. Level of Effect and Conservation Approach—Alternative 1

Level of Effect	Definition	Conservation Approach Under Alternative 1
Small disturbance	Activity disturbs less than 0.1 acre per event and has a very low potential to result in adverse effects on habitat, or would result in very limited adverse effects. Includes vegetation management activities, which disturb habitat by removing or reducing vegetation, but do not result in ground disturbance.	PG&E's existing environmental programs and commitments apply. Preactivity surveys required. General AMMs required. Additional, more comprehensive (species-specific) AMMs required. Compensation required in natural vegetation.
Medium disturbance	Activity disturbs 0.1–0.5 acre per event on average, and could result in minor or greater adverse effects on habitat.	PG&E's existing environmental programs and commitments apply. Preactivity surveys required. General AMMs required.

Level of Effect	Definition	Conservation Approach Under Alternative 1
		Additional, more comprehensive (species-specific) AMMs required.
		Compensation required in natural vegetation.
Large disturbance	Activity disturbs more than 0.5 acre per event and has the potential for greater adverse effects on habitat.	PG&E's existing environmental programs and commitments apply.
		Preactivity surveys required.
		General AMMs required.
		Additional, more comprehensive (species-specific) AMMs required.
		Compensation required in natural vegetation.
Other disturbance	Activity does not result in habitat loss.	PG&E's existing environmental programs and commitments apply.
		No preactivity surveys required.
		Some AMMs required.
		No compensation required.

Master Streambed Alteration Agreement—Alternative 1

Like the proposed action, Alternative 1 would include development of a master streambed alteration agreement between PG&E and DFG, pursuant to Section 1602 of the California Fish and Game Code. The purpose of this agreement would be to describe procedures to which PG&E has committed to avoid and minimize the potential effects of O&M and minor construction activities on habitat in watercourses with a defined bed and bank geomorphology and on the fish and wildlife that rely on such resources. DFG anticipates that the master streambed alteration agreement under Alternative 1 would include provisions and requirements similar to those discussed above for the proposed action.

Alternative 2—HCP with Enhanced Compensation

Overview of Components—Alternative 2

Like the proposed action, Alternative 2 would entail development of an HCP (referred to here as the Alternative 2 HCP) to support applications for federal and state permits and a master streambed alteration agreement.

As discussed above, USFWS has full discretionary authority over the issuance of Section 10 permits, and, having consulted with PG&E and reviewed the Alternative 2 HCP, could choose not to approve it, in which case no Section 10 permit would be issued. Similarly, following its review, DFG could elect to deny a state take permit and/or streambed alteration agreement. In order to fully analyze the potential environmental outcomes of Alternative 2, this EIS/EIR assumes that the Alternative 2 HCP would be approved, federal and state take permits would be issued, and a master streambed alteration agreement would be

enacted. Based on these assumptions, Alternative 2 would include the following components.

- Federal components:
  - approval of Alternative 2 HCP and implementation agreement,
  - Section 10 consultation and issuance of incidental take permit.
- State components:
  - issuance of Section 2081 incidental take permit,
  - entry into master streambed alteration agreement with PG&E.

As with the proposed action, approval of the Alternative 2 HCP and implementation agreement, issuance of federal and state take permits, and adoption of the streambed alteration agreement would enable PG&E to continue its San Joaquin Valley O&M program, including all current BMPs, methods, and techniques. PG&E would also be committed to new environmental measures and protections enacted under the HCP; differences in these measures, and specifically in requirements for compensation, are the key distinction between the proposed action and Alternative 2—HCP with Enhanced Compensation.

Activities Analyzed Under Alternative 2

Ongoing Operations and Maintenance Activities

PG&E's program of O&M and minor construction activities would be the same under Alternative 2 as that described above for the proposed action. In addition, as described for the proposed action, all of PG&E's standard methods, techniques, and procedures, including existing environmental programs and practices and BMPs, would continue to apply.

New Environmental Commitments Enacted by Alternative 2 HCP—Provisions for Enhanced Compensation

Like the proposed action and Alternative 1, Alternative 2 would enact new environmental commitments. The conservation strategy embodied by the Alternative 2 HCP would be similar to that described above for the proposed HCP, incorporating measures to avoid and minimize impacts; preactivity surveys to assess the potential level and nature of impact resulting from O&M activities, where warranted; and compensation for impacts that cannot be avoided. As with the proposed action, compensation would represent a last resort—the Alternative 2 HCP's conservation approach would emphasize the need to avoid and minimize impacts to the fullest extent possible.

The AMMs implemented under Alternative 2 would be the same as those described above for the proposed HCP, and would be implemented in essentially the same way, as summarized in Table S-6. The key distinction between Alternative 2 and the proposed action is that Alternative 2 would provide enhanced compensation for impacts that cannot be avoided.

Table S-6. Level of Effect and Conservation Approach—Alternative 2

Level of Effect	Definition	Conservation Approach Under Alternative 2
Small disturbance	Activity disturbs less than 0.1 acre per event and has a very low potential to result in adverse effects on habitat, or would result in very limited adverse effects. Includes vegetation management activities, which disturb habitat by removing or reducing vegetation, but do not result in ground disturbance.	PG&E's existing environmental programs and commitments apply. Preactivity surveys required in a few cases. General AMMs required. Additional species-specific AMMs may be required in some cases. Compensation at enhanced ratios required in natural vegetation. Triggers same as for proposed action.
Medium disturbance	Activity disturbs 0.1–0.5 acre per event and could result in minor or greater adverse effects on habitat.	PG&E's existing environmental programs and commitments apply. Preactivity surveys required. General AMMs required. Additional, more comprehensive (species-specific) AMMs required. Compensation at enhanced ratios required in natural vegetation. Triggers same as for proposed action.
Large disturbance	Activity disturbs more than 0.5 acre per event and has the potential for greater adverse effects on habitat.	PG&E's existing environmental programs and commitments apply. Preactivity surveys required. General AMMs required. Additional, more comprehensive (species-specific) AMMs required. Compensation at enhanced ratios required in natural vegetation. Triggers same as for proposed action.
Other disturbance	Activity does not result in habitat loss.	PG&E's existing environmental programs and commitments apply. No preactivity surveys required. General AMMs required. No compensation required.

As with the proposed action, the Alternative 2 HCP would require that PG&E propose compensation in advance 5-year increments, in order to ensure that compensation outpaces impacts. As activities occur over the 5-year period subsequent to advanced compensation, PG&E would track actual impact acreages. Any compensation surpluses would be addressed by adjusting the compensation requirement during the subsequent 5-year compensation period, and if it appears that the amount of compensation required would exceed the amount remaining in that 5-year increment, PG&E would either purchase the next 5-year increment early, or purchase sufficient compensation so that project compensation stays ahead of impacts. By providing compensation in 5-year increments and purchasing additional compensation lands early if it appears that they will run out of excess compensation, PG&E will stay ahead of project impacts.

As described for the proposed HCP, there is some uncertainty with respect to actual effects for very limited distribution wildlife and very rare plants. Like the proposed HCP, the Alternative 2 HCP would be written to avoid, minimize, and mitigate effects on all covered species, but pre-activity surveys for the rarest wildlife species (i.e., riparian brush rabbit, Buena Vista lake shrew, riparian woodrat, and limestone salamander) would ultimately determine the potential for an effect and whether a particular activity needs to be mitigated; in these instances, ~~mitigation~~ compensation would be required to occur in advance of the impact. Potential effects for the very rare plant species would need to be similarly determined. In instances where the rarest of plants could be affected, substantial efforts will be made to avoid and minimize effects, and if this is not possible, the effects would be mitigated as soon as possible within 2 years of the effect, as under the proposed HCP.

Under Alternative 2, both permanent and temporary losses of suitable habitat would be compensated at a 3:1 ratio, with 3 acres created or restored for every acre lost. Loss of wetlands, including vernal pools, would be compensated at a 3:1 ratio (3 acres restored or created for each acre directly affected) if compensation is accomplished through an existing mitigation bank, and at a 6:1 ratio (3 acres preserved and 3 acres created for each acre affected) if compensation takes place outside existing banks. Temporary effects on agricultural fields and developed or ruderal lands would ~~be excluded from compensation~~ not be compensated under Alternative 2, as under the proposed action, because such areas are regularly disturbed and the effects of O&M activities are expected to be consistent with existing conditions.

Because compensation would be required both for temporary disturbance of habitat and for permanent habitat loss, ~~mitigation~~ compensation for O&M effects would typically involve a larger area than the habitat actually lost. Compensation acreage would exceed the actual acreage of impact under the proposed HCP as well, but the margin of exceedance would be greater under Alternative 2 because of this alternative's enhanced compensation ratios.

The same process would be used to identify compensation needs under Alternative 2 as under the proposed action. For activities with the potential to disturb 0.1 acre or more, anticipated habitat losses would be calculated based on the results of preactivity surveys. For small disturbance activities, habitat losses would be estimated based on typical acreages affected per event, and the number of events expected to occur. The compensation need would then be identified based on the anticipated habitat loss and the compensation ratios presented in the preceding section, except for losses of VELB habitat, which are addressed in detail in the proposed HCP (see Appendix B of this EIS/EIR).

Desired characteristics of compensation lands would be the same under Alternative 2 as those presented for the proposed action. To qualify as compensation lands, a parcel would be required to offer habitat similar to the lands disturbed or lost as a result of O&M activities. Depending on the species and habitat requiring compensation, it might be sufficient to provide suitable habitat, but in other cases, habitat known to be occupied would likely be

required. In all cases, selection of compensation lands would be subject to USFWS and DFG approval.

As described above for the proposed action, several approaches are available for providing the compensation required under Alternative 2. These include

- purchasing lands for ~~mitigation~~ compensation use,
- purchasing mitigation credits from existing mitigation banks,
- using lands currently in PG&E ownership, and
- purchasing conservation easements; as well as
- making donations to conservation organizations, or using habitat enhancement as compensation.

The approaches could be combined in a variety of ways. Compensation is expected to emphasize purchase of compensation lands, purchase of credits from mitigation banks, and use of existing PG&E lands, but a broader palette of approaches could be necessary for some activities because of the increased compensation requirements that would be enacted under Alternative 2.

Master Streambed Alteration Agreement—Alternative 2

Like the proposed action, Alternative 2 would include development of a master streambed alteration agreement between PG&E and DFG, pursuant to Section 1602 of the California Fish and Game Code. The purpose of this agreement would be to describe procedures to which PG&E has committed to avoid and minimize the potential effects of O&M and minor construction activities on habitat in watercourses with a defined bed and bank geomorphology and on the fish and wildlife that rely on such resources. DFG anticipates that the master streambed alteration agreement under Alternative 2 would include provisions and requirements similar to those discussed above for the proposed action.

Alternative 3—HCP with Reduced Number of Covered Species

Overview of Components—Alternative 3

Like the proposed action and the other action alternatives, Alternative 3 would entail development of an HCP (referred to here as the Alternative 3 HCP) to support applications for federal and state permits and a master streambed alteration agreement.

As discussed above, USFWS has full discretionary authority over the issuance of Section 10 permits, and, having consulted with PG&E and reviewed the HCP, could choose not to approve it, in which case no Section 10 permit would be issued. Similarly, following its review, DFG could elect to deny a state take permit and/or streambed alteration agreement. In order to fully analyze the potential environmental outcomes of Alternative 3, this EIS/EIR assumes that the Alternative 3 HCP would be approved, federal and state take permits would be

issued, and a master streambed alteration agreement would be enacted. Based on these assumptions, Alternative 3 would include the following components.

- Federal components:
  - approval of Alternative 3 HCP and implementation agreement,
  - issuance of incidental take permit.
- State components:
  - issuance of Section 2081 incidental take permit,
  - entry into master streambed alteration agreement with PG&E.

As with the proposed action, approval of the Alternative 3 HCP and implementation agreement, issuance of federal and state take permits, and adoption of the streambed alteration agreement would enable PG&E to continue its San Joaquin Valley O&M program, including all current BMPs, methods, and techniques. PG&E would also be committed to new environmental measures and protections enacted under the HCP. The principal difference between Alternative 3 and the proposed action is that the Alternative 3 HCP would cover fewer species than the proposed HCP, focusing on those identified as most likely to be affected by O&M–related take. If the need arose, potential take of other species would be addressed on a case-by-case basis.

The Alternative 3 HCP would cover 13 wildlife species and 31 species of plants, listed in Table S-7. All of these species meet 2 criteria:

- they are listed under either the federal Endangered Species Act (ESA) or California Endangered Species Act (CESA), or both; and
- more than 2 acres of the species' habitat is likely to be disturbed by O&M activities each year.

Table S-7. Species Covered by San Joaquin Valley O&M Habitat Conservation Plan—Alternative 3

Wildlife	Plants	
Valley elderberry longhorn beetle	Large-flowered fiddleneck	Congdon's woolly sunflower
California tiger salamander	Lesser saltscale	Delta button-celery
Limestone salamander	Bakersfield smallscale	Striped adobe-lily
Blunt-nosed leopard lizard	Big tarplant	Pale-yellow layia
Swainson's hawk	Mariposa pussypaws	Comanche Point layia
White-tailed kite	Succulent owl's-clover	Legenere
Golden eagle	California jewelflower	Mason's lilaeopsis
Bald eagle	Hoover's spurge	Mariposa lupine
California black rail	Slough thistle	Showy madia
Western burrowing owl	Mariposa clarkia	San Joaquin woollythreads

Wildlife	Plants	
Giant kangaroo rat	Merced clarkia	Colusa grass
San Joaquin (Nelson's) antelope squirrel	Springville clarkia	Bakersfield cactus
San Joaquin kit fox	Hispid bird's-beak	San Joaquin Valley Orcutt grass
	Palmate-bracted bird's-beak	Hartweg's golden sunburst
	Kern mallow	San Joaquin adobe sunburst

The following species covered under the proposed HCP would not be covered under the Alternative 3 HCP: the vernal pool crustaceans, limestone salamander, California red-legged frog, giant garter snake, bank swallow, tricolored blackbird, Buena Vista Lake shrew, riparian brush rabbit, riparian woodrat, Tipton kangaroo rat, and some 11 plant species. All other species covered under the proposed HCP would be covered under Alternative 3.

Master Streambed Alteration Agreement—Alternative 3

Like the proposed action, Alternative 3 would include development of a master streambed alteration agreement between PG&E and DFG, pursuant to Section 1602 of the California Fish and Game Code. The purpose of this agreement would be to describe procedures to which PG&E has committed to avoid and minimize the potential effects of O&M and minor construction activities on habitat in watercourses with a defined bed and bank geomorphology and on the fish and wildlife that rely on such resources. DFG anticipates that the master streambed alteration agreement under Alternative 3 would include provisions and requirements similar to those discussed above for the proposed action.

Activities Analyzed Under Alternative 3

Ongoing Operations and Maintenance Activities

PG&E's program of O&M and minor construction activities would be the same under Alternative 3 as that described above for the proposed action. In addition, as described for the proposed action, all of PG&E's standard methods, techniques, and procedures, including existing environmental programs and practices and BMPs, would continue.

New Environmental Commitments Enacted by Alternative 3 HCP

Except for commitments specific to species not covered under Alternative 3, the Alternative 3 HCP would enact the same environmental commitments as the proposed action. Environmental commitments would be triggered and implemented as described above for the proposed action.

Alternative 4—No Action/No Project

Overview—No Action Alternative

Under the No Action Alternative, PG&E would continue to operate and maintain its natural gas and electricity facilities under the current scenario. No regional, programwide HCP would be developed for the San Joaquin Valley O&M program, and PG&E would not seek "umbrella" regional take permits from

USFWS and DFG or a master streambed alteration agreement from DFG. Instead, PG&E would continue to address threatened and endangered species issues by consulting with USFWS and DFG and undertaking conservation planning and permit applications on a case-by-case basis.

Activities Analyzed Under No Action Alternative

Under the No Action Alternative, PG&E would move forward with the same program of O&M activities described for the proposed action, including all standard methods, techniques, programs, practices, and BMPs. As identified above, case-by-case consultation with USFWS and DFG would likely be required for many activities, and permit applications for individual activities or series of activities would require development of conservation plans. However, it is not possible to predict the outcomes of conservation planning, consultation, or permit applications at this time without circumventing the review and evaluation process mandated by the federal and state Endangered Species Acts and the California Fish and Game Code; although these processes would likely result in additional avoidance and mitigation measures applied to some activities, such measures cannot be identified at this time. Consequently, this EIS/EIR considers only the O&M activities described above in analyzing the impacts of the No Action Alternative. Additional NEPA and CEQA environmental review would likely be required in the event that federal or state permits are issued for future O&M activities under the No Action Alternative.

Alternatives Eliminated from Further Consideration

The alternatives development process pursued a variety of avenues to meet the identified purpose and need of providing for conservation of potentially affected species while supporting an effective and fiscally responsible O&M program. Alternatives considered during the screening process and eliminated from further detailed analysis in this EIS/EIR include: changing O&M practices; participating in existing HCPs; relying on compensation alone (implementing no AMMs); and providing temporary (short-term) compensation for recoverable effects. The following sections summarize each approach and the reasons for its dismissal.

Changed Practices

This approach was based on the idea that PG&E might be able to modify its O&M program sufficiently that it would not result in take, while still enabling efficient, cost-effective, and reliable natural gas and electric service. Various types of modifications were considered and ultimately eliminated from detailed analysis, including the following.

- **Eliminating some activities from the program—**Evaluated as infeasible because most of the activities in the program are mandated by FERC or CPUC for public safety and system reliability; eliminating activities could reduce the program's efficacy and/or conflict with regulatory requirements.

- **Modifying some program activities—**Evaluated as infeasible because the program comprises those activities identified as necessary to provide the level of service and safety required by FERC and CPUC regulations; most program activities could not be modified sufficiently to eliminate the potential for take while still maintaining an acceptable level of effectiveness. Legal constraints also specifically limit PG&E's ability to modify some activities.
- **Seasonally restricting some or all activities—**Evaluated as logistically and economically prohibitive. Narrowing the O&M working window enough to eliminate the potential for take would reduce it to several months per year, substantially impeding PG&E's ability to respond to system emergencies and potentially compromising the safety and reliability of natural gas and electric service. Some seasonal restrictions are also precluded by legal requirements.
- **Conducting preactivity surveys for all activities—**Evaluated as financially infeasible and unlikely to satisfy legal requirements under ESA, because an expanded program of preactivity surveys alone would not appreciably reduce effects on special-status species (to reduce take effectively, preactivity surveys must be coupled with AMMs).
- **Conducting preactivity surveys for most activities—**Also evaluated as financially infeasible and unlikely to satisfy legal requirements under ESA.

Participation in Existing San Joaquin Valley HCPs

In recent years, a number of local governments in the San Joaquin Valley area have been working to develop comprehensive habitat and multi-species conservation plans within the boundaries of their respective jurisdictions. PG&E considered participating in some or all of these existing plans as a means of meeting ESA and CESA requirements regarding take of listed species. However, although these plans provide for the protection and conservation of wildlife habitat and sensitive plant species, they generally address municipal concerns related to permanent loss of habitat as a result of development. By contrast, PG&E's facilities span many local government jurisdictions, and although it leads to some permanent loss of habitat, the company's O&M program results primarily in temporary, recoverable habitat disturbance and unavailability. Consequently, the strategies appropriate for existing municipal conservation plans fail to provide a "best fit" for PG&E's O&M program. Moreover, PG&E operates—and is regulated—at a statewide scale; compliance with numerous local conservation plans could result in inconsistent policies and practices across the company.

Compensation Only

Due to the small, localized nature of many of O&M effects, PG&E considered a *compensation only* approach, which would provide larger tracts of mitigation lands in exchange for simpler logistics (fewer AMMs) and reduced administrative requirements (reduced need to administer and track AMMs). This

strategy would offer the benefit of preserving more extensive tracts of habitat than the proposed action. However, the regulations implementing the federal ESA specifically require that the project proponent implement measures to minimize effects on federally listed species, as well as compensating for those that cannot be adequately reduced or avoided. The compensation only approach would not meet that requirement, and was accordingly eliminated from further analysis.

Temporary Compensation for Temporary Effects

Because the majority of the O&M program's effects are expected to continue to be temporary and recoverable, PG&E considered an alternative that would allow temporary compensation for recoverable habitat disturbance while requiring long-term compensation for permanent loss of habitat. Temporary compensation would be provided by renting mitigation credits through existing area mitigation banks. This approach was eliminated from detailed analysis because it is inconsistent with standard compensation practices.

Environmental Consequences and Mitigation Strategies

Incremental and Cumulative Effects

Analysis in an EIS/EIR focuses on evaluating a proposed undertaking's *incremental effects*—that is, the effects resulting from that project alone. Both NEPA and CEQA also require lead agencies to evaluate a proposed undertaking's potential to contribute to *cumulative impacts* created by repeated activities in the project or program area. Cumulative impacts can represent the additive effect of repeated activities taking place as part of a single proposed undertaking, or the combined effect of activities taking place under more than one proposed undertaking (Council on Environmental Quality 1997).

Table S-8 summarizes the proposed action's anticipated environmental outcomes and the potential mitigation strategies identified in this EIS/EIR. It includes the proposed action's incremental impacts as well as its potential to contribute to cumulative impacts in the action area (see Figure S-1 for extent of action area).

As identified in *Joint Compliance Approach* above, this document is intended to meet the requirements of both NEPA and CEQA. CEQA requires an EIR to identify *significant* impacts—that is, impacts that exceed a recognized threshold of severity and thus require *mitigation*, measures or activities adopted to avoid the impact, reduce its severity, or compensate for it. NEPA embodies a similar requirement that an EIS identify approaches for mitigating adverse environmental effects. To provide the degree of specificity required by CEQA, the following terminology is used to evaluate the level of significance of incremental impacts.

- A finding of *no impact* is made when the analysis concludes that the proposed action would not affect the particular environmental resource.
- An impact is considered *less than significant* if the analysis concludes that there would be no substantial adverse change in the environment and that no mitigation is needed.
- An impact is considered *less than significant with mitigation* if the analysis concludes that there would be no substantial adverse change in the environment with the inclusion of the mitigation measure(s) described.
- An impact is considered *significant* or *potentially significant* if the analysis concludes that there could be a substantial adverse effect on the environment.
- An impact is considered *significant and unavoidable* if the analysis concludes that there could be a substantial adverse effect on the environment, and no feasible mitigation measures are available to reduce the impact to a less-than-significant level.
- An impact is considered *beneficial* if the analysis concludes that there would be a positive change in the environment.

For resources known to be subject to a regional cumulative impact independent of the proposed action, the effects of the proposed action were analyzed as they would combine with the effects of other projects to contribute to the larger cumulative effect ("multi-project analysis"). For resources not believed to be subject to an existing regional cumulative effect, separate analysis of the proposed action's additive effects was necessary to meet the NEPA requirement to evaluate whether repeated activities under the same program would result in a cumulative effect. This requirement is particularly important for actions that, like the proposed action, have a long duration—30 years, in the case of the proposed action—and entail numerous repeated activities over that lifespan.

Potential for Growth Inducement

As a community grows, the environment—natural and "built"—is affected in many ways. Because of the potential for population growth to alter the human and natural environment, both NEPA and CEQA require environmental documents to evaluate a proposed undertaking's potential to induce population growth, and assess the potential indirect effects of any growth induced by the project. A proposed action is considered *growth inducing* if it directly or indirectly fosters economic or population growth or the construction of additional housing; or encourages other activities that could result in significant environmental effects (CEQA Guidelines Sec. 15126.2[d]). A project may also be considered growth inducing if it removes an existing obstacle to growth, such as insufficient transportation or water supply infrastructure. The following paragraphs summarize the proposed action's effects related to growth. Because all three action alternatives and the No Action Alternative would enable the same program of O&M and minor construction activities as the proposed action, this analysis also applies to the alternatives.

Table S-8. Summary of Environmental Effects and Mitigation Strategies—Proposed Action

Resource	Impact	Significance Before Mitigation	Mitigation	Significance with Mitigation	Contribution to Cumulative Impacts
Land Use	Impact LUP1—Potential for O&M and minor construction activities to result in physical division of an established community or inconsistency with existing or planned land uses.	Less than significant.	None required.	N/A	No regional cumulative impact identified. Additive effects would be less than significant over the action area as a whole.
	Impact LUP2—Potential for compensation options to result in physical division of an established community.	Less than significant.	None required.	N/A	
	Impact LUP3—Potential incompatibility of preserves with existing (onsite) land uses.	Less than significant.	None required.	N/A	
	Impact LUP4—Potential incompatibility of preserves with adjacent land uses.	Less than significant.	None required.	N/A	
	Impact LUP5—Potential inconsistencies between preserve land acquisition and local land use plans and policies.	Less than significant.	None required.	N/A	
	Impact LUP6—Potential conflicts with existing HCPs or NCCPs.	Less than significant.	None required.	N/A	
Agricultural Resources	Impact AG1—Potential for the conversion of important farmland to nonagricultural uses due to O&M and minor construction activities.	Less than significant.	None required.	N/A	Conversion of agricultural land to nonagricultural uses represents a significant cumulative impact in the action area, but the maximum rate of agricultural conversion anticipated under the proposed action would not represent a cumulatively considerable contribution.
	Impact AG2—Potential for the conversion of important farmland due to implementation of compensation options.	Less than significant.	None required.	N/A	
	Impact AGR3—Potential to conflict with existing Williamson Act contracts.	Less than significant.	None required.	N/A	

Resource	Impact	Significance Before Mitigation	Mitigation	Significance with Mitigation	Contribution to Cumulative Impacts
Biological Resources	Impact BIO1—Potential disturbance of loss of natural vegetation.	Potentially significant.	Potential impacts would be addressed by the continuation of PG&E's existing biological resources program and new AMMs under the proposed HCP. No further mitigation is required.	Less than significant.	Like much of the rest of California, the action area is subject to significant cumulative impacts related to loss and degradation of habitat. Significant cumulative impacts also exist for individual plant and wildlife species that qualify for federal or state special status, including but not limited to the species covered in the proposed HCP. However, with the proposed HCP's protections and compensation in place, O&M and minor construction under the proposed action are not expected to make a cumulatively considerable contribution to regional loss of natural habitats, and the HCP is expected to result in a net long-term benefit with regard to cumulative regional habitat loss. It would also result in corollary benefits to common and special-status wildlife using the habitats preserved and protected. The HCP also provides species-specific measures that augment PG&E's existing biological resources programs to reduce and compensate for disturbance, injury, and mortality of 65 special-status plant and wildlife species. With PG&E's existing programs and the HCP's additional measures and compensation in place, O&M and minor construction under the proposed action are not expected to make a cumulatively considerable contribution to cumulative impacts on the HCP-covered species, and the proposed HCP is expected to result in a net long-term benefit for these species. O&M and minor construction have some potential to result in injury, mortality, and/or loss of habitat to special-status species other than those covered by the HCP. However, based on these species' distribution and the nature of the activities that would take place under the proposed action, PG&E's existing biological resources protection program, and corollary benefits to some species that use habitats protected under the HCP, the lead agencies have
	Impact BIO2—Potential disturbance or loss of vernal pool habitat.	Potentially significant.	Potential impacts would be addressed by new AMMs under the proposed HCP. No further mitigation is required.	Less than significant.	
	Impact BIO3—Potential disturbance or loss of covered special-status plant species and their habitat.	Potentially significant.	Potential impacts would be addressed by the continuation of PG&E's existing biological resources program and new AMMs under the proposed HCP. No further mitigation is required.	Less than significant.	
	Impact BIO4—Potential disturbance or loss of covered special-status wildlife species and their habitat.	Potentially significant.	Potential impacts would be addressed by the continuation of PG&E's existing biological resources program and new AMMs under the proposed HCP. No further mitigation is required.	Less than significant.	
	Impact BIO5—Potential loss of noncovered special-status plant species and their habitat.	Less than significant.	None required.	N/A	
	Impact BIO6—Potential effects on noncovered special-status wildlife species and their habitat.	Less than significant.	None required.	N/A	
	Impact BIO7—Potential effects on aquatic habitat as a result of inchannel work.	Potentially significant.	Potential impacts would be addressed by the continuation of PG&E's existing BMP program and new measures under the proposed MSAA. No further mitigation is required.	Less than significant.	

Resource	Impact	Significance Before Mitigation	Mitigation	Significance with Mitigation	Contribution to Cumulative Impacts
	Impact BIO8—Potential disturbance or loss of common wildlife species and their habitats.	Potentially significant.	Potential impacts would be addressed by new AMMs under the proposed HCP. No further mitigation is required.	Less than significant.	concluded that the proposed action would not make a cumulatively considerable contribution to impacts on these species.
	Impact BIO9—Potential to spread invasive nonnative plant species.	Potentially significant.	Potential impacts would be addressed by the continuation of PG&E's existing biological resources program and new AMMs under the proposed HCP. No further mitigation is required.	Less than significant.	
Aesthetics	Impact AES1—Potential for adverse effects on visual resources, visual character, or visual quality as a result of O&M activities.	Less than significant.	None required.	N/A	The overall visual character and quality of action area views does not constitute a regionwide cumulative impact. No significant additive cumulative effect is anticipated as a result of O&M. Because it is not possible to predict the exact siting or nature of minor construction projects at this time, analysis of their additive effect, if any, on regionwide visual character would be speculative.
	Impact AES2—Potential for adverse effects on visual resources associated scenic highways and other designated scenic vistas as a result of new minor construction.	No impact.	None required.	N/A	
	Impact AES3—Potential for medium- and long-term degradation of visual character of public viewshed as a result of vegetation removal and earthwork for new minor construction.	Less than significant.	None required.	N/A	
	Impact AES4—Potential for long-term degradation of region's visual resources through introduction of built elements.	Less than significant.	None required.	N/A	
	Impact AES5—Potential introduction of new substantial sources of light or glare.	Less than significant.	None required.	N/A	
	Impact AES6—Potential introduction of substantial new shading on adjacent parcels.	Less than significant.	None required.	N/A	

Resource	Impact	Significance Before Mitigation	Mitigation	Significance with Mitigation	Contribution to Cumulative Impacts
	Impact AES7—Aesthetic enhancement as a result of habitat compensation.	Beneficial.	None required.	N/A	
Geology and Soils	Impact GEO1—Potential for damage to new or upgraded facilities as a result of surface fault rupture.	Less than significant.	None required.	N/A	Factors related to geologic hazards are not typically considered to create a cumulative impact except in the case of multiple similar projects within a restricted geologic area where hazards cannot be mitigated with confidence. This is not the case for the proposed action. However, accelerating development in the San Joaquin Valley over recent decades has contributed to progressive unavailability and loss of topsoil resources, representing a significant cumulative impact in parts of the action area. O&M activities would take place on already-disturbed substrate within and adjacent to existing ROWs, and thus are not expected to result in significant additional loss of topsoil or to make a cumulatively considerable contribution to the regionwide impact. Minor construction could occur in undisturbed areas, potentially resulting in loss of topsoil resources, but the total area affected over the 30-year permit term would be small enough that the loss is not expected to represent a cumulatively considerable contribution to regional loss of topsoil resources.
	Impact GEO2—Potential for damage to new or upgraded facilities as a result of seismic groundshaking.	Less than significant.	None required.	N/A	
	Impact GEO3—Potential for damage to new or upgraded facilities as a result of seismically induced liquefaction or other seismic ground failure.	Less than significant.	None required.	N/A	
	Impact GEO4—Potential for damage to new or upgraded facilities as a result of slope failure; potential for construction activities to increase slope failure hazard.	Less than significant.	None required.	N/A	
	ImpactGEO5—Risks to new or upgraded facilities as a result of construction on expansive soils.	Less than significant.	None required.	N/A	
	Impact GEO6—Potential for proposed action to result in accelerated soil erosion.	Less than significant.	None required.	N/A	
	Impact GEO7—Potential loss of topsoil resources.	Less than significant.	None required.	N/A	
Water Quality	Impact WR1—Potential to divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake.	Potentially significant.	Potential impacts would be addressed by the continuation of PG&E's existing BMP program and new measures under the proposed MSAA. No further mitigation is required.	Less than significant.	Cumulative impacts on surface and groundwater quality exist in parts of the action area. However, the effects of potentially increased sediment loading on impaired systems as a result of onland work are not expected to be cumulatively considerable in either the short or

Resource	Impact	Significance Before Mitigation	Mitigation	Significance with Mitigation	Contribution to Cumulative Impacts
	Impact WR2—Potential for alteration of existing drainage patterns, increasing flood risk and/or erosion and siltation potential.	Potentially significant.	Potential impacts would be addressed by the continuation of PG&E's existing BMP program and measures required to comply with relevant federal and state regulations. No further mitigation is required.	Less than significant.	long term, nor is onland work expected to create a new, significant additive cumulative effect on systems not already identified as impaired. Inchannel work is similarly unlikely to make a cumulatively considerable contribution to any existing water quality impact or to create a significant additive impact in systems not identified as impaired. The same is applies to potential impacts as a result of hazardous materials spills or releases.
	Impact WR3—Potential for increase flood risks as a result of facilities installation.	Less than significant.	None required.	N/A	
	Impact WR4—Potential for increased stormwater runoff, and corollary effects	Less than significant.	None required.	N/A	
	Impact WR5—Potential use of streambed materials.	Potentially significant.	Potential impacts would be addressed by the continuation of PG&E's existing BMP program and new measures under the proposed MSAA. No further mitigation is required.	Less than significant.	
	Impact WR6—Potential for reduction in groundwater recharge	Less than significant.	None required.	N/A	
	Impact WR7—Potential temporary degradation of surface water quality as a result of ground disturbance during O&M and construction activities	Potentially significant.	Potential impacts would be addressed by the continuation of PG&E's existing BMP program, including compliance with federal and state regulations, and new AMMs under the proposed HCP. No further mitigation is required.	Less than significant.	
	Impact WR8—Potential temporary degradation of surface water quality as a result of inchannel work.	Potentially significant.	Potential impacts would be addressed by the continuation of PG&E's existing BMP program, including compliance with federal and state regulations, and new AMMs under the proposed HCP and MSAA. No further mitigation is required.	Less than significant.	

Resource	Impact	Significance Before Mitigation	Mitigation	Significance with Mitigation	Contribution to Cumulative Impacts
	Impact WR9—Potential for degradation of surface and groundwater quality as a result of hazardous materials spills or releases	Potentially significant.	Potential impacts would be addressed by the continuation of PG&E's existing BMP program, including compliance with federal and state regulations, and new AMMs under the proposed HCP and MSAA. No further mitigation is required.	Less than significant.	
Cultural Resources	Impact CR1—Potential disturbance or destruction of cultural resources as a result of O&M activities.	Less than significant.	None required.	N/A	Throughout California, including the action area, a significant cumulative impact exists with regard to loss of Native American cultural resources and heritage. With current regulations and PG&E's cultural resources protection program in place, activities under the proposed action are not expected to result in a cumulatively considerable contribution to regional loss of cultural resources, nor are they considered likely to create an independent, additive cumulative effect in excess of that already existing.
	Impact CR2—Potential disturbance or destruction of cultural resources as a result of minor construction activities.	Less than significant.	None required.	N/A	
	Impact CR3—Potential impacts on cultural resources as a result of habitat enhancement, restoration, or creation.	Less than significant.	None required.	N/A	
Paleontological Resources	Impact PAL1—Potential for damage to paleontological resources.	Significant.	PAL1.1—Include site-specific evaluation of paleontological sensitivity for projects requiring site-specific geotechnical investigation. PAL1.2—Stop work if substantial fossil remains are encountered during construction. PAL1.3—Implement follow-up assessment and remediation in the event paleontological resources are discovered during emergency repairs.	Less than significant.	No regionwide cumulative impact has been identified. With Mitigation Measures PAL1.1, PAL1.2, and PAL1.3 in place, activities under the proposed action are not expected to result in a significant additive cumulative effect on paleontological resources.

Resource	Impact	Significance Before Mitigation	Mitigation	Significance with Mitigation	Contribution to Cumulative Impacts
Transportation and Circulation	Impact TR1—Potential to result in temporary construction-related traffic increases and traffic safety hazards (O&M, minor construction, and preserve enhancements)	Less than significant.	None required.	N/A	Cumulative traffic concerns exist in parts of the action area, particularly in urban areas and along heavily traveled corridors such as parts of I-5. Other parts of the action area, including rural areas and recently developed areas where roadway infrastructure is adequate for current and projected demand, are not subject to cumulative traffic impacts. Because traffic conditions are so diverse, a regional (action area–wide) cumulative impact is not considered to exist. Neither O&M nor minor construction is expected to result in a significant additive cumulative effect on vehicular traffic or other transportation.
	Impact TR2—Potential long-term traffic increases and traffic safety hazards due to O&M activities and staffing at new facilities	Less than significant.	None required.	N/A	
	Impact TR3—Potential long-term traffic increases and traffic safety hazards due to activities at preserves	Less than significant.	None required.	N/A	
	Impact TR4—Potential to result in inadequate parking capacity	Less than significant.	None required.	N/A	
	Impact TR5—Potential conflicts with transportation plans, programs, and planned projects.	Less than significant.	None required.	N/A	
Noise and Vibration	Impact N1—Potential for temporary or permanent exposure of noise-sensitive land uses to elevated noise levels	Less than significant.	None required.	N/A	Land uses in the action area range from urban to agricultural and rural. Because of the diversity of noise environments in the action area, a regional cumulative impact is not considered to exist. Neither O&M nor minor construction is expected to result in a significant additive cumulative effect on noise conditions.
	Impact N2— Potential for temporary or permanent exposure of noise-sensitive land uses to elevated vibration levels	Less than significant.	None required.	N/A	
Air Quality	Impact AIR1—Potential to generate increased pollutant emissions during O&M activities	Less than significant.	None required.	N/A	Most of the action area is in non-attainment for federal and/or state ozone and PM10 standards; significant cumulative impacts are considered to exist for ozone levels in all parts of the action area, and for PM10 (inhalable particulate matter) levels in the San Joaquin Air Basin and Yosemite National Park. Because individual
	Impact AIR2—Potential to exceed federal General Conformity thresholds	No impact.	None required.	N/A	

Resource	Impact	Significance Before Mitigation	Mitigation	Significance with Mitigation	Contribution to Cumulative Impacts
	Impact AIR3—Air quality enhancement as a result of habitat compensation	Beneficial.	None required.	N/A	O&M activities would continue to be relatively small-scale and short in duration, and would use progressively "cleaner" equipment over the permit term, emissions of ozone precursor gases are considered to fall short of the cumulatively considerable threshold. The transition to "cleaner" gasoline- and diesel-powered equipment discussed above would reduce the contribution of tailpipe emissions to PM10 levels over time. PG&E has also committed to implementing the SJVUAPCD's "Regulation VIII" control measures to reduce dust generation. Thus, the proposed action's contribution to regional particulate matter impacts is not considered to exceed the cumulatively considerable threshold, consistent with SJVUAPCD guidance. Because vehicle and equipment use would be intermittent and short-term, additive effects of carbon monoxide released via vehicle and small equipment tailpipe emissions over the 30-year permit term are not expected to create a new significant cumulative effect.
Public Health and Environmental Hazards	Impact PH1—Potential to create a hazard to the public or the environment through routine transport, use, or disposal of hazardous materials other than herbicides; potential for inadvertent spills or releases of hazardous materials other than herbicides	Less than significant.	None required.	N/A	The action area has supported a broad range of land uses that employ hazardous materials. Some areas with a history of specific land uses (e.g., industry and manufacturing, defense-related activities, rail and highway uses) are considered to be subject to localized cumulative impacts, while other parts of the action area are comparatively unimpacted. Because it is difficult to generalize across the entire action area, no action area–wide cumulative impact relative to hazardous materials is considered to exist. There is some potential for additive effects as a result of repeated activities along PG&E's ROWs, but in light of the company's hazardous materials program and the additional protection
	Impact PH2—Potential to create a hazard to the public or the environment through routine transport, use, or disposal of herbicides; potential for inadvertent spills or releases of herbicides	Less than significant.	None required.	N/A	

Resource	Impact	Significance Before Mitigation	Mitigation	Significance with Mitigation	Contribution to Cumulative Impacts
	Impact PH3—Potential for human or environmental exposure to hazardous materials as a result of ground disturbance on sites with known hazardous materials contamination	Less than significant.	None required.	N/A	provided by regulatory clean-up and remediation requirements, the additive cumulative effect, if any, is not expected to be significant over the long term.
	Impact PH4—Potential to interfere with or impede the implementation of adopted emergency response plans; potential to interfere with emergency vehicle access or increase emergency services' response times	Less than significant.	None required.	N/A	
	Impact HC5—Potential handling of hazardous materials within 0.25 mile of an existing or planned school	Less than significant.	None required.	N/A	
Recreation	Impact REC1—Potential to result in, construct, or expand recreational facilities that might have an adverse physical effect on the environment.	Less than significant.	None required.	N/A	No regional cumulative impact on recreation has been identified. No significant additive cumulative effect on recreation is anticipated as result of O&M, construction of new facilities, or acquisition of new preserve lands.
	Impact REC2—Potential to increase the use of recreational facilities, accelerating or causing physical deterioration.	Less than significant.	None required.	N/A	
	Impact REC3—Potential for reduced recreational opportunities due to O&M and short-term construction activities	Less than significant.	None required.	N/A	
	Impact REC4—Potential for reduced recreational opportunities due to installation of new, improved, or expanded aboveground facilities or structures.	Less than significant.	None required.	N/A	

Resource	Impact	Significance Before Mitigation	Mitigation	Significance with Mitigation	Contribution to Cumulative Impacts
	Impact REC5—Potential for reduced recreational opportunities due to implementation of compensation options	Less than significant.	None required.	N/A	
	Impact REC6—Potential to provide new or enhanced recreational opportunities due to establishment of preserves or other compensation lands	Beneficial.	None required.	N/A	
Socioeconomics	Socioeconomic effects are expected to be minimal.	N/A (only NEPA analysis is required).	None required.	N/A	No regionwide cumulative impact has been identified. Analysis of the proposed action's incremental socioeconomic effects considered effects over the entire action area throughout the 30-year permit term; no further analysis of additive effects is warranted.
Environmental Justice	Effects related to environmental justice are expected to be minimal.	N/A (only NEPA analysis is required).	None required.	N/A	No regionwide cumulative impact has been identified. Analysis of the proposed action's incremental effects related to environmental justice considered effects over the entire action area throughout the 30-year permit term; no further analysis of additive effects is warranted.

Direct Growth-Related Effects

As described in Chapter 2, the proposed action would enable several types of activities under the aegis of PG&E's San Joaquin Valley O&M program. These include minor construction such as replacing or upgrading facilities and extending electrical and natural gas service to supply new customers. Facilities upgrades and extension of service to additional customers would directly serve new growth. Although it is expected that new or extended infrastructure installed under the proposed action would be sited near existing infrastructure and development, their precise nature, number, and locations are uncertain at this time, and they could serve any combination of residential, commercial, and/or industrial uses. In addition, because of the way the electrical grid is operated, power provided by PG&E may also be routed to areas of California not directly served by PG&E, or to customers in other western states. Thus, the location, timing, and nature of growth served by the proposed action cannot be predicted with certainty at this time, but the overwhelming majority of such growth in California currently occurs as planned growth via the general plan process, and this is expected to continue to be the case in the future.

Provision of essential services without which growth cannot take place may be identified as "removing an obstacle to growth," which represents one type of growth inducement recognized by the state's CEQA guidelines (CEQA Guidelines Sec. 15126.2[d]). If utility service were expanded or upgraded *in advance of* the requirements of currently planned growth, rather than *in response to* needs identified to support currently planned growth, this could be considered growth inducing because essential services would be provided without which additional future growth could not occur. However, as discussed in Chapter 1, 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, the O&M activities enabled by the proposed action are more properly considered growth accommodating rather than growth inducing. Moreover, Section 15126.2[d] of the state's CEQA Guidelines explicitly cautions against assuming that growth is "necessarily beneficial, detrimental, or of little significance to the environment." In light of these considerations, the proposed action's potential to induce growth is considered less than significant. No mitigation is required.

Indirect Growth-Related Effects

Growth served by new or expanded infrastructure installed under the proposed action would have some potential to result in corollary indirect impacts on natural and built environmental resources, including air quality, ambient noise, traffic infrastructure, water supply, and biological resources; and possibly also cultural and paleontological resources.

As identified above, the majority of any new growth served by new facilities constructed under the proposed action would likely occur as planned growth in

areas that have undergone the general plan process. As such, it would be regulated by the goals and policies embodied in the applicable general plan, and by local ordinances and regulations that enact general plan policies, which would help to avoid and reduce potential adverse effects. Effects of growth on natural resources would be further buffered by standards and requirements of federal and state environmental regulations, including

- the federal and state Clean Air Acts;
- the federal Clean Water Act and applicable Basin Plans;
- California Senate Bills 610 and 221 of 2001, which prohibit approval of moderate-sized and large development projects without documentation that adequate water supply will be available to support the resulting new demand;
- the federal and state ESAs; and
- other federal, state, and local laws and regulations.

In addition, new development would almost certainly require separate environmental review under CEQA and/or NEPA, entailing further site- and project-specific analysis of environmental effects.

In any case, because PG&E only provides new or expanded service in response to—not in advance of—an area's identified need, and the proposed action's potential to *induce* growth has thus been evaluated as less than significant, its potential to result in adverse effects as outcomes of growth is also considered less than significant. No mitigation is required.

Environmental Sustainability

NEPA and its implementing regulations require that an EIS address several issues related to the environmental sustainability of the proposed action, including the balance between short-term uses of the environment and its long-term productivity; and the use of natural resources, particularly nonrenewable resources. The state's CEQA guidelines contain a related requirement to consider significant and irreversible environmental changes that could result from implementing a proposed project.

Short-Term Uses vs. Long-Term Productivity

Some of the O&M and minor construction activities that would occur under the proposed action could result in short-term impacts on various environmental resources, including air quality, ambient noise, traffic flow, and surface water quality. Some activities could also affect wildlife habitat and/or result in take of special-status species. However, the level of impact would be reduced by permit review needed to satisfy current regulatory requirements; PG&E's existing environmental commitments, which would continue in force under the proposed action; additional measures implemented through the proposed HCP, and

mitigation for potential impacts on paleontological resources identified in Chapter 10 of this EIS/EIR. Consequently, the lead agencies have concluded that impacts would be less than significant for all resources, as discussed in Chapters 3 through 17. Moreover, the long-term goal of the proposed action is to protect, conserve and enhance the HCP-covered species and their habitats. As such, the proposed action is explicitly focused on avoiding, minimizing, and offsetting adverse effects and providing long-term benefit to the environment while allowing PG&E to proceed with a program of O&M activities essential to meeting the needs of some 4 million California utility customers.

Like the proposed action, Alternatives 1, 2, and 3 would all enact an HCP embodying a long-term conservation vision for special-status species and their habitats. Each alternative offers a different approach to providing long-term conservation benefits. Alternative 1 stresses measures to avoid take and habitat loss, while Alternative 2 emphasizes enhanced compensation for habitat loss. Alternative 3 follows the same strategy outlined in the proposed HCP but would cover fewer species, with any additional compensation needs addressed on a case-by-case basis, so the effort to regionalize a conservation approach could be less effective under Alternative 3. Consequently, while none of the alternatives would prioritize short- over long-term needs, Alternatives 1 and 2 would likely result in greater long-term benefits.

Under the No Action Alternative, no program-wide HCP would be enacted for PG&E's San Joaquin Valley O&M activities; PG&E would continue to address threatened and endangered species issues on a case-by-case basis. Consequently, although there would be no intent to deprioritize long-term environmental enhancement, in practice it would be much more difficult to implement a consistent, regional conservation strategy, and short-term uses could be emphasized at the expense of long-term environmental health and productivity.

Use of Natural Resources

O&M activities enabled by the proposed action would require an ongoing commitment of a variety of nonrenewable (depletable) natural resources, including fossil fuels needed to produce vehicle fuels and lubricants as well as various plastics and other materials; and concrete, aggregate, sand, gravel, and steel for some types of maintenance and minor construction. In addition, some activities would require timber, which is a slowly renewable resource. Many activities would also require the use of water. Use of nonrenewable commodities such as petroleum, aggregate, and iron would represent an irreversible/ irretrievable commitment of resources, although moderate use of sustainably harvested timber would be recoverable over the long term (PG&E uses sustainably harvested timber and recycled plastic lumber in some of its O&M activities, as appropriate and feasible, and would continue to do so in the future). The magnitude and duration of increased demand for water would be limited, and water use is expected to be within the capacity of available supply, so the amount of water required for ongoing O&M and minor construction is also considered renewable over time.

In addition to material resources, O&M and minor construction tasks enabled by the proposed action would entail a commitment of energy to refine petroleum for fuels and to produce various chemicals used in maintenance, repair, and construction of electrical and natural gas infrastructure. Energy would also be required to recover and process resources such as aggregate, sand, and iron/steel; to produce concrete and other materials used for O&M and minor construction; and to harvest and mill timber. Energy use would represent an irreversible and irretrievable commitment of resources.

Because all of the alternatives would enable the same program of O&M activities, resource commitments under all action alternatives and the No Action Alternative would be very similar to those described for the proposed action.

Significant, Irreversible Environmental Changes

Implementing the proposed action could result in the following types of environmental changes.

- A small loss of agricultural land associated with facility expansion and new facility construction.
- Potential for minor new constraints on recreational use as a result of the need for new facilities and compensation lands.
- A small loss of topsoil due to construction of new facilities.
- Long-term effects related to hazardous materials use.
- A long-term benefit to biological resources, aesthetics, and air and water quality because of a long-term increase in acreage of conservation lands.

Under all of the action alternatives, habitat compensation acreages are expected to consistently exceed the actual acreages impacted. This would be particularly beneficial to biological resources, aesthetics, air quality, and water quality. The benefits would continue as long as compensation lands continue in conservation status. Benefits are considered irreversible, because the intent of the proposed action—and the legal requirement under the ESA—is permanent compensation for effects of O&M and minor construction activities.

At the same time, acquisition of lands for new facilities and for compensation use has the potential to impose minor constraints on agriculture and recreation. These constraints are also considered effectively irreversible. For example, any agricultural land converted for expansion of existing facilities and construction of new facilities would become permanently unavailable—and possibly also unsuitable—for agriculture; however, note that the coexistence of infrastructure situated in agricultural lands is considered a compatible use as farming or ranching operations are likely to continue unimpeded. Land acquired for compensation use would remain physically suitable for cultivation or grazing use, but would be protected in perpetuity for the benefit of biological resources, and would only be used for agricultural production (primarily grazing, as

discussed in Chapter 4, *Agricultural Resources*) to the extent such use was consistent with the goals of habitat ~~mitigation~~ compensation under the proposed HCP. However, as discussed in Chapter 4, the extent of agricultural lands converted to nonagricultural use would be very small, so the associated environmental change, although irreversible, is nonetheless considered less than significant. Constraints on recreational resources, although irreversible, are also expected to be less than significant, as discussed in Chapter 15 (*Recreation*). Similarly, the potential extent of topsoil loss would be small enough that, while any such loss would be irreversible, it is evaluated as less than significant (see Chapter 7, *Geology and Soils*).

As discussed in Chapters 14 (*Public Health and Environmental Hazards*) and 18 (*Cumulative Effects*), there is some potential for environmental contamination through the use of hazardous substances, including but not necessarily limited to fuels, lubricants, adhesives, paints, and paving media. However, in light of PG&E's existing program of hazardous materials training and BMPs, and additional protection afforded by permit review under the federal Clean Water Act, the risk is evaluated as incrementally less than significant. Moreover, in the event of a spill or release, most types of contamination likely to result from O&M or minor construction would represent reversible effects.

Comparison of Alternatives

Table S-9 summarizes the environmental outcomes expected for the three action alternatives and the No Action Alternative, including both adverse and beneficial effects. The discussion in Table S-9 includes comparison between each alternative and the proposed action.

Environmentally Preferable/Environmentally Superior Alternative

NEPA and CEQA Requirements

NEPA requires lead agencies to identify the environmentally preferable alternative from the range of alternatives analyzed in an EIS. The *environmentally preferable alternative* refers to the alternative that would best accomplish NEPA's goals of minimizing adverse effects on the environment, and protecting natural and cultural resources. Much like NEPA, the state's 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. If the No Project Alternative is identified as environmentally superior but would not meet project objectives, the lead agency must also identify the environmentally superior alternative that would implement the project (CEQA Guidelines Sec. 15126.6[a], [e]). In addition, the proposed project itself cannot be identified as the environmentally superior alternative, although the lead agency is expected to compare the environmental risks and

benefits of the proposed approach with those of the environmentally superior alternative approach.

Methods and Outcome

Table S-9 below presents a summary comparison of the proposed action, the three action alternatives, and the No Action Alternative. This provides the basic context for identifying the environmentally preferable/environmentally superior alternative, but additional detail at a resource-specific level is needed. This was obtained by assessing each impact individually to identify the alternative that would offer the best outcome for that specific concern, as summarized in Table S-10.

As shown in Table S-10, the alternative offering the best outcome for the most impacts under each resource topic was selected as preferable for that resource. The environmentally preferable/environmentally superior alternative is expected to be the one identified as preferable for the most resource areas—that is, the one that offers the best outcome overall for the most resources. Alternative 1 was identified as preferable for land use and planning (because of the increased regionalization it would provide) and for biological resources (because of its emphasis on reduced take). It would also be preferable for agricultural resources and for recreation, which would be subject to increased constraints as compensation acreages increase under Alternative 2 and would suffer under the less coordinated planning approach offered by Alternative 3 and the No Action Alternative. On the other hand, Alternative 2 is clearly preferable for resources benefited by increased acreages of open space—aesthetic resources, water resources (in particular, water quality), and air quality. Finally, for many of the resource areas analyzed, environmental effects would be comparable under all alternatives, and it is difficult to differentiate clearly between them.

In summary, Alternative 1 would offer the best outcome for a total of four resources, while Alternative 2 would offer the best outcome for a total of three resources, reflecting a slight advantage under Alternative 1. Resources without a clearly preferable alternative were considered not to bear directly on identification of an environmentally preferable approach. Because of the proposed action's focus on protection and conservation of sensitive biological resources, potential biological benefits were considered the deciding factor, and Alternative 1, which focuses on avoiding impacts on known populations of sensitive species through increased stringency in implementing AMMs, is identified as the environmentally preferable/environmentally superior alternative.

Comparison of Environmentally Superior Alternative and Proposed Action

Alternative 1 would reduce take by comparison with the proposed action, by applying AMMs more comprehensively and stringently. Thus, it would offer some level of biological benefit over the proposed action. However, because

Table S-9. Comparison of Anticipated Environmental Effects—Alternatives 1 through 4

Resource	Alternative 1—HCP with Reduced Take	Alternative 2—HCP with Enhanced Compensation	Alternative 3—HCP with Reduced Number of Covered Species	Alternative 4—No Action
Land Use	Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action with minor differences specific to HCP commitments for the protection of biological resources. Specifically, under Alternative 1, compensation ratios for loss or disturbance of habitat would be the same as those described for the proposed action, but AMMs would be implemented more comprehensively. Although the level of take would be reduced because of the increased stringency in implementing the HCP's AMMs, compensation acreages are expected to be similar under both alternatives because compensation would be calculated based on acreage of disturbance, not level of take. Consequently, under Alternative 1, impacts related to land use would be similar to those described for the proposed action.	Like Alternative 1, Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Differences between Alternative 2 and the proposed action center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action, as described in Chapter 2). Alternative 2's emphasis on compensation would entail a greater compensation acreage at a given level of disturbance, and could result in the establishment of a greater number of preserves or preserves that encompass larger geographic areas by comparison with the proposed action. Nonetheless, consultation with appropriate local jurisdiction land managers would minimize or avoid substantial conflicts with existing and planned land uses and with applicable land use policies and plans. Therefore, impacts related to land use would be similar under Alternative 2 to those described for the proposed action, despite the greater geographic area potentially affected under Alternative 2.	Alternative 3 would enable the same program of O&M and minor construction activities described for the proposed action, and would enact the same additional environmental commitments for other resource areas identified in this EIS/EIR. The key difference between Alternative 3 and the proposed action relates to the number of species covered under Alternative 3 (reduced by comparison with the proposed action, as described in Chapter 2). Depending on their status at the time, other species might be subject to state, and possibly also federal, requirements for impact assessment and compensation, which would need to be addressed on a case-by-case basis. Reducing the number of HCP-covered species could result in the establishment of a smaller number of preserves or preserves that encompass smaller geographic areas by comparison with the proposed action. At the same time, additional, case-by-case assessment of compensation needs might be required for any individual activities identified as having the potential to affect noncovered special-status species. However, criteria for identifying suitable compensation lands would remain the same and selection of appropriate compensation lands would be subject to essentially the same agency approval process. Further, PG&E's commitment to consult with local jurisdictions regarding land use planning issues would carry forward. Thus, although it might be more difficult to achieve efficient land use planning and ensure consistency of compensation uses with other existing and planned uses, the net effect on land use under Alternative 3 would be similar to that identified for the proposed action. .	Under the No Action Alternative, PG&E would continue its existing program of O&M activities and current environmental programs and practices, including BMPs, unchanged. No HCP would be implemented, and no other new environmental commitments would be put in place. Individual activities with the potential to affect threatened and/or endangered species would be assessed on a case-by-case basis through consultation with USFWS and DFG for level of effect and compensation needs. Because compensation requirements would be assessed on a case-by-case basis, smaller parcels of land would probably be identified for enhancement at any given time, but case-by-case assessment could also result in identification of a larger number of parcels for compensation use. This is similar to but more extreme than the scenario described above for Alternative 3, where most compensation would likely occur under the auspices of an HCP process. Criteria for identifying suitable compensation lands would likely be similar to those described for the proposed action, and selection of appropriate compensation lands would be subject to the same agency approval process. Moreover, PG&E would still consult with local jurisdiction land managers in an attempt to minimize or avoid land use conflicts. Thus, outcomes for land use would probably be broadly similar under the No Action Alternative to those described for the proposed action. However, the area affected could vary, and with no HCP (and hence, no centralized conservation planning process) in place, it would probably be substantially more difficult to achieve efficient land use planning and ensure consistency of compensation uses with other existing and planned uses.
Agricultural Resources	Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences in the commitments for protection of biological resources. Alternative 1 would enact the same environmental commitments for other resource areas identified in this EIS/EIR for the proposed action, and compensation ratios for loss or disturbance of habitat would also be the same. The key difference between the proposed action and Alternative 1 is that Alternative 1 would implement avoidance and minimization measures (AMMs) at a lower level of effect than the proposed action, with the intent of reducing take. Although the level of take would be reduced because of the increased stringency associated with implementation of the AMMs, compensation needs are expected to be similar under both alternatives, because compensation acreages would be based on acreage affected rather than level of take. Consequently, under Alternative 1, impacts on agricultural resources would be similar to those described for the proposed action.	Alternative 2 would enable the same program of O&M and minor construction activities and the same environmental commitments for other resource areas identified in this EIS/EIR for the proposed action. Differences between Alternative 2 and the proposed action center on compensation ratios for habitat disturbed or lost (greater under Alternative 2 than under the proposed action). Under Alternative 2, assuming the same level of habitat disturbance, overall compensation requirements would be higher than under the proposed action, although criteria for identifying suitable compensation lands would remain the same and selection of appropriate compensation lands would be subject to the same agency approval. As the demand for compensation lands increases, availability of lands that support the appropriate habitat types can be expected to decrease, both within and outside of PG&E ROWs. However, where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options would be still available (i.e., purchase of mitigation credits, donations, and enhancement), and might be more extensively used; reliance on compensation options other than acquisition by purchase or easement might offset some of the difference in compensation needs. Nonetheless, the enhanced compensation requirements under Alternative 2 would result in greater overall compensation requirements and, as a result, could lead to the establishment of a greater number and/or larger acreage of preserves. Consequently, impacts on agricultural resources would likely be slightly greater under Alternative 2 than those described for the proposed action, when viewed from a NEPA perspective. Impacts under CEQA would be the same; that is, less than significant. This is because the physical attributes of agricultural/grazing lands that may be acquired for habitat compensation use under the proposed action would not be lost or otherwise altered by the proposed action, although they would be	Alternative 3 would enable the same program of O&M and minor construction activities as that described for the proposed action, and would enact the same additional environmental commitments for other resource areas identified in this EIS/EIR. The key difference between Alternative 3 and the proposed action relates to the number of species covered under Alternative 3 (reduced by comparison with the proposed action, as described in Chapter 2). Depending on their status at the time, other species might be subject to state, and possibly also federal, requirements for impact assessment and compensation, which would need to be addressed on a case-by-case basis. Under Alternative 3, reducing the number of covered species could result in the establishment of a smaller number of preserves or preserves that encompass smaller geographic areas by comparison with the proposed action. At the same time, additional, case-by-case assessment of compensation needs might be required for any individual activities identified as having the potential to affect noncovered special-status species. It is difficult to determine the precise effect that this approach would have on agricultural lands since detailed compensation needs cannot be identified at this time. However, because Alternative 3 could require the assessment of at least some compensation needs on a case-by-case basis, it could result in the identification of smaller parcels of land (including ROW areas) for enhancement use, compared to the proposed action. Also, while Alternative 3 could result in smaller contiguous areas for acquisition and/or enhancement use, more numerous acquisitions could also occur under Alternative 3. Depending on availability of appropriate habitat, multiple land acquisitions and/or enhancement areas could potentially be scattered throughout the action area. As the demand for compensation lands increases, availability of lands that support the appropriate habitat types can be expected to decrease, including areas within PG&E ROWs. Where appropriate and	Under the No Action Alternative, PG&E would continue its existing program of O&M activities unchanged. No HCP would be implemented, and no other new or additional environmental commitments would be put in place. Individual actions affecting suitable habitat for listed special-status species would be assessed through case-by-case consultation with USFWS and DFG for level of effect and compensation needs. Because the compensation requirements for habitat disturbance would be assessed on a case-by-case basis, smaller parcels of land would likely be identified for acquisition or enhancement at any given time, but case-by-case assessment could also result in a need for more numerous parcels, potentially distributed over a wider area. This is similar to but more extreme than the case described above for Alternative 3, where most compensation would likely occur under the auspices of an HCP process. The availability of desirable compensation lands is expected to decrease over time, as lands are used for compensation or other purposes. However, as described for the action alternatives, where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options would likely still be available (e.g., purchase of mitigation credits, donations, and enhancement). Because of the need for activity-by-activity consultation, the No Action Alternative would have the potential to result in some permanent loss of agricultural resources in the action area, and the overall nature of effects would be similar to that described above for the proposed action. However, the degree of impact is uncertain. Adverse effects on agricultural resources could be slightly reduced under the No Action Alternative compared to the proposed action since suitable compensation lands might be more difficult to acquire

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		managed to benefit biological resources as opposed to focused solely on the production of agricultural commodities. In this sense, acquisition and management of agricultural/grazing lands to benefit biological resources is not expected to result in a significant impact on the environment associated with the loss of agricultural land.	available compensation lands cannot be identified for purchase or easement, other compensation options would still be available (e.g., purchase of mitigation credits, donations, and enhancement); reliance on compensation options other than acquisition by purchase or easement could offset some of the difference in compensation needs. However, criteria for identifying suitable compensation lands would remain the same, and selection of appropriate compensation lands would be subject to USFWS and DFG approval. Alternative 3 would thus have some potential to permanently affect agricultural lands (and particularly grazing lands) in the action area, and impacts could be spread over a wider area because more activity-by-activity compensation could be required. Impacts related to agricultural resources would probably be essentially the same or slightly greater under Alternative 3 compared to those described for the proposed action, when viewed from a NEPA perspective. As described for Alternative 2, impacts under CEQA would be the same; that is, less than significant. This is because the physical attributes of agricultural/grazing lands that may be acquired for habitat compensation use under the proposed action would not be lost or otherwise altered by the proposed action, although they would be managed to benefit biological resources as opposed to focused solely on the production of agricultural commodities. In this sense, acquisition and management of agricultural/grazing lands to benefit biological resources is not expected to result in a significant impact on the environment associated with the loss of agricultural land.	on a case-by-case basis, and smaller parcels might be less likely to meet the biological objectives of compensation; accordingly, payment-type compensation options might be used to a greater degree. It is difficult to assess the precise effect that this approach would have on agriculture because locations and other details about specific habitat enhancement sites are unknown at this time, as are the actual compensation acreages that would be required. Alternatively, if payment-type compensation options were not emphasized, the case-by-case approach to compensation determination under the No Action Alternative would result in a greater number of acquisitions/enhancements, some or all of which could be located on agricultural (largely grazing) lands. Consequently, impacts on agricultural resources could be slightly greater under the No Action Alternative than those described for the proposed action when viewed from a NEPA perspective. As described above for the action alternatives, impacts under CEQA would be the same in this case; that is, less than significant. This is because the physical attributes of agricultural/grazing lands that may be acquired for habitat compensation use under the proposed action would not be lost or otherwise altered by the proposed action, although they would be managed to benefit biological resources as opposed to focused solely on the production of agricultural commodities. In this sense, acquisition and management of agricultural/grazing lands to benefit biological resources is not expected to result in a significant impact on the environment associated with the loss of agricultural land.
Biological Resources	Alternative 1 would enable the same program of O&M and minor construction activities analyzed for the proposed action; differences between Alternative 1 and the proposed action center on mechanisms for avoiding take. Specifically, Alternative 1 focuses on increased avoidance of take, and would require much more comprehensive and stringent implementation of the HCP's AMM program, which would benefit both covered and noncovered special-status species, and would likely also provide corollary benefits for common species. Impacts on special-status species (covered and noncovered), identified as less than significant for the proposed action, are expected to be further reduced under Alternative 1. Impacts on common species, also expected to be less than significant under the proposed action, would likely also be somewhat reduced under Alternative 1.	Like Alternative 1, Alternative 2 would enable the same program of O&M and minor construction activities analyzed for the proposed action. Alternative 2 would also implement the same AMMs; however, because Alternative 2 stresses increased compensation for unavoidable habitat losses, habitat compensation requirements would be substantially increased under Alternative 2. As a result, impacts on biological resources would be essentially the same under Alternative 2 as those described for the proposed action, but temporary and permanent habitat losses would be compensated at a higher ratio, so a greater acreage of compensation lands (with corollary benefits for covered, noncovered, and common species) would accrue under Alternative 2.	Alternative 3 would enable the same program of O&M and minor construction activities analyzed for the proposed action and the other action alternatives. The key difference between Alternative 3 and the proposed action is that a smaller number of species would be covered under the Alternative 3 HCP; AMMs and habitat compensation would otherwise be essentially the same as those described for the proposed action. Because the Alternative 3 HCP would protect fewer special-status species, it would provide less corollary protection for noncovered special-status species and common species, and would likely require less habitat compensation over the long term. Impacts on biological resources could thus be somewhat greater under Alternative 3 than under the proposed action.	Under the No Action Alternative, PG&E would continue O&M and minor construction activities for its San Joaquin Valley natural gas and electricity facilities without implementing a program-wide HCP. Instead, potential take of threatened and endangered species would continue to be addressed on a case-by-case basis, pursuant to the requirements of ESA Section 7 and Section 2081 of the California Fish and Game Code. Through the consultation process, PG&E would likely address impacts on many or all of the species included in the proposed HCP and discussed in this EIS/EIR. Measures implemented to avoid, minimize, and mitigate impacts on special-status species, would likely also help to reduce or avoid impacts on common species. The general types of impacts on natural vegetation, special-status species, and common species expected under the No Action Alternative would be very similar to those identified above for the proposed action. The key differences are (1) no new AMMs would be implemented to buffer potential impacts, so impacts are more likely to be significant; and (2) potential take would be dealt with on a case-by-case basis rather than through a coordinated conservation program. Consequently, conservation efforts under the No Action Alternative would be less integrated; in particular, the purchase of conservation lands would probably be more fragmented. While case-by-case mitigation might be effective at targeting and preserving localized high-value habitat, the creation of a large number of smaller mitigation sites could result in less effective species conservation across the action area as a whole. Conservation lands would be less likely to offer preferred conditions such as larger contiguous areas of habitat or connectivity with other open space or conservation areas. This would be of particular concern for species such as the San Joaquin kit fox that require large areas of habitat or corridors allowing them to travel between areas of suitable habitat. The absence of a comprehensive monitoring and adaptive management program would also reduce opportunities to ensure the success of mitigation sites. In summary, because the No Action Alternative would approach conservation on a case-by-case basis, it would not offer the advantages of integrated regional conservation planning provided by the action alternatives. Outcomes for all categories of habitats and

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				wildlife are more likely to be adverse/significant under the No Action Alternative.
Aesthetics	Alternative 1 would enable the same program of O&M and minor construction activities as the proposed action. Consequently, Impacts AES1 through AES5 would be the same under Alternative 1 as those described above for the proposed action. Differences between Alternative 1 and the proposed action center on the strategy for mitigating the biological effects of PG&E's O&M and minor construction activities; Alternative 1 stresses reducing take. However, although the level of take would be reduced because of the increased stringency associated with implementation of the AMMs, compensation needs are expected to be similar under both alternatives because compensation acreages would be calculated based on acreage affected, not level of take. Consequently, under Alternative 1, impacts related to aesthetic resources would be similar to those described for the proposed action.	Alternative 2 would enable the same program of O&M and minor construction activities as the proposed action. Consequently, as with Alternative 1, Impacts AES1 through AES6 would be the same under Alternative 2 as those described above for the proposed action. Differences between Alternative 2 and the proposed action center on the strategy for mitigating the biological effects of PG&E's O&M and minor construction activities; Alternative 2 would entail compensation at higher ratios than the proposed action, and thus is expected to require substantially larger compensation acreages. Aesthetic benefits related to the preservation of natural open space would thus be maximized under Alternative 2.	Alternative 3 would enable the same program of O&M and minor construction activities as the proposed action; Impacts AES1 through AES6 would thus be the same under Alternative 3 as those described above for the proposed action. The key difference between Alternative 3 and the proposed action is that the Alternative 3 HCP would cover a smaller number of species, so the compensation acreages required under the Alternative 3 HCP are likely to be somewhat less. However, PG&E could still be required to consult separately with the U.S. Fish and Wildlife Service regarding potential take of other special-status species not covered by the Alternative 3 HCP, and any such consultation could result in the identification of additional habitat compensation needs; as identified in Chapter 3 (*Land Use and Planning*), the net result of Alternative 3 could be the preservation of a somewhat larger number of smaller and more areally distributed parcels compared to the larger, more consolidated preserve acreages anticipated under the proposed action. Smaller, more widely distributed preserves could ultimately result in benefits to more viewers. On the other hand, smaller, more areally distributed preserves could be less aesthetically effective than larger parcels. In summary, it is difficult to predict benefits under Alternative 3, but it is likely that they would be slightly less than those offered by the proposed action.	Under the No Action Alternative, PG&E would continue its existing program of O&M activities unchanged. Impacts AES1 through AES6 would be essentially the same under the No Action Alternative as those described above for the proposed action. No HCP would be implemented under the No Action Alternative, but PG&E would nonetheless be required to obtain permits for any incidental take of special-status species on a case-by-case basis. As described in Chapter 1 (*Introduction*), the permitting process would require conservation planning and consultation with USFWS, with the expectation that habitat losses would be compensated at ratios similar to those required under the proposed action. There would thus be some potential for aesthetic benefits related to the preservation of natural open space under the No Action Alternative. However, because conservation planning would be less centralized, and habitat preservation would occur in a less systematic way, smaller acreages would probably be preserved at any one time. The scenario for the No Action Alternative would be similar to that for Alternative 3, but is likely to result in even less centralized compensation planning. As described for Alternative 3, if compensation lands were widely distributed, they could ultimately benefit more viewers than would benefit from larger, more consolidated preserves. On the other hand, smaller, more areally distributed preserves could be less aesthetically effective than larger ones. In summary, aesthetic benefits under the No Action Alternative are difficult to predict, but are likely to be less marked than those offered by any of the action alternatives.
Geology and Soils	Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. The same program of BMPs, and the same regulatory protection including codes and standards, would continue to apply. Consequently, impacts related to geology and soils would be essentially the same under Alternative 1 as those described for the proposed action.	Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action. Differences between Alternative 2 and the proposed action would center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). As with Alternative 1, the same program of BMPs and the same regulatory protection, including codes and standards, would continue to apply. Thus, impacts related to geology and soils would be essentially the same under Alternative 2 as those described for the proposed action.	Alternative 3 would enable the same program of O&M and minor construction activities as that described for the proposed action. The key difference between Alternative 3 and the proposed action would relate to the number of species covered under the Alternative 3 (reduced by comparison with the proposed HCP, as described in Chapter 2). As described for the other action alternatives, the same program of BMPs and the same regulatory protection, including codes and standards, would continue to apply. Impacts related to geology and soils would be essentially the same under Alternative 3 as those described for the proposed action.	Under the No Action Alternative, PG&E would continue its existing program of O&M and minor construction activities unchanged. No HCP would be implemented, and no other new environmental commitments would be put in place. However, as identified for the three action alternatives, the same program of BMPs and the same regulatory protection, including codes and standards, would continue to apply under the No Action Alternative. Impacts related to geology and soils would thus be essentially the same under Alternative 4 as those described for the proposed action.
Water Resources	Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Alternative 1 would incorporate the same environmental commitments for water resources protection identified in this EIS/EIR for the proposed action. Consequently, any adverse effects on water resources would be essentially the same under Alternative 1 as those described for the proposed action.	Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action. Differences between Alternative 2 and the proposed action would center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). Alternative 2 would incorporate the same environmental commitments for water resources protection identified in this EIS/EIR for the proposed action. As with Alternative 1, any adverse effects on water resources would be essentially the same under Alternative 2 as those described for the proposed action. Alternative 2 could offer a slight benefit for water resources by comparison with the proposed action and action alternatives, because its enhanced compensation ratios would maximize the preservation of natural drainage patterns and permeable natural surfaces, and preserve the greatest area from recontouring, cultivation, development and other types of ground disturbance.	Alternative 3 would enable the same program of O&M and minor construction activities as that described for the proposed action. The key difference between Alternative 3 and the proposed action would relate to the number of species covered under the Alternative 3 HCP (reduced by comparison with the proposed HCP, as described in Chapter 2), which would likely reduce the total compensation acreage preserved. Alternative 3 would incorporate the same environmental commitments for water resources protection identified in this EIS/EIR for the proposed action. Any adverse effects on water resources would be essentially the same under Alternative 3 as those described for the proposed action. Potential benefits related to preservation of compensation lands would be less than those afforded under Alternative 2, and probably also less than those under the proposed action.	Under the No Action Alternative, PG&E would continue its existing program of O&M activities unchanged. No HCP would be implemented, and no other new or environmental commitments in addition to those already in place would be put implemented. However, PG&E would continue to follow the same standard methods and techniques for carrying out O&M activities, and would continue to implement the company's existing environmental programs, practices, and BMPs, and the same regulatory protection would apply. Therefore, impacts on water resources would be very similar under Alternative 4 to those described for the proposed action. Slight differences could result from variations in compensation requirements, but would be speculative to predict at this time.
Cultural Resources	Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. PG&E's current cultural resources program would continue in force under Alternative 1. Consequently, impacts on cultural resources would be essentially the same under Alternative 1 as those described for the proposed action.	Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action, and PG&E's current cultural resources program would continue in force under Alternative 2. Differences between Alternative 2 and the proposed action would center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). As with Alternative 1, impacts on cultural resources would be similar under Alternative 2 to those described for	Alternative 3 would enable the same program of O&M and minor construction activities as that described for the proposed action, and PG&E's current cultural resources program would also continue in force under Alternative 3. The key difference between Alternative 3 and the proposed action would relate to the number of species covered under the Alternative 3 (reduced by comparison with the proposed HCP, as described in Chapter 2). Impacts on cultural resources would be similar under Alternative 3 to those described for	Under the No Action Alternative, PG&E would continue its existing program of O&M and minor construction activities unchanged, but no HCP would be implemented, and any habitat compensation would occur on a case-by-case, piecemeal basis. The company's existing cultural resources program—including pre-activity database searches for larger activities, and BMPs consistent with relevant federal and state regulations for all activities—would continue in force, although compliance would be performed on a case-by-case basis as projects

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		the proposed action, but could be somewhat greater because of the enhanced compensation requirements. However, because PG&E's existing cultural resources program would continue in force under Alternative 2—including pre-activity database searches for larger activities, and BMPs consistent with relevant federal and state regulations for all activities—impacts are nonetheless expected to be less than significant.	the proposed action, although they could be somewhat reduced because the reduced number of covered species could reduce compensation acreage somewhat. Because the same protective measures would apply—including pre-activity database searches for larger activities, and BMPs consistent with relevant federal and state regulations for all activities—impacts are expected to be less than significant. .	arise. Consequently, O&M and minor construction impacts on cultural resources under the No Action Alternative would be very similar to those described for the proposed action. Impacts related to ground disturbance for habitat enhancement, restoration, or creation are speculative to predict because the nature and location of compensation parcels remains speculative at this time.
Paleontological Resources	Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Consequently, impacts on paleontological resources would be essentially the same under Alternative 1 as those described for the proposed action, and the same mitigation strategy would apply.	Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action. Differences between Alternative 2 and the proposed action would center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). As with Alternative 1, impacts on paleontological resources would be very similar under Alternative 2 to those described for the proposed action, and the same mitigation strategy would apply.	Alternative 3 would enable the same program of O&M and minor construction activities as that described for the proposed action. The key difference between Alternative 3 and the proposed action would relate to the number of species covered under the Alternative 3 (reduced by comparison with the proposed HCP, as described in Chapter 2). Impacts on paleontological resources would be very similar under Alternative 3 to those described for the proposed action, and the same mitigation strategy would apply.	Under the No Action Alternative, PG&E would continue its existing program of O&M activities unchanged. No HCP would be implemented, and no other new or additional environmental commitments would be put in place. However, because the activities most likely to affect paleontological resources would not change substantially, paleontological impacts would be essentially the same as those described for the proposed action. The same mitigation strategy would apply.
Transportation and Circulation	Alternative 1 would enable the same program of O&M and minor construction activities described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Alternative 1 would enact the same additional environmental commitments for other resource areas identified in this EIS/EIR for the proposed action, and compensation ratios for loss or disturbance of habitat would be the same as under the proposed action. The key difference between the proposed action and Alternative 1 is an additional level of stringency associated with the implementation of AMMs at a lower level of effect than under the proposed action, with the intent of reducing take. As discussed in Chapter 2 (*Proposed Action and Alternatives*), the AMMs implemented under Alternative 1 would be the same as those described above for the proposed HCP. However, under Alternative 1, AMMs for certain activities would be implemented at a lower level of disturbance. Although the level of take would be reduced because of the increased stringency associated with implementation of the AMMs, compensation is expected to be similar under both alternatives because compensation acreages would be calculated based on acreage affected, not on level of take. Consequently, under Alternative 1, impacts on traffic would be similar to those described for the proposed action.	Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Alternative 2 would enact the same additional environmental commitments for other resource areas identified in this EIS/EIR for the proposed action. Differences between Alternative 2 and the proposed action center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). Under Alternative 2, assuming the same level of habitat disturbance, overall compensation needs would likely be greater than under the proposed action. Thus, as identified in Chapter 3 (*Land Use and Planning*), Alternative 3 would probably result in the establishment of a greater number of preserves, or preserves that encompass larger geographic areas, compared to the proposed action. Criteria for identifying suitable compensation lands would remain the same under Alternative 2, and selection of appropriate compensation lands would be subject to the same USFWS and DFG approval process. Thus, as the demand for compensation lands increases, availability of lands that support the appropriate habitat types would decrease, both within and outside of PG&E ROWs. Where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options would still be available (e.g., purchase of mitigation credits, donations, and enhancement), and might be used to a greater extent; reliance on compensation options other than acquisition by purchase or easement might offset some of the difference in compensation ratios. However, Alternative 2's enhanced compensation requirements would probably still result in greater overall compensation requirements and hence a greater number and/or larger acreage of preserves. Thus, impacts on traffic under Alternative 2 would be similar to but somewhat greater than those described for the proposed action.	Alternative 3 would enable the same program of O&M and minor construction activities described for the proposed action, and would enact the same additional environmental commitments for other resource areas identified in this EIS/EIR. The key difference between Alternative 3 and the proposed action relates to the number of species covered under Alternative 3 (reduced by comparison with the proposed action, as described in Chapter 2). Reducing the number of covered species could result in the establishment of a smaller number of preserves or preserves that encompass smaller geographic areas by comparison with the proposed action. At the same time, separate, case-by-case consultation for level of effect and compensation needs could be necessary for noncovered species, depending on the species potentially affected, and their status at the time of the proposed activity. It is difficult to determine the precise effect that this approach would have on traffic since locations and other details about specific compensation lands are unknown at this time. However, because some compensation requirements might be assessed on a case-by-case basis, Alternative 3 would have the potential to result in a greater number of smaller preserve areas, potentially requiring slightly increased management-related trips while distributing traffic effects related to use and management of preserves over a greater area. In summary, impacts on traffic would likely be similar under Alternative 3 to those described for the proposed action, but could be somewhat greater overall.	Under the No Action Alternative, PG&E would continue its existing program of O&M activities unchanged. No HCP would be implemented, and no other new or additional environmental commitments would be put in place. Individual actions affecting suitable habitat for listed special-status species would be assessed through case-by-case consultation with USFWS and DFG for level of effect and compensation needs. Because the compensation requirements for habitat disturbance would be assessed on a case-by-case basis, smaller parcels of land would likely be identified for enhancement at any given time; case-by-case assessment could also result in the establishment of a greater number of preserves. This is similar to but more extreme than the case described above for Alternative 3, where most compensation would likely occur under the auspices of an HCP process. The availability of desirable compensation lands is expected to decrease over time, as lands are used for compensation or other purposes. However, as described for the action alternatives, where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options would likely still be available (e.g., purchase of mitigation credits, donations, and enhancement), and might be used to a greater extent. It is difficult to determine the precise effect that this approach would have on traffic since locations and other details about specific compensation lands are unknown at this time. However, since the resulting compensation requirements would be assessed on a case-by-case basis, Alternative 4 could result in a greater number of smaller contiguous preserve areas, requiring more management-related trips but distributing traffic effects over a wider area. Thus, impacts on traffic would likely be similar under the No Action Alternative to those described for the proposed action, but could be somewhat greater overall.
Noise and Vibration	Because O&M and minor construction activities would be the same under the proposed action and all alternatives, noise generation would be similar for all alternatives. There could be some in-practice difference in long-term noise generation related to increases/decreases in the extent of compensation lands under the various alternatives, and thus in the noise-generating activities (notably, earthwork) needed to manage them. However, it is impossible to predict the extent and type of management- or restoration-related earthwork needed under each alternative, because the location and condition of compensation lands cannot be identified at this time. Consequently, analysis of the (probably minor) differences in noise generation among the proposed action and alternatives would be speculative.			

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Air Quality	O&M and minor construction activities would be the principal source of pollutant emissions associated with the proposed action, so analysis of the proposed action's effects on air quality focused on O&M and minor construction activities. As identified above for noise and vibration, there could be some in-practice difference in long-term pollutant generation related to variation in the extent of compensation lands and the equipment and ground disturbance needed to manage them. However, as identified above for noise, it is impossible to predict the extent and type of management activities needed under each alternative, or the exact equipment required, because the location and condition of compensation lands cannot be identified at this time. Consequently, analysis of the—probably minor—differences in air pollutant emissions among the proposed action and alternatives would be speculative. The potential air quality benefits would depend on the acreage of compensation lands, and thus can be assessed comparatively at this time. Alternative 1 would focus on reducing take by comparison with the proposed action, through increased stringency in implementing the HCP's AMMs. However, although the level of take would be reduced, compensation needs are expected to be similar under both alternatives because compensation acreages would be calculated based on acreage affected, not level of take. Thus, air quality benefits would be very similar under Alternative 1 to those expected for the proposed action.	Alternative 2 would offer increase air quality benefits relative to the proposed action and other alternatives because of its increased requirement for compensation lands and the potential to preserve larger areas of vegetated open space.	Air quality benefits related to preservation of vegetated open space would be reduced under Alternative 3 by comparison with the other action alternatives, because the reduced list of covered species is expected to result in smaller compensation requirements.	It is difficult to predict the acreages required for compensation—and hence the potential for air quality benefits—under the piecemeal conservation approach that would result from implementing Alternative 4. However, it is unlikely that compensation acreages and the corresponding air quality benefits resulting from preservation of vegetated open space would match or exceed those anticipated under Alternative 2.
Public Health and Environmental Hazards	Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Alternative 1 would be subject to the same regulatory requirements and would incorporate the same program of training and BMPs for hazardous materials handling identified in this EIS/EIR for the proposed action. Consequently, impacts related to hazardous materials and public health and safety would be essentially the same under Alternative 1 as those described for the proposed action.	Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action. Differences between Alternative 2 and the proposed action would center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). Alternative 2 would be subject to the same regulatory requirements and would incorporate the same program of training and BMPs for hazardous materials handling identified in this EIS/EIR for the proposed action. As with Alternative 1, impacts related to hazardous materials and public health and safety would be essentially the same under Alternative 2 as those described for the proposed action.	Alternative 3 would enable the same program of O&M and minor construction activities as that described for the proposed action. The key difference between Alternative 3 and the proposed action would relate to the number of species covered under the Alternative 3 (reduced by comparison with the proposed HCP, as described in Chapter 2). Alternative 3 would be subject to the same regulatory requirements and would incorporate the same program of training and BMPs for hazardous materials handling identified in this EIS/EIR for the proposed action. As with Alternatives 1 and 2, impacts related to hazardous materials and public health and safety would be essentially the same under Alternative 3 as those described for the proposed action.	Under the No Action Alternative, PG&E would continue its existing program of O&M and minor construction activities unchanged. No HCP would be implemented, and any habitat compensation needed would occur on a case-by-case, piecemeal basis. However, PG&E would still implement their standard methods and techniques for carrying out O&M activities, including the existing program of training and BMPs for hazardous materials handling. Therefore, impacts related to hazardous materials and public health and safety would be essentially the same under Alternative 4 as those described for the proposed action.
Recreation	Alternative 1 would enable the same program of O&M and minor construction activities described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Compensation ratios for loss or disturbance of habitat would be the same as under the proposed action; the key difference between the proposed action and Alternative 1 is an additional level of stringency associated with the implementation of AMMs at a lower level of effect than under the proposed action, with the intent of reducing take. As discussed in Chapter 2 (*Proposed Action and Alternatives*), the AMMs implemented under Alternative 1 would be the same as those described above for the proposed HCP. However, under Alternative 1, AMMs for certain activities would be implemented at a lower level of disturbance (for more detailed information about AMMs under the proposed action and the alternatives, see Chapter 2). Although the level of take would be reduced because of the increased stringency in implementing the HCP's AMMs, compensation is expected to be similar under both alternatives because compensation acreages would be calculated based on acreage affected, not level of take. Consequently, under Alternative 1, impacts related to recreational resources would be similar to those described for the proposed action.	Alternative 2 would enable the same program of O&M and minor construction activities described for the proposed action. Differences between Alternative 2 and the proposed action center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). As identified in Chapter 3 (*Land Use and Planning*), increased compensation ratios could result in the establishment of a greater number of preserves or preserves that encompass larger geographic areas as compared to those established under the proposed action. Under Alternative 2, assuming the same level of habitat disturbance, overall compensation requirements could be greater than under the proposed action, possibly resulting in greater potential to disturb recreational facilities and opportunities. Criteria for identifying suitable compensation lands would remain the same under Alternative 2 (see Chapter 4 of the proposed HCP in Appendix B), and selection of appropriate compensation lands would be subject to USFWS and DFG approval. Nonetheless, as the demand for compensation lands increases, availability of lands that support the appropriate habitat types can be expected to decrease, both within and outside of PG&E ROWs. Where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options are available (e.g., purchase of mitigation credits, donations, and enhancement). Implementation of compensation options other than acquisition by purchase or easement may offset some of the	Alternative 3 would enable the same program of O&M and minor construction activities described for the proposed action, and would enact the same additional environmental commitments for other resource areas identified in this EIS/EIR. The key difference between Alternative 3 and the proposed action relates to the number of species covered under Alternative 3 (reduced by comparison with the proposed action, as described in Chapter 2). Depending on their status at the time, other species might be subject to state, and possibly also federal, requirements for impact assessment and compensation, which would need to be addressed on a case-by-case basis. Reducing the number of HCP covered species could result in the establishment of a lesser number of preserves or preserves that encompass smaller geographic areas (as compared to those established under the proposed action) as a result of activities enabled under Alternative 3. At the same time, additional, case-by-case assessment of compensation needs might be required for any individual activities identified as having the potential to affect noncovered special-status species. It is difficult to determine the precise effect that this approach would have on recreation since the species potentially involved, their listing status, and detailed compensation needs cannot be identified at this time. However, because Alternative 3 could require the assessment of at least some compensation needs on a case-by-case basis, it could result in the identification of smaller parcels of land (including ROW areas) for enhancement use, compared to the proposed action. Also, while Alternative 3 could result in smaller contiguous areas where access	Under the No Action Alternative, PG&E would continue its existing program of O&M activities unchanged. No HCP would be implemented, and no other new environmental commitments would be put in place. The following paragraphs describe the range of possible outcomes for recreation under the No Action Alternative. Individual actions affecting suitable habitat for listed species would be assessed through case-by-case consultation with USFWS and DFG for level of effect and associated compensation needs. Because the compensation requirements for habitat disturbance would be evaluated on a case-by-case basis, smaller parcels of land (including portions of ROW areas) would likely be identified for enhancement at any given time, but case-by-case consultation could also result in more numerous occurrences of closures or access limitations. This is similar to but more extreme than the case described above for Alternative 3, where most compensation would be expected to occur under the auspices of an HCP process. The availability of desirable compensation lands is expected to decrease over time, as lands are used for compensation or other purposes. However, as described for the action alternatives, where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options would likely still be available (e.g., purchase of mitigation credits, donations, and enhancement). Potential adverse effects on existing recreational opportunities could

Resource	Alternative 1—HCP with Reduced Take	Alternative 2—HCP with Enhanced Compensation	Alternative 3—HCP with Reduced Number of Covered Species	Alternative 4—No Action
		difference in compensation ratios. However, Alternative 2 would still have the potential to permanently reduce recreational opportunities in the action area. Further, the enhanced compensation requirements under Alternative 2 could result in greater overall compensation requirements and as a result, a greater number and/or larger acreage of preserves. Consequently, impacts related to recreation would likely be slightly greater under Alternative 2 than those described for the proposed action.	may be limited or closed, more numerous occurrences of closures or access limitations could occur under Alternative 3. Depending on availability of appropriate habitat, multiple restricted access areas could potentially be scattered within the same recreational facility or distributed among several facilities throughout the action area. As the demand for compensation lands increases, availability of lands that support the appropriate habitat types can be expected to decrease, including areas within PG&E ROWs. Where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options are available (e.g., purchase of mitigation credits, donations, and enhancement); reliance on compensation options other than acquisition by purchase or easement could offset some of the difference in compensation needs. However, criteria for identifying suitable compensation lands would remain the same, and selection of appropriate compensation lands would be subject to DFG and possibly also USFWS approval, depending on the species involved. Alternative 3 would thus have some potential to permanently reduce recreational opportunities in the action area. Impacts would be similar under Alternative 3 to those described for the proposed action, but the case-by-case approach to compensation determination for impacts on noncovered species under Alternative 3 could result in a greater number of preserves, and could also result in greater restrictions on existing recreational opportunities. In summary, impacts related to recreation could be slightly greater under Alternative 3 compared to those described for the proposed action, but might also be slightly less, depending on the need for, and the outcomes of, case-by-case assessment outside the HCP process. Depending on the need for, and the outcomes of, separate case-by-case assessment outside the HCP process, impacts could also be slightly less than those identified for the proposed action.	be reduced under the No Action Alternative compared to the proposed action since suitable compensation lands might become more difficult to acquire on a case-by-case basis and payment-type compensation options might be used to a greater degree. It is difficult to assess the precise effect that this approach would have on recreation because locations and other details about specific habitat enhancement sites are unknown at this time, as are the actual compensation acreages that would be required. If payment-type compensation options were not emphasized, the case-by-case approach to compensation determination under the No Action Alternative could result in a greater number of preserves, and/or greater restrictions on existing recreational uses than the proposed action. Consequently, impacts related to recreation could also be greater under the No Action Alternative than those described for the proposed action.
Environmental Justice	Effects related to environmental justice are expected to be minimal under the action alternatives, as under the proposed action, and would not require mitigation.			Environmental justice impacts under the No Action Alternative, if any, are thus expected to be minimal, and would not require mitigation.
Socioeconomics	No socioeconomic effects have been identified under the proposed action or action alternatives.			Under the No Action Alternative, no HCP would be implemented, and ESA compliance would continue to be accomplished on a case-by-case basis. Consequently, any changes by comparison to existing conditions would be negligible, and mitigation would not be needed.
Growth Inducement	The proposed action and action alternatives would all enable the same program of service upgrades and expansion in support of planned growth. Under all alternatives, upgrades and expansions would be implemented only in response to identified need; thus, the proposed action and all action alternatives have been identified as growth accommodating rather than growth inducing.			Because the No Action Alternative would continue the same program of O&M and minor construction as the proposed action, it would also support planned growth, and thus has the same potential for growth accommodation (as distinct from growth inducement) as the proposed action and action alternatives.
Environmental Sustainability	Environmental sustainability would be very similar for all of the action alternatives to that described for the proposed action. However, Alternatives 1 and 2 would offer a slight advantage over Alternative 3 by providing a more coordinated/integrative approach to conservation planning.		Environmental sustainability would be very similar for all of the action alternatives to that described for the proposed action. However, Alternative 3 would be slightly less advantageous overall because it would offer less coordinated to conservation planning.	Under the No Action Alternative, no HCP would be implemented, and ESA compliance would continue to be accomplished on a case-by-case basis. This would be slightly less advantageous in terms of environmental sustainability than the proposed action and action alternatives, because it would not support coordinated conservation planning over the long term.

Resource	Impact	Effect of Increased Conservation Acreage on Impact—Beneficial or Adverse?	Environmentally Preferable Alternative by Impact	Environmentally Preferable Alternative for Resource Overall
Land Use	Impact LUP1—Potential for O&M and minor construction activities to result in physical division of an established community or inconsistency with existing or planned land uses	No effect	No clear differentiation between alternatives	**Alternative 1**
	Impact LUP2—Potential for compensation options to result in physical division of an established community	Adverse	Alternative 1	
	Impact LUP3—Potential incompatibility of preserves with existing (onsite) land uses	Adverse	Alternative 1	
	Impact LUP4—Potential incompatibility of preserves with adjacent land uses	Adverse	Alternative 1	
	Impact LUP5—Potential inconsistencies between preserve land acquisition and local land use plans and policies	Adverse	Alternative 1	
	Impact LUP6—Potential conflicts with existing HCPs or NCCPs	No effect	No clear differentiation between alternatives	
Agricultural Resources	Impact AG1—Potential for the conversion of important farmland to nonagricultural uses due to O&M and minor construction activities	Little or no effect	No clear differentiation between alternatives	**Alternative 1**
	Impact AG2—Potential for the conversion of important farmland due to implementation of compensation options	Potentially somewhat adverse under NEPA; no effect under CEQA	Alternative 1	
	Impact AGR3—Potential to conflict with existing Williamson Act contracts	Adverse	Alternative 1	
Biological Resources	Impact BIO1—Potential disturbance or loss of natural vegetation	Beneficial; but avoidance of impacts is preferable to compensation	Alternative 1	**Alternative 1**
	Impact BIO2—Potential disturbance or loss of vernal pool habitat	Beneficial; but avoidance of impacts is preferable to compensation	Alternative 1	
	Impact BIO3—Potential disturbance or loss of covered special-status plant species and their habitat	Beneficial; but avoidance of impacts is preferable to compensation	Alternative 1	

Resource	Impact	Effect of Increased Conservation Acreage on Impact—Beneficial or Adverse?	Environmentally Preferable Alternative by Impact	Environmentally Preferable Alternative for Resource Overall
	Impact BIO4—Potential disturbance or loss of covered special-status wildlife species and their habitat	Beneficial; but avoidance of impacts is preferable to compensation	Alternative 1	
	Impact BIO5—Potential loss of noncovered special-status plant species and their habitat	Probably beneficial	No clear differentiation between alternatives	
	Impact BIO6—Potential effects on noncovered special-status wildlife species and their habitat	Probably beneficial	No clear differentiation between alternatives	
	Impact BIO7—Potential effects on aquatic habitat as a result of inchannel work	No effect	No clear differentiation between alternatives	
	Impact BIO8—Potential disturbance or loss of common wildlife species and their habitats	Probably beneficial	No clear differentiation between alternatives	
	Impact BIO9—Potential to spread invasive nonnative plant species	No effect	No clear differentiation between alternatives	
Aesthetics	Impact AES1—Potential for adverse effects on visual resources, visual character, or visual quality as a result of O&M activities	No effect	No clear differentiation between alternatives	**Alternative 2**
	Impact AES2—Potential for adverse effects on visual resources associated scenic highways and other designated scenic vistas as a result of new minor construction	No effect	No clear differentiation between alternatives	
	Impact AES3—Potential for medium- and long-term degradation of visual character of public viewshed as a result of vegetation removal and earthwork for new minor construction	No effect	No clear differentiation between alternatives	
	Impact AES4—Potential for long-term degradation of region’s visual resources through introduction of built elements	No effect	No clear differentiation between alternatives	
	Impact AES5—Potential introduction of new substantial sources of light or glare	No effect	No clear differentiation between alternatives	
	Impact AES6—Potential introduction of substantial new shading on adjacent parcels	No effect	No clear differentiation between alternatives	

Resource	Impact	Effect of Increased Conservation Acreage on Impact—Beneficial or Adverse?	Environmentally Preferable Alternative by Impact	Environmentally Preferable Alternative for Resource Overall
	Impact AES7—Aesthetic enhancement as a result of habitat compensation	Beneficial	Alternative 2	
Geology and Soils	Impact GEO1—Potential for damage to new or upgraded facilities as a result of surface fault rupture	No effect	No clear differentiation between alternatives	**No clear differentiation between alternatives**
	Impact GEO2—Potential for damage to new or upgraded facilities as a result of seismic groundshaking	No effect	No clear differentiation between alternatives	
	Impact GEO3—Potential for damage to new or upgraded facilities as a result of seismically induced liquefaction or other seismic ground failure	No effect	No clear differentiation between alternatives	
	Impact GEO4—Potential for damage to new or upgraded facilities as a result of slope failure; potential for construction activities to increase slope failure hazard	No effect	No clear differentiation between alternatives	
	Impact GEO5—Risks to new or upgraded facilities as a result of construction on expansive soils	No effect	No clear differentiation between alternatives	
	Impact GEO6—Potential for proposed action to result in accelerated soil erosion	No effect	No clear differentiation between alternatives	
	Impact GEO7—Potential loss of topsoil resources	No effect	No clear differentiation between alternatives	
Water Quality	Impact WR1—Potential to divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake	Beneficial	Alternative 2	**Alternative 2**
	Impact WR2—Potential for alteration of existing drainage patterns, increasing flood risk and/or erosion and siltation potential	Beneficial	Alternative 2	
	Impact WR3—Potential for increased flood risks as a result of facilities installation.	No effect	No clear differentiation between alternatives	
	Impact WR4—Potential for increased stormwater runoff, and corollary effects	Beneficial	Alternative 2	

Resource	Impact	Effect of Increased Conservation Acreage on Impact—Beneficial or Adverse?	Environmentally Preferable Alternative by Impact	Environmentally Preferable Alternative for Resource Overall
	Impact WR5—Potential use of streambed materials	No effect	No clear differentiation between alternatives	
	Impact WR6—Potential for reduction in groundwater recharge	Beneficial	Alternative 2	
	Impact WR7—Potential temporary degradation of surface water quality as a result of ground disturbance during O&M and construction activities	No effect	No clear differentiation between alternatives	
	Impact WR8—Potential temporary degradation of surface water quality as a result of inchannel work.	No effect	No clear differentiation between alternatives	
	Impact WR9—Potential for degradation of surface and groundwater quality as a result of hazardous materials spills or releases	No effect	No clear differentiation between alternatives	
Cultural Resources	Impact CR1—Potential disturbance or destruction of cultural resources as a result of O&M activities	No effect	No clear differentiation between alternatives	**No clear differentiation between alternatives**
	Impact CR2—Potential disturbance or destruction of cultural resources as a result of minor construction activities	No effect	No clear differentiation between alternatives	
	Impact CR3—Potential impacts on cultural resources as a result of habitat enhancement, restoration, or creation	No effect	No clear differentiation between alternatives	
Paleontological Resources	Impact PAL1—Potential for damage to paleontological resources	No effect	No clear differentiation between alternatives	**No clear differentiation between alternatives**
Transportation and Circulation	Impact TR1—Potential to result in temporary construction-related traffic increases and traffic safety hazards (O&M, minor construction, and preserve enhancements)	No effect	No clear differentiation between alternatives	**No clear differentiation between alternatives; Alternative 1 possibly slightly preferable overall**
	Impact TR2—Potential long-term traffic increases and traffic safety hazards due to O&M activities and staffing at new facilities	No effect	No clear differentiation between alternatives	
	Impact TR3—Potential long-term traffic increases and traffic safety hazards due to activities at	No effect	Alternative 1 slightly preferable	

Resource	Impact	Effect of Increased Conservation Acreage on Impact—Beneficial or Adverse?	Environmentally Preferable Alternative by Impact	Environmentally Preferable Alternative for Resource Overall
	preserves			
	Impact TR4—Potential to result in inadequate parking capacity	No effect	No clear differentiation between alternatives	
	Impact TR5—Potential conflicts with transportation plans, programs, and planned projects	No effect	No clear differentiation between alternatives	
Noise and Vibration	Impact N1—Potential for temporary or permanent exposure of noise-sensitive land uses to elevated noise levels	No effect	No clear differentiation between alternatives	**No clear differentiation between alternatives**
	Impact N2—Potential for temporary or permanent exposure of noise-sensitive land uses to elevated vibration levels	No effect	No clear differentiation between alternatives	
Air Quality	Impact AIR1—Potential to generate increased pollutant emissions during O&M activities	No effect	No clear differentiation between alternatives	**Alternative 2**
	Impact AIR2—Potential to exceed federal General Conformity thresholds	No effect	No clear differentiation between alternatives	
	Impact AIR3—Air quality enhancement as a result of habitat compensation	Beneficial	Alternative 2	
Public Health and Environmental Hazards	Impact PH1—Potential to create a hazard to the public or the environment through routine transport, use, or disposal of hazardous materials other than herbicides; potential for inadvertent spills or releases of hazardous materials other than herbicides	No effect	No clear differentiation between alternatives	**No clear differentiation between alternatives**
	Impact PH2—Potential to create a hazard to the public or the environment through routine transport, use, or disposal of herbicides; potential for inadvertent spills or releases of herbicides	No effect	No clear differentiation between alternatives	
	Impact PH3—Potential for human or environmental exposure to hazardous materials as a result of ground disturbance on sites with known hazardous materials contamination	No effect	No clear differentiation between alternatives	

Resource	Impact	Effect of Increased Conservation Acreage on Impact—Beneficial or Adverse?	Environmentally Preferable Alternative by Impact	Environmentally Preferable Alternative for Resource Overall
	Impact PH4—Potential to interfere with or impede the implementation of adopted emergency response plans; potential to interfere with emergency vehicle access or increase emergency services' response times	No effect	No clear differentiation between alternatives	
	Impact HC5—Potential handling of hazardous materials within 0.25 mile of an existing or planned school	No effect	No clear differentiation between alternatives	
Recreation	Impact REC1—Potential to result in, construct, or expand recreational facilities that might have an adverse physical effect on the environment	No effect	No clear differentiation between alternatives	**No clear differentiation between alternatives**
	Impact REC2—Potential to increase the use of recreational facilities accelerating or causing physical deterioration	No effect	No clear differentiation between alternatives	
	Impact REC3—Potential for reduced recreational opportunities due to O&M and short-term construction activities	No effect	No clear differentiation between alternatives	
	Impact REC4—Potential for reduced recreational opportunities due to installation of new, improved, or expanded aboveground facilities or structures	No effect	No clear differentiation between alternatives	
	Impact REC5—Potential for reduced recreational opportunities due to implementation of compensation options	Adverse	Alternative 1	
	Impact REC6—Potential to provide new or enhanced recreational opportunities due to establishment of preserves or other compensation lands	Beneficial	Alternative 2 (benefit considered speculative)	
Socioeconomics	No impacts identified	No effect	No clear differentiation between alternatives	**No clear differentiation between alternatives**
Environmental Justice	No impacts identified	No effect	No clear differentiation between alternatives	**No clear differentiation between alternatives**

Alternative 1 would require preactivity surveys for a wide variety of fairly minor activities, it would likely restrict the seasons during which some O&M activities could be conducted and thus could impede the timely performance of O&M and/or interfere with emergency repair activities. This could result in conflicts with CPUC safety regulations, and could also compromise PG&E's ability to deliver reliable electrical and natural gas service. In addition, PG&E's budget analyses suggest that full implementation of Alternative 1 would be prohibitively expensive. Thus, although potentially feasible, Alternative 1 has been evaluated as difficult to implement reliably in practice, and potentially counter to PG&E's legal responsibilities under CPUC regulations.

The proposed action would avoid these conflicts and support PG&E's service delivery responsibilities, while providing adequate protection for the covered species and their habitats. It offers the additional advantages of more manageable costs, and would still yield substantial biological benefits by comparison with existing procedures.

Contents and Organization of this EIS/EIR

Table S-11 provides a chapter-by-chapter overview of this EIS/EIR's contents.

Table S-11. Organization of this ~~Draft~~ Environmental Impact Statement/Environmental Impact Report

Chapter	Contents	Chapter	Contents
1	Introduction	14	Public Health and Environmental Hazards
2	Proposed Action and Alternatives	15	Recreation
3	Land Use and Planning	16	Socioeconomics
4	Agricultural Resources	17	Environmental Justice
5	Biological Resources	18	Cumulative Effects
6	Aesthetics	19	Growth Inducement and Related Effects
7	Geology and Soils	20	Environmental Sustainability
8	Water Resources	21	Comparison of Alternatives
9	Cultural Resources	22	List of EIS Preparers
10	Paleontological Resources	23	EIS/EIR Recipients
11	Transportation and Circulation	Appendix A	NOI, NOP, Scoping Comments
12	Noise and Vibration	Appendix B	~~Draft~~ San Joaquin Valley O&M HCP
13	Air Quality	Appendix C	Acronyms and Abbreviations (11 x 17 foldout)
		Appendix D	Public and Agency Comments and Lead Agency Responses

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Chapter 1

Introduction

Chapter 1
Introduction

This document is an environmental impact statement/environmental impact report (EIS/EIR) analyzing the effects of issuing state and federal incidental take permits and entering into a streambed alteration agreement to enable the Pacific Gas and Electric Company to continue its San Joaquin Valley operations and maintenance programs in conformity with the requirements of federal and state endangered species laws and the California Fish and Game Code. It has been prepared in compliance with the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA), and is intended to disclose potential environmental effects and enable the public and regulatory agencies to comment on the proposed program of activities and alternative approaches. The U.S. Fish and Wildlife Service (USFWS) is serving as the lead agency for NEPA compliance and the California Department of Fish and Game (DFG) is the lead agency for CEQA compliance.

This document is the final EIS/EIR for the proposed action. The draft EIS/EIR was circulated for a 90-day public and agency review period that ended September 28, 2006. All comments received during the review period appear in Appendix D, along with lead agency responses. Changes and updates made in the text of this EIS/EIR as a result of comments received appear in underline (insertions) and strikeout (deletions). Additional information on the review and comment process is provided in *Public and Agency Involvement* below.

Background

The Pacific Gas and Electric Company (PG&E) is the largest publicly traded electric and gas utility in the United States, serving more than 4.8 million electricity customers and 4 million natural gas customers in 48 of California's 58 counties. Almost one-third of PG&E's 70,000–square mile service area, and a substantial proportion of its electricity and gas transmission infrastructure, lies within nine San Joaquin Valley counties: San Joaquin, Stanislaus, Merced, Fresno, Kings, Kern, Mariposa, Madera, and Tulare.

PG&E's existing infrastructure requires ongoing maintenance to ensure reliable delivery of electricity and gas service. The company's operations and

maintenance (O&M) program[1] includes a wide variety of activities, some of which have some potential to result in disturbance, injury, or mortality of wildlife listed as endangered or threatened under the federal and/or state Endangered Species Acts (ESAs). Such "take" of listed species is strictly regulated. To date, O&M activities have not been substantially constrained by ESA restrictions; however, because additional species continue to be listed as threatened or endangered, thus becoming subject to ESA protections, PG&E has entered into discussions with USFWS to develop an approach that will allow its essential O&M activities to continue while maintaining the program in full compliance with the federal and state ESAs.

Provisions of Section 10[a][1][b] of the federal ESA establish a process through which a "nonfederal entity" (a business or individual) can apply for a permit allowing take of federally listed species under certain, restricted circumstances.[2] The permit is issued by the USFWS and/or National Marine Fisheries Service (NMFS), depending on the species involved. A key requirement for issuance of a Section 10[a][1][b] permit is preparation of a conservation plan, commonly referred to as a *habitat conservation plan* or HCP. The HCP must fully analyze the effects of the proposed take, and describe the measures that will be taken to avoid, minimize, and compensate for it.

PG&E began informal consultation with USFWS in the mid-1990s. This effort was inconclusive, and discussion was reinitiated in 2001. Based on the outcome of these conversations, PG&E has been working with USFWS to prepare an HCP covering its San Joaquin Valley O&M activities. The draft HCP document ~~is currently available for public review, and is included~~ was circulated for public review as Appendix B of ~~this~~ the draft EIS/EIR. A revised final HCP is included as Appendix B of this final EIS/EIR. When ~~it~~ the HCP is finalized, PG&E hopes to obtain a Section 10 permit authorizing take of listed species as a corollary of its San Joaquin Valley O&M program.[3] The USFWS decision regarding issuance of a Section 10 permit to PG&E will constitute a federal action subject to the provisions of NEPA, which requires that federal agencies consider and disclose the environmental consequences of their actions, including permitting

[1] Throughout this document, the terms *O&M program*, *O&M*, *O&M activities* are used to include both operations and maintenance activities *per se*, as well as certain types of very limited minor construction activities. More information on the nature of the O&M activities analyzed, and the scope of the minor construction activities, is provided in Chapter 2 of this EIS/EIR.

[2] To be permissible under ESA Section 10[a][1][b], take must occur as a corollary of otherwise lawful activities, and may not be the purpose of the activities; this is referred to as *incidental take*.

[3] The HCP includes analysis of potential effects on migratory birds, and the federal incidental take permit, if issued, will also be used to request a Special Purpose Permit consistent with Section 21.27 of the federal Migratory Bird Treaty Act (see additional discussion under *Regulatory Context* in Chapter 5).

and funding the activities of other entities. Where those consequences may be significant, NEPA requires preparation of an EIS.[4]

PG&E also plans to use the HCP to apply for a state take permit under Section 2081 of the California Fish and Game Code, which regulates take of species listed under the California ESA; and to support its application for a streambed alteration agreement under Section 1602 of the California Fish and Game Code, to ensure authorization of any O&M activities that may affect the bed or banks of natural watercourses. Much like NEPA, CEQA requires that state agencies analyze and disclose the environmental impacts of their discretionary activities, specifically calling for the preparation of an EIR when impacts may be significant; CEQA compliance is required because DFG will exercise discretionary (decision-making) authority in reviewing PG&E's applications for a Section 2081 permit and streambed alteration agreement.

Joint Compliance Approach

This document has been prepared as a combined EIS/EIR for "joint" compliance with NEPA and CEQA. When a project is subject to review under both NEPA and CEQA, state and local agencies are encouraged to cooperate with federal agencies in the preparation of joint environmental documents. Joint environmental documents must fulfill the procedural and content requirements of both NEPA and CEQA; an important advantage of joint compliance is that it streamlines the environmental review process by satisfying both laws with a single document, while providing full opportunity for the public and agencies to comment on the proposed activities.

For simplicity, this document uses NEPA terminology; Table 1-1 shows the correspondence between key federal (NEPA) and state (CEQA) terms.

Table 1-1. Correspondence between Key National Environmental Policy Act and California Environmental Quality Act Terms

NEPA Term (Federal)	CEQA Term (California)
Lead Agency	Lead Agency
Cooperating Agency	Responsible Agency
Environmental Assessment	Initial Study
Finding of No Significant Impact	Negative Declaration
Environmental Impact Statement	Environmental Impact Report
Notice of Intent	Notice of Preparation

[4] An EIS is also required for projects whose environmental effects are highly controversial; for policy or regulation changes that substantially alter federal agency programs; and for programs that allocate agency resources essential to future actions (40 CFR 1502.4).

NEPA Term (Federal)	CEQA Term (California)
Notice of Availability	Notice of Completion
Record of Decision	Findings
Proposed Action	Proposed Project
No Action Alternative	No Project Alternative
Environmentally Preferable Alternative	Environmentally Superior Alternative
Purpose and Need	Project Objectives
Environmental Consequences	Environmental Impacts
Affected Environment, Existing Conditions	Environmental Setting

Overview of PG&E Facilities in San Joaquin Valley Area

Natural Gas System

PG&E's natural gas system includes transmission pipelines, compressor stations, regulator stations, and distribution pipelines. The transmission system consists of large-diameter trunk lines that convey substantial volumes of natural gas at high pressure; pressure is maintained by compressor stations located at widely spaced intervals along the lines. Gas is distributed to individual home and business customers via smaller, lower-pressure distribution pipelines, transitioning from high-pressure lines to smaller, low-pressure lines via pressure regulators or pressure-limiting stations. Statewide, PG&E owns more than 5,700 miles of high-pressure transmission pipelines; 59 compressors at 17 stations; and more than 35,000 miles of gas distribution pipelines.

PG&E currently has a total of approximately 1,550 linear miles of transmission pipeline in the San Joaquin Valley, the largest of which include

- **Line 401**, which is 426 miles long, running south from the California/Oregon border to PG&E's Panoche Metering Station in Fresno County;
- **Line 2**, which is 115 miles long and connects the Panoche Metering Station with the Brentwood Compressor Station; and
- **Lines 300A and B**, which are 502 mile–long dual pipelines that cross the California/Arizona border near Needles, California to access PG&E's Milpitas Terminal in the San Francisco Bay Area.

Transmission pipelines range from 8 to 42 inches in diameter and are typically buried at depths of 3–4 feet below ground. Pressure in these lines generally exceeds 60 pounds per square inch (psi).

PG&E's San Joaquin Valley distribution system comprises some 8,326 miles of steel and plastic lines, about 90% of which is located in urban areas. Gas distribution lines range from 0.75 inch to 8 inches in diameter and are typically buried 2–4 feet deep. Pressure in distribution pipelines is generally less than 60 psi.

The right-of-way (ROW) that accommodates the natural gas system ranges from 15 to 100 feet wide. Less than 1% of the ROW's length is owned in fee title; the overwhelming majority is in easements and in franchise. For the most part, PG&E has nonexclusive easements without the right to fence the pipeline corridors. Exclusive easements with the right to construct fences are obtained when security fencing is required for valve lots, compressor stations, and other facilities.

Electrical System

PG&E's electrical system consists of transmission lines, distribution lines, and switching stations or substations. Statewide, the PG&E system comprises about 18,450 miles of interconnected transmission lines; about 105,500 miles of distribution lines; and 1,014 substations. High-voltage (50–500 kilovolts [kV]) transmission lines convey power from generation plants to switching stations or substations, where power is redirected and transformed to lower voltages. Distribution lines then carry the lower voltage (12 kV or 21 kV) service for delivery to industries, businesses, and homes. Pole-mounted or pad-mounted transformers further reduce the voltage for normal household and business use.

In the San Joaquin Valley, PG&E's electrical transmission system consists of approximately 4,588 miles of transmission lines, typically carried on tubular steel lattice towers. Bulk transmission voltages (230 kV and 500 kV) are carried by conductors (wires) supported on steel lattice towers or steel poles. Conductors carrying subtransmission voltages (60 kV, 70 kV, and 115 kV) are supported by steel towers, tubular steel poles, or wood poles. The spacing of these structures varies. The height of conductors above the ground also varies according to topography and the design of the transmission system. Generally, conductors on 230-kV and 500-kV systems are designed to maintain a minimum height of 30 feet above the ground. Most transmission ROWs (99% by length) are located within easements negotiated with private landowners or the holders of public lands; only 1% is owned in fee title by PG&E. Transmission ROW widths depend on the system voltage, number of lines per ROW, terrain, and other factors.

PG&E presently owns approximately 20,549 miles of overhead distribution lines and 3,987 miles of underground distribution lines in the San Joaquin Valley. Distribution conductors are carried on wood or steel poles. *Primary distribution lines* carry three-phase AC power in the 2–50 kV range to street rail and bus systems, as well as industrial and commercial customers. *Secondary distribution lines* serve most residential customers with 120/240-volt, single-phase, three-wire service, which provides electric power for most appliances.

The width of PG&E's distribution ROWs varies depending on topography, system voltage, and other factors. Most distribution ROWs are accommodated in easements on privately owned lands.

Proposed Action and Activities Analyzed in this EIS/EIR

Overview

As described above, PG&E proposes to use the HCP it is currently developing to apply for federal and state permits authorizing take of listed species as a result of its San Joaquin Valley O&M program, and to support development of a streambed alteration agreement to regulate O&M activities that may affect the bed or banks of natural drainages.[5] The activities entailed under the O&M program are authorized and/or mandated by the California Public Utilities Commission (CPUC), which has sole jurisdiction over PG&E. However, the lead agencies must now evaluate the potential effects of those activities in making their permit decisions.

USFWS has full discretionary authority over the issuance of Section 10 permits, and, having consulted with PG&E and reviewed the HCP, could choose not to approve it, in which case no Section 10 permit would be issued. Similarly, following its review, DFG could elect to deny a state take permit and/or master streambed alteration agreement, or could decide not to approve the HCP implementation agreement. In order to fully analyze the potential environmental outcomes, this EIS/EIR assumes that the HCP will be approved, federal and state take permits will be issued, and a master streambed alteration agreement will be enacted. However, this document uses the language "proposed action" to emphasize the discretionary nature of the key federal and state approvals as well as the need to complete the NEPA and CEQA review processes.

Based on the assumptions discussed above, the proposed action would include the following components.

- Federal components:
  - approval of HCP and HCP implementation agreement,
  - issuance of incidental take permit.

[5] DFG anticipates that the streambed alteration agreement will take the form of a program-scale master agreement extending for the 30-year duration of the HCP and permit term and covering all O&M and minor construction activities enabled under the proposed action. The term *master streambed alteration agreement* is accordingly used in this EIS/EIR. DFG is currently revising the draft streambed alteration agreement to reflect the latest updates to the California Fish and Game Code.

- State components:
  - approval of HCP implementation agreement,
  - issuance of Section 2081 incidental take permit,
  - entry into master streambed alteration agreement with PG&E.

Together, assuming that PG&E's applications for take permits and a streambed alteration agreement are approved, the federal and state components of the proposed action would enable PG&E to continue its existing program of O&M activities in a lawful manner. They would also implement the HCP and commit PG&E to a program of environmental and conservation measures to avoid, minimize, and mitigate the effects of incidental take. Accordingly, this EIS/EIR analyzes two categories of activities:

1. PG&E's ongoing O&M and minor new construction activities, and
2. new environmental commitments and mitigation measures required under the terms of the HCP and the HCP implementation agreement.

These activities are described in detail in Chapter 2 (*Proposed Action and Alternatives*).

Purpose and Need, Goals and Objectives

NEPA requires an EIS to briefly describe the underlying purpose and need for a proposed federal action. CEQA embodies a similar requirement for an EIR to contain a statement of the goals and objectives a project is proposed to meet. The following paragraphs present the NEPA purpose and need and CEQA goals and objectives for the proposed action, as identified by USFWS and DFG.

The purpose of the proposed action is to respond to PG&E's application for federal and state incidental take permits under Section 10[a][1][B] of the federal Endangered Species Act, Section 2081 of the California Endangered Species Act, and all implementing regulations and policies for 42 wildlife and plant species that are state- or federally listed as threatened or endangered and 23 additional species that are not yet listed, but that may become listed during the term of the permit, collectively referred to as the *covered species*.

Activities proposed by PG&E for the operation and maintenance of their existing gas and electrical facilities throughout the San Joaquin Valley could result in the take of individuals belonging to covered species. In the absence of a permit—and the conservation planning entailed by the permit review process—take would violate the federal and California Endangered Species Acts. Thus, the proposed action is needed to ensure compliance with the federal and California Endangered Species Act, as well as NEPA, CEQA, and other applicable federal and state laws and regulations, while allowing PG&E to continue a program of O&M activities essential to the reliable delivery of electricity and gas service to some 4 million customers in their California service area.

Consistent with the identified need, the goal of the proposed action is to review PG&E's permit applications under the federal and California Endangered Species Acts and make a permitting decision, in order to protect, conserve, and enhance the covered species and their habitats for the continuing benefit of the people of the United States. Specific objectives include the following.

- Provide a means and take steps to conserve the ecosystems depended on by covered species.
- Ensure the long-term survival of the covered species through protection and management of the species and their habitats.
- Ensure that take of covered species is avoided and minimized to the maximum extent feasible and is fully compensated for by appropriate mitigation measures.

Lead, Cooperating, and Responsible Agencies

As identified above, USFWS is the lead agency for NEPA compliance and DFG is the lead agency for CEQA compliance for the proposed action.

The following agencies have been identified as *cooperating agencies* under NEPA—that is, additional federal agencies with legal jurisdiction over the project and/or expertise regarding its potential environmental effects.

- Bureau of Land Management.
- Department of Housing and Urban Development.
- ~~Environmental Protection Agency.~~
- NMFS.
- U.S. Army Corps of Engineers.

Responsible agencies under CEQA—additional agencies with approval or funding responsibility for the proposed action—include the following.

- CPUC.
- Central Valley Regional Water Quality Control Board.
- Counties of Fresno, Kern, Kings, Madera, Mariposa, Merced, San Joaquin, Stanislaus, and Tulare.
- California Department of Transportation, Districts 6 and 10.
- Native American Heritage Commission.
- San Joaquin Valley Air Pollution Control District, Kern County Air Pollution Control District, and Mariposa County Air Pollution Control District.

Required Permits and Approvals

CPUC Jurisdiction

The California Constitution vests in the California Public Utilities Commission (CPUC) exclusive power and authority with respect to "all matters cognate and germane to the regulation of public utilities" (Cal. Const., Art. XII, Sec. 5; *Pacific Telephone & Telegraph v. Eshleman* [1913] 166 Cal. 640, 652–660). The California Public Utilities Commission (CPUC) thus has sole authority over the siting, design, operation, and maintenance of PG&E facilities.

Natural gas infrastructure is regulated under CPUC General Order 112-E, which is intended to augment federal Pipeline Safety Regulations by providing further 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 and in liquefied natural gas facilities to safeguard life or limb, health, property and public welfare and to provide that adequate service will be maintained by gas utilities operating under the jurisdiction of the commission [CPUC].

Electrical utility facilities are regulated under General Order 131-D, which is similarly aimed at ensuring safety and reliability of service, and establishes several avenues for project review and approval, depending on the nature of the project.

The California Constitution (Art. XII, Sec. 8) explicitly prohibits municipalities regulating "matters over which the Legislature grants regulating power to the Commission [CPUC]." As a result, CPUC's jurisdiction preempts the discretionary[6] authority of local jurisdictions over gas and electrical facilities. However, all projects subject to General Orders 112-E and 131-D are required to comply with local ministerial[7] permitting requirements, along with all relevant all state and federal regulations and permitting requirements.

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[6] A *discretionary* decision is one that requires require a public agency to exercise judgment or deliberation in deciding to approve or disapprove a proposed activity, as distinguished from situations where only needs to determine whether a proponent has complied or conformed with applicable statutes, ordinances, or regulations (CEQA Guidelines Sec. 15357). Examples of discretionary decisions include passage of new laws and ordinances; approval and revision of planning documents such as General Plans, Specific Plans, HCPs, Timber Harvest Plans, etc.; and approval of proposals for new public facilities and many private developments.

[7] A *ministerial* decision is one that is mandated by existing laws, regulations, statutes, or procedures, and thus involves little or no personal, subjective judgment by public officials or agencies. Examples include issuing automobile registrations, dog licenses, and marriage licenses. A grading or building permit is ministerial if the ordinance requiring the permit limits the public official to determining whether zoning allows the structure to be built in the requested location, whether the structure would meet applicable building codes, and whether the applicant has paid the required fee (CEQA Guidelines Sec. 15369).

Additional State and Federal Regulatory Framework

In addition to the provisions of the federal and state Endangered Species Acts, the California Fish and Game Code, NEPA, and CEQA, the activities analyzed in this EIS/EIR may be subject to a wide range of other environmental compliance requirements. Briefly, these include the following.

- The federal Migratory Bird Treaty Act.
- Requirements of the federal Clean Water Act regarding discharge of stormwater from construction sites.
- Federal Clean Water Act stipulations regarding placement of fill materials in jurisdictional waters of the United States.
- Requirements of local jurisdictions' grading and construction permitting processes (note that issuance of grading and building permits is typically a ministerial action).
- Federal and state protection of cultural and paleontological resources, including the National Historic Preservation Act and Native American Graves Protection and Repatriation Act, and Executive Orders regarding tribal assets.
- Federal environmental justice regulations.
- Federal and state air quality regulations.

USFWS is also subject to the federal Administrative Procedure Act, which mandates uniformity and openness in federal agencies' procedures; and the Federal Advisory Committee Act, which governs the initiation and operation of advisory committees in the executive branch of the federal government.

Individual regulations, codes, and standards are described in detail in Chapters 3 through 15, which discuss the proposed action's effects on specific resources.

Public and Agency Involvement

Public disclosure and dialogue are priorities under both NEPA and CEQA. Both laws mandate specific periods during the compliance process when public and agency comments on the proposed action and draft EIS (or EIR) document are solicited: during the scoping comment period, during the review period for the draft document, and during the release of the final EIS/EIR document. Lead agencies are also encouraged to hold public meetings or hearings to review the draft version of the document. Brief descriptions of these milestones are provided below, as they apply to this document.

Scoping Comment Period

Scoping refers to the public outreach process used under NEPA and CEQA to determine the coverage and content of an EIS or EIR. The scoping comment period offers an important opportunity for public review and comment in the early phases of project development. Scoping contributes to the selection of a range of alternatives to be considered, and can also help to establish methods of analysis, identify the environmental effects that will be considered in detail, and develop mitigation measures to avoid or compensate for adverse effects. The scoping process for an EIS is initiated by publication of the Notice of Intent (NOI) required by NEPA, which is a formal announcement to the public and to interested agencies and organizations that an EIS is in preparation; similarly, CEQA requires the lead agency to issue a Notice of Preparation (NOP) announcing the beginning of the EIR process. During the scoping period, agencies and the public are invited to comment on the proposed action, the approach to environmental analysis, and any issues of concern.

USFWS published the NOI for this document in the Federal Register on March 25, 2004 and DFG submitted the corresponding NOP to the State Clearinghouse on March 26, 2004, initiating the 30-day public scoping period required by NEPA and CEQA. Consistent with NEPA and CEQA requirements, the NOI and NOP provided information on the background and purpose of the proposed action; announced preparation of and requested public comment on the EIS/EIR; and provided information on the public scoping meetings to be held in support of the EIS/EIR. Appendix A contains the full text of both notices.

USFWS and DFG held two public scoping meetings for the proposed action in April 2004. To maximize public access to the meetings, one meeting was held in Stockton and the other in Fresno. Both meetings were advertised in local newspapers (the *Fresno Bee* and *Stockton Record*) and via direct mailing to interested parties.

The scoping meetings used an informal workshop format with informational handouts and personnel available to discuss the proposed action and alternatives with attendees. Attendees were greeted on arrival and asked to sign an attendance record form listing their name, address, and affiliation (if any), and indicating whether they would like to be added to a project mailing list. Each guest was also given the option to provide written comments or concerns s/he would like addressed in the EIS/EIR and was provided with a comment form; attendees had the option of completing the form at the meeting or mailing it to USFWS prior to the close of the scoping period (April 26, 2004).

Public and Agency Review of EIS/EIR

Once a draft EIS or EIR is complete, the lead agency is required to notify agencies and the public that it is available for review. The official notification is referred to as a Notice of Availability (NOA) under NEPA and a Notice of Completion (NOC) under CEQA. The NOA is sent to the U.S. Environmental

Protection Agency for publication in the *Federal Register*. The NOC is sent to the State Clearinghouse; CEQA also requires that the lead agency provide written notice of the draft document's availability to the County Clerk's office for posting, as well as publishing it in a general-circulation newspaper, posting it on and off the project site, or mailing it to residents of properties adjacent to the project site. Issuance of the NOA/NOC initiates a public review period, during which the lead agency receives and collates public and agency comments on the proposed action and the document.

USFWS and DFG ~~are now circulating~~ circulated ~~this~~ the draft EIS/EIR for a 90-day public review and comment period~~,~~, which ended September 28, 2006. ~~and~~ Two public meetings were held during the review period, to present the draft HCP and the ~~will also hold a public meeting to present the~~ results of the EIS/EIR analyses and solicit comments in person. The first meeting was held in Stockton on August 1, 2006, and the second meeting was held in Fresno on August 2, 2006.

The purpose of public circulation and the public meetings ~~is~~ was to provide agencies and interested individuals with opportunities to comment on or express concerns regarding the contents of the draft EIS/EIR. A total of seven comment letters were received on the draft document. There were no attendees at the Stockton public meeting, and one attendee at the Fresno public meeting. No comments were received during the public meetings.

Preparation of This Final EIS/EIR

Before the lead agency can approve a proposed action, it must prepare a final EIS/EIR that addresses all comments received on the draft document. This is the final EIS/EIR for the proposed action.

The final EIS/EIR is required to ~~must~~ include a list of all individuals, organizations, and agencies that provided comments, and must contain copies of all comments received during the public review period, along with the lead agency's responses. Please see Appendix D for these materials. In addition, as indicated above, some changes and updates have been made in the text of this EIS/EIR to address points raised in the comments. These appear in underline (insertions) and strikeout (deletions).

~~The final EIS/EIR is expected to be available in mid-2006.~~

Issues Identified in Scoping Comments

As discussed above, one of the purposes of the scoping process under both NEPA and CEQA is to identify any areas of controversy or public concern related to a proposed project. Both CEQA and NEPA require that an EIR/EIS identify issues of known controversy, if any exist. However, despite the premeeting outreach

conducted by USFWS and DFG, attendance at the scoping meetings for the proposed action was sparse, and very few comments were received during the scoping period (see Appendix A). The single comment letter received stressed the breadth and complexity of the conservation effort entailed by the proposed action, the number of species and diversity of habitats involved, and the need to ensure that PG&E's conservation planning is consistent with existing recovery plans for species covered by the HCP. No other areas of specific public or agency concern ~~have been~~were identified ~~at this time.~~ during the scoping process.

Contents of this EIS/EIR

EIS/EIR Organization

In addition to this introduction, this EIS/EIR contains chapters that describe the proposed action and alternatives; discuss the proposed action's likely effects on key resources in the San Joaquin Valley area; and evaluate its potential to contribute to cumulative regional concerns and to foster growth. It also includes a list of the people involved in preparing the document and a copy of the EIS/EIR distribution list. Table 1-2 provides a chapter-by-chapter overview.

Table 1-2. Organization of this ~~Draft~~ Environmental Impact Statement/Environmental Impact Report

Chapter	Contents	Chapter	Contents
1	Introduction	14	Public Health and Environmental Hazards
2	Proposed Action and Alternatives	15	Recreation
3	Land Use and Planning	16	Socioeconomics
4	Agricultural Resources	17	Environmental Justice
5	Biological Resources	18	Cumulative Effects
6	Aesthetics	19	Growth Inducement and Related Effects
7	Geology and Soils	20	Environmental Sustainability
8	Water Resources	21	Comparison of Alternatives
9	Cultural Resources	22	List of EIS Preparers
10	Paleontological Resources	23	EIS/EIR Recipients
11	Transportation and Circulation	Appendix A	NOI, NOP, Scoping Comments
12	Noise and Vibration	Appendix B	~~Draft~~ Final San Joaquin Valley O&M HCP
13	Air Quality	Appendix C	Acronyms and Abbreviations (11 x 17 foldout)
		Appendix D	Public and Agency Comments and Lead Agency Responses

Geographic Area Analyzed in this EIS/EIR

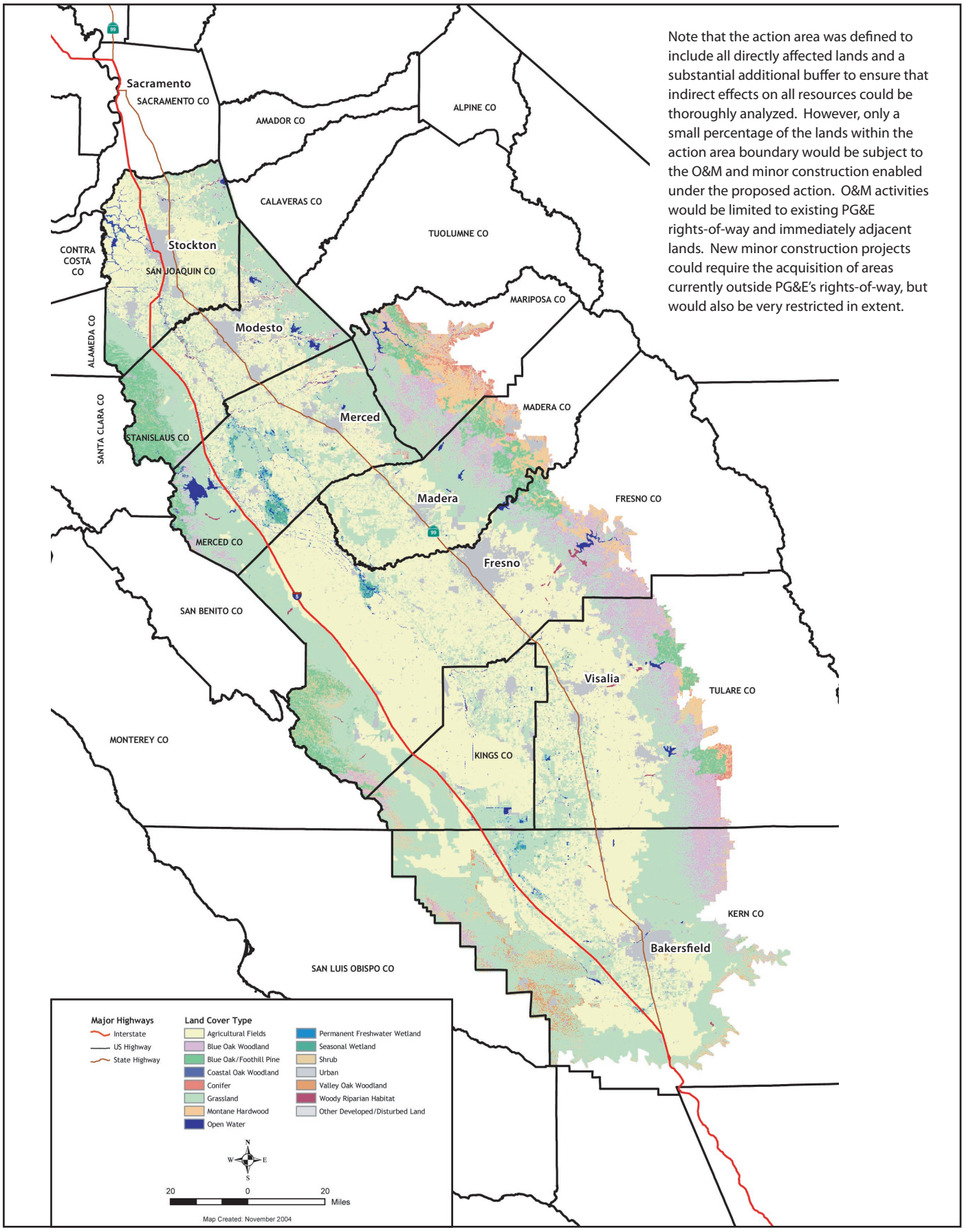
Analyses presented in this EIS/EIR focus on the geographic area expected to experience direct and indirect effects as a result of the activities enabled under the proposed action. This area—referred to herein as the *action area*—includes part or all of nine San Joaquin Valley counties: San Joaquin, Stanislaus, Merced, Fresno, Kings, Kern, Mariposa, Madera, and Tulare, as shown in Figure 1-1. The north boundary is the northern San Joaquin County line, and the south boundary is the 3,000-foot elevation contour north of the Kern County line. The east boundary coincides with the San Joaquin and Stanislaus County lines to the south edge of Stanislaus County and then follows the perimeter of federal lands or the 3,000-foot elevation contour, whichever is lower, along the flank of the Sierra Nevada. The west boundary of the action area is defined by the west boundaries of San Joaquin, Stanislaus, Merced, Fresno, Kings, and Kern Counties along the margin of the San Joaquin Valley.

The action area was defined to include all directly affected lands and a substantial additional buffer to ensure that indirect effects on all resources could be thoroughly analyzed. Its boundaries were based on the extent of the area covered by the proposed San Joaquin Valley O&M HCP. The proposed action would not enable any activities outside these boundaries, and only a small percentage of the lands within the action area boundary would be actually be subject to O&M and minor construction enabled under the proposed action. O&M activities would be limited to existing PG&E rights-of-way (ROWs) and immediately adjacent lands, while minor construction projects could require the acquisition of small acreages of additional ROW, but would also be very restricted in extent.

Thresholds of Significance and Level of Effect

As identified in *Joint Compliance Approach* above, this document is intended to meet the requirements of both NEPA and CEQA. CEQA requires an EIR to identify "significant" impacts—that is, impacts that exceed a recognized threshold of severity and thus require *mitigation*, measures or activities adopted to avoid the impact, reduce its severity, or compensate for it. NEPA embodies a similar requirement that an EIS identify approaches for mitigating adverse environmental effects.

This EIS/EIR document uses the term "mitigation" consistent with Section 15126.4[a][1][A] of the State of California's CEQA Guidelines, which requires that an EIR "distinguish between measures which are proposed by project proponents to be included in the project, and other measures proposed by the lead … agency … and not included in the project." The proposed HCP's Conservation Strategy (see HCP Chapter 4), (including the requirement to preserve suitable habitat to offset potential species effects of O&M–related habitat disturbance and loss), is included in the project (i.e. is part of the Proposed Action), and is referred to as "compensation" in this EIS/EIR. The lead



Jones & Stokes

Figure 1-1
Extent of Action Area,
Showing County Boundaries and Land Cover Types

agencies have proposed "other measures" only for potential project impacts to the paleontological resources identified in Chapter 10 of this EIS/EIR. This document also uses mitigation in the general sense, referring to the process of avoiding, reducing, or compensating for impacts (for example, in discussing the use of mitigation sites or use of existing mitigation banks).

Each chapter in this EIS/EIR identifies the criteria used to assess the proposed action's level of effect on the resource discussed in that chapter. Significance criteria used in these analyses drew on both NEPA and CEQA standards; where standards differ, the more rigorous threshold was applied. This ensures that the criteria applied in the analyses are adequate under both federal and state regulations and that the mitigation measures identified will similarly meet both standards.

To provide the degree of specificity required by CEQA, the following terminology is used to evaluate the level of significance of impacts discussed in this EIS/EIR. This usage is consistent with generally accepted standards of CEQA compliance practice.

- A finding of *no impact* is made when the analysis concludes that the proposed action would not affect the particular environmental resource.
- An impact is considered *less than significant* if the analysis concludes that there would be no substantial adverse change in the environment and that no mitigation is needed.
- An impact is considered *less than significant with mitigation* if the analysis concludes that there would be no substantial adverse change in the environment with the inclusion of the mitigation measure(s) described.
- An impact is considered *significant* or *potentially significant* if the analysis concludes that there could be a substantial adverse effect on the environment.
- An impact is considered *significant and unavoidable* if the analysis concludes that there could be a substantial adverse effect on the environment, and no feasible mitigation measures are available to reduce the impact to a less-than-significant level.

An impact is considered *beneficial* if the analysis concludes that there would be a positive change in the environment.

Chapter 2

Proposed Action and Alternatives

Chapter 2

Proposed Action and Alternatives

This chapter presents the proposed action and describes the activities analyzed in this EIS/EIR under the proposed action. It also discusses the process through which alternatives to the proposed action were developed; describes the alternatives analyzed in this EIS/EIR, including the No Action Alternative; and provides an overview of the alternatives eliminated from further consideration, along with the reasons for their dismissal. To the extent feasible, the alternatives analyzed in this EIS/EIR are described at a level of detail equal to that provided for the proposed action, as NEPA requires.

Location—Proposed Action and Alternatives

The proposed action and alternatives would all be implemented within the same area, referred to in this document as the *action area* (see Figure 1-1). No activities would take place outside the action area. Note that, as discussed in Chapter 1, only a small portion of the lands within the action area boundary would be directly subject to O&M and minor construction activities enabled under the proposed action. O&M activities would be limited to existing PG&E rights-of-way (ROWs) and immediately adjacent lands. Minor construction activities could require the acquisition of additional small acreages of ROW, but would also be very restricted in extent.

Overview of Proposed Action

Description of Proposed Action

As discussed in Chapter 1, PG&E proposes to use the habitat conservation plan (HCP) it is currently developing to apply for federal and state permits authorizing take of listed species as a result of its San Joaquin Valley operations and maintenance (O&M) program. PG&E also intends to use the HCP to support the development of a streambed alteration agreement with California Department of

Fish and Game (DFG) to regulate O&M activities that may affect the bed or banks of natural drainages.[1]

The U.S. Fish and Wildlife Service (USFWS) has full discretionary authority over the issuance of Section 10 permits, and, having consulted with PG&E and reviewed the HCP, could choose not to approve it, in which case no Section 10 permit would be issued. Similarly, following its review, DFG could elect to deny a state take permit and/or streambed alteration agreement, or could decide not to approve the HCP implementation agreement. In order to fully analyze the potential environmental outcomes, this EIS/EIR assumes that the HCP will be approved, federal and state take permits will be issued, and a master streambed alteration agreement will be enacted. However, this document uses the language "proposed action" to emphasize the discretionary nature of the key federal and state approvals as well as the need to complete the NEPA and CEQA review processes.

Based on the assumptions above, the proposed action would include the following components.

- Federal components:
  - approval of HCP and HCP implementation agreement,
  - issuance of incidental take permit.
- State components:
  - approval of HCP implementation agreement,
  - issuance of Section 2081 incidental take permit,
  - entry into master streambed alteration agreement with PG&E.

Activities Analyzed Under Proposed Action

Together, assuming that PG&E's applications for take permits and a streambed alteration agreement are approved, the federal and state components of the proposed action would enable PG&E to continue its existing program of O&M activities in compliance with federal and state Endangered Species Acts and the California Fish and Game Code. They would also implement the HCP and commit PG&E to a program of environmental and conservation measures to avoid, minimize, and mitigate the effects of incidental take. Accordingly, this EIS/EIR analyzes two categories of activities:

[1] DFG anticipates that the streambed alteration agreement will take the form of a program-scale master agreement extending for the 30-year duration of the HCP and permit term and covering all O&M and minor construction activities enabled under the proposed action. The term *master streambed alteration agreement* is accordingly used in this EIS/EIR. DFG is currently revising the draft streambed alteration agreement to reflect the latest updates to the California Fish and Game Code.

1. PG&E's ongoing O&M and minor construction activities; and
2. activities included in environmental commitments and mitigation measures required under the terms of the HCP and the HCP implementation agreement.

Note that for brevity, the terms *O&M program*, *O&M*, *O&M activities* are used to include both O&M and minor construction activities throughout this document. The two types of activities are distinguished only where there is a difference for environmental outcomes.

The following sections provide additional detail. Ongoing O&M activities are discussed first, followed by an overview of PG&E's current methods, techniques, and environmental programs and practices, and a summary of environmental commitments enacted by the HCP.[2]

Ongoing Operations, Maintenance, and Minor Construction Activities

The proposed action would enable three types of activities under the aegis of the San Joaquin Valley O&M program, as follows.

- *Operation activities* include inspecting, monitoring, testing, and operating valves, reclosures, switches, etc. To perform these activities, personnel work at existing facilities and typically use existing access roads.
- *Maintenance activities* include ongoing and emergency repairs to facilities, structures, and access roads; replacement of facilities, structures, and roads, as needed; and vegetation management, including tree trimming and construction of firebreaks.
- *Minor construction activities* include installing new or replacement structures to upgrade facilities or to extend service to new customers. Minor construction is limited to installation of 1 mile or less of new electric or gas

[2] The analyses conducted for the proposed HCP identified the extent of disturbance associated with various types of O&M and minor construction activities: large disturbance (>0.5 acre), medium disturbance (between 0.5 and 0.1 acre), small disturbance (<0.1 acre), and "other disturbance" (activities that do not result in habitat disturbance or loss but that in some cases may nonetheless have the potential to result in take of covered species) (see page 4-3 in the HCP, and additional discussion in *Avoidance and Minimization Measures* under *Environmental Commitments Enacted by the Proposed HCP* below). These distinctions are identified in the EIS/EIR only where they are material to the lead agencies' findings regarding need for mitigation and/or level of significance under CEQA. However, all analyses of the effects of O&M and minor construction in this EIS/EIR have considered the O&M and minor construction program in its entirety, including the combined effect of all large-, medium-, small-, and "other disturbance" activities.

line (per project), and/or new permanent facilities with an average footprint of 0.5 acre (per project).[3]

The following sections provide additional information on operation, maintenance, and minor construction activities that would be permitted through the proposed action.

Operation and Maintenance Activities

Natural Gas System

Patrols

Natural gas infrastructure is patrolled regularly to verify its condition and identify any needed repairs. California Public Utilities Commission (CPUC) guidelines establish minimum patrol requirements, but PG&E may exceed the minimum when additional checks are considered advisable.

Required patrols include weekly aerial inspection of selected pipelines and associated facilities using helicopters or fixed-wing light aircraft. Consistent with CPUC guidance[4], pipelines and associated facilities are also inspected by ground patrols on a quarterly or annual basis, as needed. Ground patrols include reading gas meters. To increase efficiency, patrols may also be combined with minor repairs or maintenance activities described below.

Ground patrols typically use a light truck on existing access and pipeline patrol roads. Additional leak detection patrols are conducted on foot or using all-terrain vehicles (ATVs) at least once each year in suburban and urban areas and at least once every 5 years in rural areas. During years when pedestrian leak detection surveys are not conducted, rural areas undergo helicopter leak detection patrols. Leak detection patrols use either a portable hydrogen-flame ionization gas detector or a laser-methane detector that samples air above the gas line to test for leaks.

[3] The length of service extension allowed under minor new construction is understood as a total length of 1 mile from the current terminus of an existing line, regardless of the nature of the facilities involved. Multiple consecutive (end-to-end) extensions with a total length exceeding 1 mile would not be covered under the proposed HCP. Multiple 1-mile extensions in different geographic areas would be covered, but each would be treated as a separate activity. The size of a minor construction project would be estimated as the total footprint, expressed in acres. Both linear and acreage estimates will be required to address the entirety of a proposed project; consistent with the requirements of federal and state environmental review, the HCP will not allow segmentation of proposed construction to obtain coverage under the HCP.

[4] CPUC, the California Public Utilities Commission, is the primary agency regulating utilities in California. CPUC establishes gas and retail electric rates, approves major construction projects, and provides general oversight of utility O&M programs and financial/accounting practices. Guidance for ground inspections of natural gas facilities is contained in CPUC's General Order 112-D. Additional information on CPUC's jurisdiction over PG&E projects and activities is presented in Chapter 1, and throughout the document where it is relevant.

Facilities Inspections

Key facilities are inspected several times each year. Inspection visits typically use light trucks on existing access and pipeline roads. Additional information on inspection visits to specific types of facilities follows.

- **Valves—**Valve sites along the pipelines are inspected and tested three to four times per year. During these visits, valves are lubricated as necessary, using a gun pump to administer either motor oil or grease.
- **Telecommunication sites—**Routine inspections of telecommunication sites are conducted monthly unless problems are identified at specific sites. Helicopters are sometimes used instead of trucks; helicopters are typically used for aerial visual inspections, but in rare cases are used to deliver personnel to remote sites for on-the-ground inspections.
- **Anode beds—**Cathodic protection[5] is inspected every 2 months by checking the electrical current at various test locations along the line and at anode bed sites.
- **Pressure limiting stations—**Existing pressure limiting stations undergo routine inspections every 2 months.

Pipeline Remedial Maintenance

Remedial maintenance is conducted to correct problems that develop as a pipeline's protective coating or other components age, or as a result of erosion during severe weather. Materials used to address erosion-related problems include riprap, soil matting, concrete, palisade systems, and concrete pillow systems. In rare cases where the depth of cover overlying an underground pipeline is evaluated as insufficient, concrete may be used as a cap cover.

Aboveground facilities require periodic painting, and are sometimes vandalized. Vandalism typically involves visual rather than structural damage (e.g., spray-painted graffiti), and repairs usually focus on aesthetics rather than functionality.

Pipelines typically remain in operation during remedial maintenance.

Compressor Station Maintenance

The Kettleman Compressor Station is inspected daily and maintenance is carried out on an ongoing, as-needed basis. Typical maintenance tasks include overhauling compressors and engines; maintaining or reconstructing the cooling water tower; repairing and replacing piping; painting the station; and drilling or cleaning water wells. In addition, operational and air quality standards may require modifications or upgrades of the station's emission control equipment. Existing paved roads provide access to the compressor station.

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[5] *Cathodic protection* refers to the use of electric current to prevent soil and groundwater from corroding metal structures such as tanks and pipelines in the subsurface. There are two types of cathodic protection. An *impressed current* system uses alternating current (AC) supplied from an external source to offset the tendency of a buried metal structure to corrode. A *sacrificial anode* system like that used by PG&E relies on the difference in electrical potential between the metal in buried anodes and that in the tank or pipeline requiring protection.

Pipeline Electric Test System Installation

Electric Test Systems (ETSs) are located every 1–5 miles on pipelines to assess pipe corrosion and measure conductivity. This technology avoids the need to systematically expose the pipe and physically examine it for signs of corrosion. It also assists in locating the pipe accurately if excavation is required. ETSs are typically included in a new pipeline installation, and may also be added as a retrofit to older existing facilities.

Each ETS consists of two leads (wires) attached to the pipe with a liquid weld material; the leads are exposed at the surface inside a 4-foot-tall orange plastic tube with a diameter of 4 inches. The tube is closed with a removable cap that protects the system from moisture while allowing easy access for readings. Installation on an existing pipeline entails exposing a section of pipeline 3–5 feet long, attaching the leads with liquid weld, and reburying the pipe. Surface disturbance typically affects about 100 square feet, and most sites are accessible by existing roads. Existing pipelines remain in operation during ETS installation.

Pipeline Valve Replacement

Mainline valves spaced 10–20 miles apart regulate the flow of gas through the pipeline. They are periodically replaced if they wear out or become faulty.

Prior to valve replacement, a portion of the gas line must be *blown down*, meaning that gas is safely evacuated from the affected section of pipe via a control point. Valve replacement involves excavating to expose approximately 75 feet of the pipe on either side of the valve, with a working corridor approximately 100–150 feet wide. A laydown area (typically about 50 by 50 feet) may also be required; if so, it may be necessary to clear surface vegetation.

Once the valve is replaced, the pipeline must be hydrostatically tested. Water is pumped into the pipe and sustained at a pressure appropriate to ensure the integrity of the pipeline and valve; additional information on hydrostatic testing is provided in *Methods, Techniques, and Environmental Commitments* below.

Replacement of mainline valves requires a temporary shutdown of the line. Repairs can occur at any time, depending on the weather and on operational needs.

Pipeline Cathodic Protection Maintenance

As described above, *cathodic protection* refers to the use of electrical current to prevent soil and groundwater from corroding metal structures such as tanks and pipelines in the subsurface.[6] As a pipeline's coating degrades over time, it requires increased cathodic protection to prevent corrosion. However, increased cathodic protection current speeds the consumption of anode beds and decreases their effectiveness. Consequently, existing anode beds must be replaced periodically, and additional anode beds may be needed.

[6] PG&E typically uses impressed current systems; other types of cathodic protection are used only rarely at PG&E facilities.

Anode beds are typically located every 10–20 miles along the pipeline. The anode beds must be approximately 1,000 feet from the pipeline to adequately distribute the current.

Anodes are laid out in beds approximately 50 feet long by 20 feet wide, adjacent to a pipeline. Installation of anode beds involves drilling deep (>300 feet below ground surface) wells and installing zinc or magnesium bars, platinum anode rods, or ground mats. Once an anode bed is installed, it is connected to the pipeline by an underground cable.

Clearing the site and erecting additional poles to carry power from the existing distribution line to the anode bed causes surface disturbance—a construction corridor approximately 30 feet wide and a permanent right-of-way (ROW) approximately 15 feet wide is needed to install underground cable from the anode bed to the pipeline. Electricity from the distribution system is preferable to solar power for providing current to the underground cable. If this is not feasible, an additional fenced area of approximately 50 by 75 feet must be constructed to house a solar battery electrical source.

The pipeline continues to operate during anode bed installation or replacement.

Pipeline Lowering

Public safety sometimes requires that a gas pipeline be lowered, or relocated to a greater depth below the ground surface. This need is most common in agricultural areas and areas undergoing development, but may arise in other areas where pipe structures are exposed, such as stream crossings.

Lowering a pipeline requires excavation of a trench parallel to and deeper than the existing pipeline, extending 300–500 feet beyond each end of the section of pipeline to be lowered. Gas pressure is reduced to the lowest possible operating pressure, referred to as *line clearance*. The pipeline is then briefly removed from service so that it can be cut and relocated to the new trench, where it is seated on appropriate fill material. Prefabricated bends are installed to connect the lowered section of the pipe to the remaining pipeline. If necessary, the pipe is rewrapped. The construction corridor is typically 100–150 feet wide.

Pipeline lowering requires a temporary shutdown, as identified above. It may occur at any time of year, depending on operational needs.

Pipeline Coating Replacement

Natural gas pipelines are coated to protect them from degradation and external corrosion. To determine whether the coating has maintained its integrity, electrical current is induced on the pipeline and then measured for a loss of voltage that would indicate a reduction in coating integrity. Pipeline coating generally needs to be replaced about every 30–40 years, depending on local soil conditions. When a pipeline's coating has deteriorated to the point of requiring replacement, the pipe must be rewrapped with epoxy.

To avoid damaging the pipe by bending it, the pipeline is excavated in sections and supported at intervals of about 40 feet. The old coating is removed by

jetting, scraping, and/or sandblasting, and the surface is prepared for the new wrap with a self-contained grit- or shot-blasting machine. The new coating is then applied using a coating machine. A working corridor approximately 100 feet wide is needed. Sand used in sandblasting is contained by ground covers or cradles.

The pipeline continues to operate during coating replacement.

Pipeline Valve Recoating

Pipeline valve recoating involves excavating around and under an existing valve; sandblasting the existing epoxy coating or removing it by hand; and recoating the valve assembly with epoxy to prevent corrosion. Excavations are typically about 50 feet wide, although their size varies, depending on the depth and diameter of the pipeline, consistent with Cal-OSHA requirements. Clearing the site and excavating to expose the pipeline generally disturbs about 5,000 square feet. A small laydown area (typically about 50 feet by 50 feet) beside the valve site is also required, which may entail clearing surface vegetation. The pipeline is not opened and remains operational during the recoating activity. Most valve sites are accessible by existing access roads.

Pipeline Replacement

Public safety may necessitate replacing sections of pipe as the pipe ages or is damaged by natural processes or vandalism. In addition, changes in land use along a pipeline alignment can alter the maintenance requirements for the pipeline; in particular, new development along a formerly rural or agricultural pipeline may require that the pipeline be relocated or replaced with thicker-walled pipe to comply with CPUC standards.

The length of pipeline replaced varies, depending on the reason for its replacement; however, the minimum length replaced is typically 40 feet (one joint of pipe). To replace a segment of pipeline, it is removed from service and blown down. Any gas condensate is captured, removed from the old pipeline, and disposed of in compliance with current regulatory standards. The disused pipeline is either abandoned in place by filling it with an inert gas and capping it, or removed after the new replacement section of pipe is operational. Once installed, the new pipeline is hydrostatically tested and backfilled.

Pipeline segments may be replaced at any time of year, depending on operational restrictions related to the need to shut down the pipeline temporarily.

Pipeline Telecommunication Site Maintenance

A Supervisory Control and Data Acquisition (SCADA) system monitors pipeline functions, transmitting operational information about the pipeline system to PG&E's operations offices at the Kettleman Compressor Station. Periodic vehicle or helicopter access is required to check the telecommunication facilities, replace batteries, conduct minor maintenance, or make adjustments to the facilities or components. Access roads may also need periodic blading to keep them passable for four-wheel-drive trucks.

Most of the work typically occurs within existing facility footprints, but a small staging area may be required for major maintenance or storm damage repairs. Typically, the staging area is located adjacent to the repair site; offsite staging may also be used for helicopter transport of workers and materials.

Maintenance and repairs occur throughout the year, as needed. In the event of major storm damage, repairs may be required as soon as weather permits. The pipelines continue to operate during telecommunication site maintenance.

Vegetation Management and Access Road Maintenance

PG&E manages vegetation along its pipeline ROWs to prevent damage to the natural gas system, facilitate inspections, and comply with regulations. Vegetation management activities include the following.

- Trees and brush that interfere with safety inspection patrols require periodic removal. Tree canopy cover that obscures the ROW is also removed to facilitate aerial inspections.
- Local fire districts periodically require PG&E to abate ruderal vegetation and annual grasses when fire districts determine that a fire hazard exists.

Areas within the ROW requiring vegetation removal are identified during routine patrols. Vegetation management is performed by a combination of manual and mechanical techniques. Large woody vegetation is removed manually, using chainsaws. Smaller growth is cut back to a maximum height of 1 foot or less with a brush hog, hydro-axe, or brush rake. PG&E also uses chemical herbicides in some cases. In general, herbicides are used only in the transmission ROWs. Where permission has been granted by the landowner or, on public lands, by the agency with jurisdiction, herbicides may also be used to remove cut stumps.[7]

PG&E's unsurfaced access roads must be maintained to permit vehicle passage for routine patrols. Access road maintenance is usually limited to blading the road, although fill or riprap is occasionally used to repair holes or armor the roadbed.

Electrical System

Patrols

PG&E patrols electrical system infrastructure regularly to verify its condition. Consistent with CPUC guidance, selected transmission and distribution lines and associated facilities undergo scheduled aerial (helicopter) patrols; additional aerial patrols take place on an as-needed or emergency basis. Transmission lines and associated facilities are inspected by ground patrols on a quarterly to 18-month cycle. Distribution lines are inspected by ground patrols for electric maintenance issues every 3 years. Vegetation management personnel also

[7] Note that herbicide use would not be covered under the proposed HCP. PG&E's current herbicide handling practices, including adherence to all federal label requirements, would continue under the proposed action (see discussion in *Herbicide Use* and *BMPs for Vegetation Management* under *PG&E's Existing Environmental Programs and Practices* below).

conduct annual ground patrols of all transmission and distribution facilities. Electric meters are read during routine ground patrols.

Ground patrols use light trucks or ATVs on existing access roads and ROW patrol roads.

Inspections

Key facilities are inspected several times each year. Inspection visits typically use light trucks on existing access roads, although pedestrian surveys are sometimes conducted. In some cases, cross-country vehicle access is necessary. Additional information on specific types of facilities follows.

- **Towers, poles, and equipment—**Tower footings and poles are routinely inspected to verify their stability and structural integrity and check the condition of fuses, breakers, relays, cutouts, switches, transformers, and other features.
- **Substations—**All substations undergo a monthly safety and operations inspection.
- **Telecommunication sites—**Routine inspections of telecommunication sites are conducted monthly unless problems are identified at specific sites. Helicopters are sometimes used to access these sites.
- **Underground lines—**Aboveground components of underground line segments are inspected at least once each year for corrosion, equipment misalignment, loose fittings, and other common mechanical problems. Underground components are also inspected annually via access vaults.

In addition to the routine inspections described above, when outages and CPUC Reportable Incidents[8] occur, PG&E inspects lines to determine the location and probable cause of the outage, and to assess any repair needs.

Electrical Insulator Washing

Insulators are periodically washed to prevent faults that can result from the accumulation of conductive debris such as airborne dust or bird feces. Washing employs a truck- or trailer-mounted spray system, or an aerial (helicopter) system. Distilled water, typically from local sources, is often used; alternatively, insulators may be "dry washed" with ground corn hulls.

Insulator washing is typically carried out while the power lines are operating.

Electric Substation Maintenance

Most of PG&E's substations are located near load centers, such as residential, commercial, and industrial areas. Typical major maintenance tasks at these substations include repair and replacement of transformers, switches, fuses, cutouts, meters, and insulators. Occasionally, maintenance of substation systems

[8] *CPUC Reportable Incidents* include events that are potentially harmful to the public, and those that meet certain financial thresholds.

requires minor construction (see *Minor Construction Activities* below); for instance, load demands may require modifications of station equipment or installation of new facilities.

Electrical System Outage Repair

Outages may be caused by weather, equipment failure, accident, fire, or bird electrocution. They must be repaired to maintain system function and public safety.

When an outage is reported, the line is inspected to determine the cause of the outage. Repairs are then performed as quickly as is feasible to restore service; they may entail anything from reclosing a switch to replacing a transformer or pole.

Facility Installations (Shoo-Flies)

Poles or towers and associated equipment such as anchors, cross arms, insulators, wires, cables, guys, and switches periodically require replacement or repair. During the repair, a temporary support system referred to as a *shoo-fly* may be installed to create a bypass around facilities needing repairs or upgrades. Existing conductors are removed from the old poles or structures and reattached to the shoo-fly structure. This allows service to continue uninterrupted, or with minimal interruption, while repairs or replacements are performed. Shoo-fly supports are removed when repairs are complete.

In most cases, a shoo-fly can be constructed with one to two poles for every circuit attached to the structure being bypassed. For example, one double-circuit 115 kV tower with six wires attached would require a minimum of four poles installed.

Electrical System Tower Replacement or Repair

Tower replacement or repair typically involves raising towers or strengthening their foundations or superstructures.

Two methods are used to raise towers:

- adding vertical leg extensions to the base of the tower on existing footings or foundations, or
- adding extensions just below the tower cross arms at the "cage" of the tower.

The first method requires lifting the tower. If the ground is level, a tower lifter is driven beneath the tower, and its four arms are clamped to the tower legs. The legs are unbolted from the tower base, the tower is lifted, and leg extensions are installed. Where a tower lifter cannot be used, a crane is used to hoist the tower. A level area of approximately 25 feet by 40 feet is graded immediately adjacent to the tower to serve as a crane pad. Shoo-flies (see preceding section) are constructed adjacent to the tower to support the conductors while the crane lifts the tower. The tower extension is then installed, the conductors are replaced, and the shoo-flies are removed.

The second method entails using a crane to hoist the tower and then installing the extension at the tower cage, which is near the top of the tower, just below the cross arms. A level area of about 25 feet by 40 feet is graded immediately adjacent to the tower to serve as a crane pad. Shoo-flies are constructed adjacent to the tower to support the conductors while the crane lifts the tower. The tower extension is then installed, the conductors are replaced, and the shoo-flies are removed.

To strengthen tower foundations, concrete from the existing footings is broken away to expose the steel reinforcements. A grade beam–type concrete footing is then poured between each existing footing.

Superstructures are typically strengthened by replacement, modification, or addition of pieces of steel lattice, as determined by engineering analysis specific to each tower. Telecommunications attachments may be installed by clamping apparatus and cables directly to the tower superstructure.

Other minor repairs include accessing tower facilities to replace fuses, breakers, relays, cutouts, switches, transformers, and paint.

Electrical System Pole and Equipment Replacement and Repair

When a pole must be replaced, the new pole is constructed adjacent to the existing pole to minimize ground disturbance. The line may be de-energized first. The new pole is framed—i.e., the cross arms, pins, insulators, grounds, bonding, markers, and any needed equipment are installed—before it is set. A line truck augers a hole, the pole is set, and the conductors are moved to the new pole. The old pole is usually removed, but if pole removal would jeopardize habitat values (for instance, in grasslands with a high density of burrows), the base of the pole may be left in place.

Electric Line Reconductoring

In order to replace conductors, the line must be temporarily de-energized. New conductors are installed by temporarily splicing them to the ends of the existing conductors; feeding them through travelers (pulleys) attached to tower arms or pole cross arms; and pulling them to a predetermined sag and tension. The conductors are then permanently attached to the insulators and existing conductors.

Reconductoring is typically conducted in 2-mile sections, with a tension site and a pull site for each section. Pull and tension sites have footprints of approximately 200 by 300 feet, and historic pull and tension sites are reused where possible. A boom truck, winch, or helicopter is used to install the travelers. At the pull site, a truck- or trailer-mounted bull-wheel puller, a small truck- or trailer-mounted crane, and rewinders with collapsible reels are used to pull the conductors through the travelers. Truck-mounted tensioners, small cranes, conductor reel trailers, and conductor reels are used to tension the conductors.

Before the conductor can be pulled, temporary clearance structures are installed at road crossings and other locations where they are needed to prevent conductors

from contacting existing electric or communication facilities or passing vehicles. They consist of wood poles; if needed, a support net is stretched beneath the conductors.

Vegetation Management and Access Road Maintenance

Consistent with the California Public Resource Code and CPUC requirements, PG&E performs various types of vegetation management and road maintenance to keep its electrical system in safe operating order. The following paragraphs describe key types of activities. Additional specific information on procedures for vegetation management, including best management practices and measures to protect nesting birds, is provided in *Methods, Techniques, and Environmental Commitments* below. Service is not typically interrupted for vegetation management or road maintenance activities.

Routine Maintenance—Distribution and Transmission Systems. Public Resource Code Section 4293 and CPUC General Order 95, Rule 35 identify specific clearance distances (ranging from 4 feet to 10 feet or more) that must be maintained between vegetation and energized conductors carrying different voltages. PG&E's routine vegetation management activities include an annual patrol of all overhead facilities; trimming or removal of trees that will not remain in compliance until the next year's patrol; and trimming or removal of hazard trees. Removals for routine maintenance generally involve individual trees or small groups of trees covering less than 0.1 acre.

Transmission Vegetation Projects/ROW Management, Road Access Maintenance, Footings Inspection. PG&E has an Integrated Vegetation Management (IVM) program in place to control incompatible vegetation along transmission ROWs; to provide firebreaks that will protect the transmission system in the event of a fire; and to prevent fires related to vegetation growing too close to electrical infrastructure.

Short-term IVM activities focus on clearing the ROWs of incompatible vegetation. This may be done either mechanically or manually. Herbicides are also used to control vegetation selectively.[9] Because cutting or mowing can stimulate regrowth, ROWs that have been cleared are monitored for reinvasion by incompatible vegetation. When this occurs, the ROW is managed to achieve the desired outcome.

The long-term goal of the IVM program is to convert tall-growing plant communities to low-growing communities. Such conversion can be accomplished by selectively controlling taller plant species while preserving low-growing grasses, herbs, and woody shrubs over a period of many years. With proper management, low-growing vegetation eventually dominates the ROW and suppresses the growth of taller species, reducing the need for future treatments.

[9] As identified above, herbicide use would not be covered under the proposed HCP; PG&E's existing herbicide BMPs would continue under the proposed action (see PG&E's *Existing Environmental Programs and Practices* below).

Long-term ROW management is based on the concept of creating "wire zones" and "border zones," as shown in Figure 2-1 below.

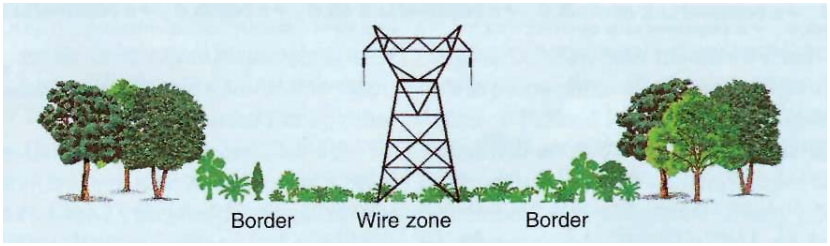

Figure 2-1
Wire Zone/Border Concept for ROW Vegetation Management

The wire zone, which comprises the portion of the ROW immediately beneath the transmission wire plus a 10-foot buffer on either side, is managed for low-growing shrub-forb-grass (early successional) communities. The border zone, which extends from the edge of the wire zone to the edge of the ROW, is managed for taller shrubs and brush communities (transition zone).

Tree Removal Projects—Distribution and Transmission Systems. CPUC regulations specifically require PG&E to remove trees that grow too close to its overhead distribution and transmission facilities and thus pose a fire hazard. If the trees are located on privately held land, landowner permission is required. Tree removal to reduce fire hazard can involve more than 0.1 acre of trees.

Subject Pole Clearing—Distribution and Transmission Systems. Public Resource Code Section 4292 requires that transmission and distribution poles with certain types of equipment such as switches and lightning arrestors (referred to as *subject poles*) be maintained clear of any vegetation that would propagate a fire for a radial distance of 10 feet from the pole/tower to the height of the conductor. PG&E patrols its overhead facilities at least once each year to assess the need to clear vegetation from subject poles. If vegetation grows rapidly, it may be necessary to clear a pole more than once during the year.

Wood Transmission Pole Test and Treat

All wood transmission poles that are 10 years old or more are evaluated to determine whether they need trussing or stubbing to provide additional stability, or replacement.[10] All poles that are not identified for stubbing, trussing, or replacement are fiber-wrapped, using a material impregnated with preservatives to retard deterioration of the pole.

[10] *Stubbing* and *trussing* entail driving or setting a short steel truss or wood pole into the ground and attaching it to the existing pole to provide the support originally afforded by the pole butt.

Twenty inches of soil are excavated around the pole and a minimum of three 9/16-inch holes are bored at 45º angles to the axis of the pole. Each successive boring is 120º to the right and 12 inches above the previous bore. The shell thickness and circumference of the pole are then used to assess the pole's condition and identify the appropriate treatment (wrapping, stubbing/trussing, or replacement).

Minor Construction Activities[11]

Natural Gas System

Construction of Pipeline Pressure Limiting Stations

As land use patterns change and rural and agricultural areas are increasingly developed, it is sometimes necessary to upgrade a section of pipe to meet CPUC safety standards for more densely populated areas. An alternative to replacing existing pipeline with thicker-walled pipe is to install a pressure limiting station (PLS) that reduces the pressure of gas in the line. A typical PLS such as the existing facility near Barstow in the Mojave Desert has a footprint of approximately 250 feet by 100 feet, with aboveground pipe and valve structures and a small control/SCADA monitoring building about 100 feet square surrounded by security fencing. Electricity for the SCADA monitoring equipment is provided by PG&E or comes from onsite batteries charged by solar panels, or a generator.

Constructing a PLS involves excavating a joint of pipeline. The segment affected by construction is blown down, the PLS facility is constructed, and the pipeline is reconnected. The pipeline is then hydrostatically tested and returned to service. In addition to the footprint of the new fenced valve lot, PLS construction requires a construction corridor approximately 125 feet wide and a laydown area approximately 1,000 feet square.

Pipeline Valve Installation

Occasionally, new mainline valves are installed to regulate the flow of gas or to make it possible to isolate segments of pipeline for repairs. Installing a new valve set requires excavating a segment of pipeline and blowing it down. Once the valve set is installed, the pipeline is hydrostatically tested; it can then be returned to service.

Valve installation typically requires a construction corridor 100–150 feet wide, extending about 75 feet on either side of the location of the new valve. This activity can take place at any time of year, depending on weather and operational needs.

[11] As identified above, these activities are limited to 1 linear mile or less for new electric or gas facilities; larger PG&E projects will not be segmented or piecemealed to achieve HCP coverage. Although an existing line may have several extensions they would serve different geographic areas and would be subject to CPUC regulations. See footnote 3 on page 2-4.

New Pipeline Installation

Installation of a new section of pipeline follows a procedure similar to that described above for installation of replacement pipeline. It typically involves clearing and grading the ROW; trenching; placing the pipe (including welding, inspection of welds, field coating or fiber wrapping, and backfilling); conducting hydrostatic testing; installing corrosion protection; marking the pipeline; installing erosion control; and cleaning up and restoring/revegetating the site.

In most terrains, the pipeline is installed by standard open-trench techniques, unless specific circumstances dictate construction of aboveground sections. Specialized trenching and boring methods are used where the alignment crosses rivers, streams, backwaters, washes; faults; roads, railroads, utilities, aqueducts, and canals. These excavation methods and the other actions involved in new/replacement pipeline installation are described in detail in *Standard PG&E Methods and Techniques* below.

Electrical System

Electrical Tower Line Construction (Transmission Lines)

To provide additional service to customers or to replace or upgrade facilities, it is sometimes necessary to extend existing transmission lines.

Extending a transmission line may require a new ROW, which is typically about 200 feet wide but less than 1 mile long, if needed.[12] The centerline for the new alignment is surveyed and staked, then vegetation is cleared from support sites, pull sites, access roads, and the laydown area, if necessary. Concrete footings are poured and a crane or helicopter is used to erect the supports. Supports are typically located about 1,000 feet apart. Once they are in place, conductors are strung as described in *Electric Line Reconductoring* above.

In addition to the new ROW (if one is needed), transmission line extension requires a laydown area approximately 100 feet by 100 feet, and a pull site and tension site, each about 50 feet by 150 feet. Each tower requires a work area of about 25 feet by 100 feet.

[12] Transmission line extensions more than 1 mile long are not considered minor construction activities. Thus, they are not part of PG&E's regular, ongoing O&M program, and are outside the scope of activities that would be enabled by the proposed action. Instead, they are required to undergo separate environmental review.

Wood Pole Line Construction/Relocation (Distribution Lines)

To provide additional service to customers or to replace facilities, it is sometimes necessary to extend existing distribution lines. Extending a distribution line may require a new ROW, which is typically about 50 feet wide and less than 1 mile long, if needed.[13] The centerline for the new alignment is surveyed and staked, then vegetation is cleared from pole sites, pull sites, access roads, and lay-down areas, if necessary. Pole holes and any needed anchor holes are augered or excavated about every 350 feet along the new extension alignment; where possible, a machine auger is used. The width and depth of the setting hole depends on the size of the pole, the soil type, the spacing between poles (the span), and the anticipated wind loading. Minimum pole setting depths typically range from 4 to 14 feet.

Poles may be wood, direct-embedded steel, or self-supporting steel types. They are framed (cross arms, pins, insulators, grounds, bonding, markers, and any needed equipment are installed) and anchors and guys are installed before the pole is set. After the pole is set, conductors are strung as described in *Electric Line Reconductoring* above.

In addition to the new ROW, extending a distribution line requires a pull site and a tension site, each approximately 60 feet by 60 feet, and a laydown area approximately 70 feet square. It may also be necessary to construct new access. Access roads are typically unsurfaced and are 12 feet wide.

Minor Substation Expansion

A substation expansion may require a footprint anywhere between 0.25 acre and 5 acres or more to accommodate additional transformers, new distribution line outlets, and possibly also new fencing for safety and security. Because substations are usually constructed near residential, commercial, or industrial development, the expansion footprint may also need to accommodate setbacks, landscaping, and/or new access. Substation sites are graded, paved, or surfaced; the area of hardscape may expand as a result of substation expansion.

Underground Transmission and Distribution Line Construction

Underground lines are almost always located in urban settings. The following discussion assumes installation of a 115 kV transmission line; actual dimensions vary, and are less for many lines than those provided here. Cut-and-cover trenching (open trenching) is generally used to install the underground powerline, duct banks, and splice vaults. To comply with Cal-OSHA earthwork standards, a minimum corridor width of 65 feet is typically required. Excavated materials are stockpiled and reused as fill, unless test results show hazardous materials contamination. If this is the case, spoils are offhauled for disposal at an appropriate facility.

If open trenching cannot be used—for instance, in some urban settings where it would disrupt traffic flow or create a safety hazard—horizontal boring or

[13] As described for transmission lines, distribution line extensions more than 1 mile long are outside the scope of activities that would be enabled by the proposed action, and thus are not discussed in this EIS/EIR.

directional drilling may be required. Trenching, boring, and drilling procedures are discussed in detail in *Methods, Best Practices, and Environmental Commitments* below.

Duct Bank Installation. *Duct bank* refers to the conduits, typically consisting of polyvinyl chloride (PVC), that contain the underground cables. A typical trench for installation of a single circuit measures approximately 3 feet wide by 5 feet deep; however, trench depths vary depending on soil stability and presence of existing substructures. Once the PVC conduits and ground are installed, backfill is placed and compacted in compliance with applicable codes and standards. Excavated materials may be reused, or thermal-select fill[14] may be imported. A road base backfill or slurry concrete cap is then installed.

Vault Installation. Vaults are used initially to pull the cables through the conduits and to splice cables together. When construction is complete and the line is in service, they provide access to the underground cables for inspection, maintenance, and repairs. The spacing between vaults varies with the kV capacity of the conductors. Vaults are constructed of prefabricated, steel-reinforced concrete. The total excavation depth for a vault installation is typically 10 feet, with a footprint of 22 feet by 12 feet.

Cable Pulling, Splicing, and Termination. Once the conduit is in place, cables are installed in the duct banks. Cable segments are pulled into the duct bank, spliced at each of the vaults along the route, and terminated at the bus structures at switchyards. To pull the cable through the duct bank, a cable reel is placed at one end and a pulling rig is placed at the other. With a fishing line, a larger wire rope is pulled into the duct. The wire rope is attached to cable pulling eyes for pulling. To ease pulling tensions, a lubricant is applied to the cable as it enters the duct. Cables are spliced at all vaults after they are pulled all the way through the ducts. A splice trailer is positioned directly above the vault openings for each access. At each end, cables daylight via a transition pole and terminate at a bus structure in the switchyards.

Methods, Techniques, and Environmental Commitments

The following sections

- describe PG&E's standard work practices and existing environmental programs as they would apply to the tasks described under *Operations and Maintenance Activities* and *Minor Construction Activities* above;
- summarize the environmental commitments that would be put in place by approval of the HCP and implementation agreement; and

[14] Thermal-select fill helps to conduct heat away from the duct bank and buried conductor.

- describe the types of measures expected to be included in the master streambed alteration agreement to be developed under the proposed action.

In addition to the specific measures and procedures described below, PG&E has a continuing commitment to ensure that all work is performed in accordance with federal, state, and local regulations for safety and protection. Where applicable, work is also conducted in accordance with landowner agreements.

Standard PG&E Methods and Techniques

Access

PG&E's access to company facilities is legally protected. Under normal conditions, PG&E is committed to using existing public and private roads to access its ROWs, and does so to the maximum extent possible. If no road exists, or if an emergency arises, it is sometimes necessary to travel cross-country or to construct a new temporary access road. Because the total length of PG&E's electric facilities is greater, and more of these facilities are located in rural or remote areas, cross-country travel or construction of a new temporary road is more often needed for electrical facilities than for gas facilities. Speeds on all roads are restricted to the limit deemed safe under driving conditions.

Vegetation Management Practices

Vegetation management needs for natural gas and electrical infrastructure differ substantially. For natural gas facilities, the principal concern is the potential for root systems to damage buried pipelines and other infrastructure in the subsurface. Accordingly, PG&E's vegetation management program for its natural gas system focuses on maintaining a 15-foot-wide corridor on either side of each pipeline clear of deep-rooted plants. For electrical infrastructure, the key concern is fire hazard; vegetation management needs focus on establishing clearance between vegetation and overhead facilities, as discussed in the following sections.

All vegetation clearing is conducted in accordance with PG&E's standard BMPs (see *PG&E's Existing Environmental Programs and Practices* below). In addition, planning for vegetation clearing operations must consider the following factors.

- Characteristics of the target species; height and density of existing brush.
- Land uses within and adjacent to ROW; terms of ROW agreement, and any applicable legal restrictions or requirements
- Potential effects on water quality, wildlife and wildlife habitat (including special-status species), soil resources, cultural resources, etc.
- Safety of workers and the public.
- Fire safety.
- Safety of facilities.

Vegetation clearing begins by surveying and staking the ROW to establish a well-defined boundary for the area to be cleared. The area within the boundary is then cleared and graded to the extent necessary to allow safe and efficient use of maintenance and/or construction equipment. Mechanical, hand, or herbicide techniques may be used to remove vegetation; techniques are selected based on the nature of the vegetation to be cleared. If it is necessary to remove privately owned commercial trees, they are moved and stacked in accordance with the landowner's preference. Stump profiles are kept as low as possible, but stumps are removed only when removal is required for pipeline installation. All debris generated during clearing and preparation of the ROW is disposed of appropriately, in accordance with state and local regulations.

Grading and Cut-and-Fill

Grading is limited to the work necessary to ensure the safe movement of vehicles and construction equipment in the ROW and to permit proper repairs and correct installation of new equipment or facilities. Grading or recontouring can also help to maintain the structural integrity of facilities that are threatened by slope instability or soil movement. All grading and recontouring activities are designed to minimize effects on natural drainage while maintaining or enhancing slope stability.

Unless they are contaminated and require special handling and disposal, excavated materials are stockpiled and reused onsite as fill. Topsoil in particular is preserved by segregating and windrowing. Rock may also be stockpiled for reuse.

Hydrostatic Testing

As described above for specific activities (see *Ongoing Operations and Maintenance Activities—Proposed Action*), new pipes and valves are hydrostatically tested to verify their integrity before they are put into service. Existing pipes and valves also undergo periodic testing.

All hydrostatic testing complies with requirements of the CPUC, California Department of Transportation (Caltrans), and Cal-OSHA. Test pressure and duration are determined based on the size and specifications of the pipe and the elevation of the site. Water is the most commonly used test medium, but compressed air or compressed nitrogen gas is occasionally used for testing of small-diameter pipes.

Before testing begins, a contingency plan is developed to allow a quick response and effective containment of any released water in the event the test fails. Prefabricated test heads are installed on the section of line to be tested. The section is then filled with water or another test medium; water may be obtained from an onsite source such as a fire hydrant, transported to the site by water truck, or piped in via temporary aboveground water lines. Once the pipeline is filled, a pump is used to increase the internal pressure to the design test pressure, typically 1.5 times the system's maximum operating pressure. Upon successful completion of the hydrostatic test, pressure is reduced and the water is expelled from the pipeline using air compressors and cylindrical foam pigs. Disposal is consistent with local water quality regulations and protection for special-status

species; for example, water is not released overland in areas that offer habitat for burrowing species.

General Procedures for Onland Trenching and Excavation

Procedures for trenching and excavation vary depending on the nature of the substrate and the terrain. However, all trenching, excavation, and backfill placement is conducted in accordance with Cal-OSHA requirements and applicable CPUC general orders. On moderate terrain, self-propelled trenching machines or backhoes are used for trench excavation. If rock is encountered, tractor-mounted mechanical rippers are used to expedite excavation. In areas where mechanical rippers are not practical or where the substrate is non-rippable, blasting or rock trenching equipment may be employed. The bottom of the trench is cleared of loose rocks using a backhoe, and, when necessary, imported fill or other suitable bedding material is provided as a cushion for the pipe. Access across the trench is provided at convenient intervals for public safety.

The width and depth of the trench depends on the diameter of the pipe or other structure to be installed; the soil type; terrain; and design requirements, including minimum depth of burial. Typically, the narrowest portion of the trench is 12 inches wider than the diameter of the structure being installed. The trench must be deep enough to achieve an adequate depth of underlying material, as well as adequate soil cover over the buried structure. Minimum cover depths range from 1.5–2 feet in rocky areas to 2.5–3 feet in uncultivated areas with thicker soils to as much as 3–6 feet in actively cultivated areas.

In areas where it is necessary to trench through topsoil and subsoil, a two-pass trenching process is used. The first pass removes topsoil, and the second pass removes subsoil. Spoils from each pass are stockpiled separately so that the soil profile can be restored when the excavation is backfilled.

In cultivated and improved areas and areas where the topsoil layer is thin, it is sometimes necessary to remove and stockpile all topsoil from the disturbed area of the construction ROW. This stockpiled topsoil is then replaced across the ROW during cleanup activities.

In agricultural areas with drainage tile systems, any tiles that are damaged, cut, or removed during pipeline construction are repaired or replaced to the satisfaction of the landowner. During construction, temporary measures are used to ensure that drainage systems continue to function effectively.

If it is necessary to dewater the trench, a pump or well point is used. Water is pumped into containment tanks and disposed of appropriately offsite.

Stockpiled site soils are typically used as trench backfill, as identified above. However, if the excavated material contains too much rock or is otherwise unsuitable for use as fill, clean fill is imported. Fill is compacted in accordance with applicable standards; the minimum compaction requirement for ROWs is 85%. Surplus material may be used to create a berm above the trench, to allow for further settlement of backfill over time.

Crossing Procedures

Specific procedures are needed where infrastructure must cross a waterway, railroad alignment, or major roadway. In some cases, open trenching can be used effectively, but in other cases it is necessary to use one of three subsurface boring techniques: jack and bore, directional bore, or microtunneling. The following paragraphs describe open trenching for wet crossings as well as the three boring techniques.

Trenching Techniques for Wet Crossings

When the open trench technique is used for wet crossings, the excavation may be accomplished with a backhoe, barge-mounted backhoe, clamshell, or dragline, depending on flow characteristics. Flow diversions are installed to maintain flow during construction. Cofferdams, silt curtains, or other appropriate measures are used to contain disturbed sediment and protect water quality. In large waterways, spoils removed from the trench are stockpiled out of the water or on the downstream side of the trench. A plug of unexcavated soils is left in place at each bank to preserve bank integrity until the pipe is installed. The pipeline is placed at least 6 feet below the maximum anticipated scour depth at the design flow.[15] The entire length of pipe for the crossing is assembled as a unit, tested, then placed in the trench. After installation, the trench and the stream bank are backfilled, stabilized, and restored to approximate preconstruction contours. As with onland trenching, if it is necessary to dewater the trench, a pump or well point is used. Water is pumped into sedimentation basins or containment tanks and disposed of appropriately on- or offsite.

Boring Techniques

Jack and Bore. The jack and bore technique, also referred to as *dry bore*, requires excavating a pit at each side of the crossing to accommodate personnel and equipment, including a boring auger. The auger is used to advance a horizontal bore between the two pits, and a sleeve consisting of pipe is jacked through the bore. The permanent pipeline or conduit is then pushed through the sleeve. Pipe or conduit is typically inserted in short lengths that are manageable in the confined space of the jack pit; segments are put in place and then welded together.

The jack and bore technique typically results in a cased crossing. Cased crossings are equipped with vent pipes and cathodic protection, and are appropriately marked.

Directional Boring. Directional boring offers two key advantages over the jack and bore technique: it can cover longer distances, and it results in less surface disturbance because no jack pits are required. Instead, a directional drilling or directional boring machine is set up on the surface. It drills beneath the crossing at an angle predetermined to attain the desired depth of crossing. A lubricant ("drilling mud," commonly a bentonite suspension) is circulated through the bore to maintain its integrity and return drill cuttings to the surface. Once the bore is complete, the pipeline or conduit is pulled through by the boring machine.

[15] Design flow varies, depending on stream characteristics.

Drilling mud that remains in the bore helps to reduce friction along the boring walls.

Microtunneling. Microtunneling is commonly used in wet conditions where it is necessary to control the amount of soil being removed as the boring head progresses. A pit is excavated on each side of the crossing to accommodate the equipment—a jetting head and suction apparatus. The jetting head is attached to the pipe being installed. Water is then forced at high pressure through multiple jets on the head, dislodging soil as the head advances in the subsurface to create a bore. Pipe is installed behind the jetting head. Suction is used to control the amount of soil being removed to accommodate the forward progress of the jetting head and pipeline. Only the soil displaced by the pipeline is removed. Water used during this process is captured and disposed of appropriately.

Selection of Appropriate Crossing Technique

The appropriate method for installation of a subsurface crossing is selected based on the type of feature to be crossed, the site topography, the nature of the substrate, and the type of facility being installed. Table 2-1 summarizes the constraints associated with the most common types of crossings.

Table 2-1. Overview of Crossing Constraints and Approaches

Type of Crossing	Constraints	Typical Construction Methods
River, stream, backwater/lagoon, arroyo	Inchannel construction is regulated by the U.S. Army Corps of Engineers and Regional Water Quality Control Boards under the federal Clean Water Act and by the Department of Fish and Game under the California Fish and Game Code. In active channels, open trenching requires coffer damming and diversion of flow. Construction can substantially affect water quality.	Methods vary depending on site-specific conditions, including width, depth, and flow characteristics. Directional boring is often used to cross large waterways. Temporary vehicle crossings constructed of clean rock fill, culvert bridges, flexi-float, or portable bridges may be installed to convey construction traffic if there is no existing crossing in the vicinity. Where pipelines are installed in a low-density substrate such as peat, the pipe may be coated with concrete to provide added weight and counteract its tendency to "float" toward the surface (i.e., *negative buoyancy*).
Aqueduct, canal	Interruption of supply is a concern with aqueducts and canals, and flow diversion may not be practicable. Aqueducts are typically hardscaped. Irrigation canals may be constrained by the need to maintain adjacent agricultural uses.	Methods vary. Boring is usually most appropriate; alternatively, pipelines may be installed on an aerial suspension system.
Road, railroad, or utility	Construction can substantially disrupt traffic flow or railroad service, or can damage existing utilities if improperly designed or carried out.	The open-trench method may be used to cross roads with light traffic, where permitted by local authorities or landowners; a temporary road detour or a temporary construction bridge is provided

Type of Crossing	Constraints	Typical Construction Methods
		to maintain traffic movement. Jack and bore or directional boring is more common for heavily traveled roadways and other crossings where service cannot be disrupted. Jack and bore is required for all federal and state highway crossings. Underground utilities are generally crossed by boring or by manually exposing the pipe or cable.
Active fault	Ground rupture associated with earthquake activity or fault creep can damage infrastructure that crosses an active fault; design should allow accommodation of potential fault displacement without overstressing the pipeline, conduit, etc.	Designs vary, depending on the type of fault and the type and magnitude of displacement expected. Pipeline trenches are typically widened and deepened to accommodate anticipated fault displacements, and the segment of pipeline or conduit that crosses the fault is suspended in granular bedding material to minimize the resistance of the trench backfill to displacement.

Pipeline Marking

PG&E pipelines are generally identified by markers installed along their centerlines. The markers show the precise location of the pipeline, identify it as a PG&E facility, and convey emergency information in accordance with applicable regulations. Additional markers are placed at rivers, roads, fences, public access crossings, and edges of agricultural fields. Where a new or replacement pipeline is located immediately adjacent to an existing pipeline, the markers are installed near those for the existing pipeline. Special markers providing information and guidance to aerial patrol pilots may also be installed.

PG&E's Existing Environmental Programs and Practices

In general, the CPUC requires PG&E to provide reliable energy to the public in a way that avoids or substantially lessens the related environmental impacts. Accordingly, PG&E conducts an annual environmental awareness training program attended by as many as 6,000–8,000 company staff throughout the company's service territory. Contractors retained by PG&E are normally trained by their respective companies, but, like PG&E employees, the company's contractors are held responsible for complying with all applicable environmental laws and regulations while working under contract, and with implementing any additional environmental protection measures established by PG&E. Both PG&E employees and contractors also receive site-specific tailboard briefings for activities requiring environmental compliance.

The following sections describe PG&E's environmental programs and practices, including best management practices (BMPs) that are routinely implemented

during PG&E's O&M and minor construction activities and will apply to all activities, including habitat enhancement and restoration, under the proposed action and alternatives.

Land Use and Planning Practices

PG&E routinely consults with local (county and city) jurisdictions concerning land use issues. The goal of the process is to take local concerns into account when designing the company's projects, where this is feasible and consistent with CPUC requirements and the fulfillment of PG&E's power delivery responsibilities.

Visual Resources Practices

As discussed in *Land Use and Planning Practices* above, PG&E is committed to consulting with local jurisdictions to ensure that new facilities are as consistent with, and appropriate to, their setting as possible. Issues addressed in land use consultations may include visual resources concerns. If disputes arise, PG&E works with the local authority to identify and implement appropriate measures that are feasible and compatible with CPUC regulations and PG&E's mandate to deliver safe, reliable electricity and natural gas services. Measures typically include one or more of the following, depending on the project being implemented:

- modifications to siting of new facilities;
- modifications to design of new facilities, including the types of materials used for the visible surfaces of structures, pavement elements, etc.;
- finished grade contouring at the project site to provide a natural appearing landform upon completion of construction activities; and/or
- revegetation of disturbed areas using methods consistent with its setting.

PG&E minimizes visual disturbance during O&M and construction activities by requiring work crews to follow good construction site housekeeping practices: maintaining sites in a clean orderly condition, storing building materials and equipment in construction staging areas and/or away from public view, and removing construction debris promptly at regular intervals.[16]

In addition to its general practices to protect visual resources, PG&E has recently adopted a Dark Sky Initiative specifically aimed at reducing light pollution ("urban glow," glare, and light trespass or fugitive light). This is consistent with the California Energy Commission's current effort to develop standards regulating the use of outdoor lighting at public and private sector facilities in the state. PG&E's Dark Sky Initiative includes promoting and offering a range of Dark Sky–friendly products and services. As part of the program, the company will be

[16] Note that this commitment is included in the proposed HCP as AMM5, but also reflects current PG&E practice.

- offering full cutoff–type (reduced glare) replacement lenses and luminaires, and new post-top lights with Dark Sky-approved shielding, through its street lighting program;
- developing replacement and retrofit programs for aging fixtures that are not Dark Sky–friendly;
- creating new brochures and outreach materials for service planning personnel to distribute to local jurisdictions and private developers to make them aware of Dark Sky options available through the company.

PG&E now also routinely incorporates Dark Sky–friendly components in its new facilities.

Biological Resources Program

As part of its environmental awareness training program, PG&E includes specific information on biological resources, such as new and current legislation, sensitive species, precautions that apply when working in sensitive ecological areas, and BMPs to minimize the potential for disturbance of sensitive biological resources. PG&E provides customized examples of sensitive resources in each of its different regional training sessions. The program is publicized to employees via informational brochures and the company website.

Where the project manager identifies a need, PG&E's biologists or environmental specialists review new minor construction activities (unless they are covered under the developer's environmental documents) and some O&M activities, to evaluate their potential to disturb sensitive or protected habitats, such as wetlands, waterways, and the habitat of sensitive species. Biological review typically includes searches of the California Natural Diversity Database's (CNDDB's) mapping of locations known to be used by special-status (threatened or endangered) plants and wildlife, and reviewing company files, where available, for past biological survey results and reports; qualified biologists may also conduct pre-activity biological surveys if necessary. To support the biological review process, PG&E maintains CNDDB records as part of its companywide Map Guide GIS database, which is available through the company's intranet to all company personnel. Map Guide also links to air photos so project managers, estimators, and environmental professionals have access to site-specific species information.[17] The company also holds worksite "tailboard" training sessions for crews, providing information on biological resources that can be used or adapted for individual activities and sites. A component of the biological resources program stresses individual accountability for the avoidance and protection of resources. The program also includes monitoring and reporting of biological impacts associated with construction or ongoing operational activities, when appropriate.

[17] The proposed HCP database has not yet gone live but it is programmed to link with the company's accounting software, offering a "smart system," and will be available to individuals responsible for project planning or data entry. It will also be accessible to all environmental professionals once the HCP is implemented.

To enable responsible personnel such as project managers and construction leads to identify when additional precautions may be needed for smaller or routine O&M activities not evaluated in advance, PG&E conducts training on site conditions or characteristics that indicate biological sensitivity, such as the presence of wetland vegetation or vernal pools. This enables responsible personnel to call in company biologists on an as-needed basis, to further assess the potential for impacts and identify appropriate avoidance measures.

All of PG&E's activities include general BMPs to protect biological resources, such as

- using the smallest possible work footprint;
- minimizing ground disturbance in all areas, and particularly in sensitive areas such as riparian habitats;
- keeping vehicles on existing roads as much as possible;
- maintaining clean worksites;
- implementing measures to control and minimize the spread of noxious weeds, such as requiring appropriate footwear, ensuring that seeds are removed from clothing, and inspecting and cleaning vehicles; and
- using exclusion fencing or flagging to alert crews to the presence of sensitive habitats and to serve as protection.

The company also has an extensive program to protect birds, including but not limited to migratory birds and raptors, described in detail in Appendix E of the proposed HCP (the final HCP is included as Appendix B of this EIS/EIR).

Additional measures that may be implemented if they are needed include

- requiring crews to stay within a designated work area, and/or
- keeping the removal of vegetation to the minimum required to ensure safety and meet CPUC standards.

PG&E minimizes impacts on known populations of sensitive species, and avoids small, localized populations of sensitive species (particularly listed species) to the maximum extent practicable. If a small, localized population of such a species is known to use an area under or near an existing facility that requires repair or maintenance, species-specific avoidance measures are implemented. Occasionally, when it is warranted by the species' sensitivity and state and federal regulations, the company's biologists or a species expert may identify additional precautions such as restricting seasons when certain types of activities may occur, or requiring crews to hand-carry tools and equipment to the work site. In addition, biological monitoring may be recommended by biologists, as appropriate. Species-specific BMPs are currently in place for VELB, California tiger salamander, California red-legged frog, California clapper rail, black rail, spotted owl, marbled murrelet, burrowing owl, and Kenwood marsh

checkerbloom; the proposed HCP will expand and further record the company's program of species-specific BMPs.

Geology and Soils Program

PG&E is committed to sound engineering and construction of its projects, beginning with an evaluation of the geology and soils at worksites where new facilities are constructed. As part of the design process for all new construction, a site-specific geotechnical investigation consistent with the conditions at the site and currently accepted standards of care for the engineering geologic and geotechnical engineering professions is conducted. The purpose of the investigation is to provide a geologic basis for the development of appropriate project design. Investigations typically consider geologic structure, including primary and secondary seismic hazards as defined by the State of California; soils; slope stability; previous history of excavation and fill placement; earthwork recommendations, and any other topics identified by PG&E's design engineer(s), the geotechnical engineer, or the project engineering geologist.

PG&E staff geologists also consult on paleontological resources, if they are found. The company's current practice includes notifying a staff geologist or contract paleontologist if a discovery is made and implementing any prescribed protective measures at the job site.

Water Quality Protection Program

Overview

PG&E's water quality protection program consists of

- promotion and dissemination of water quality educational materials via training sessions and the company website, and on job sites as necessary;
- onsite tailboard briefings for jobs requiring environmental oversight;
- BMPs to avoid and minimize effects to water quality; and
- monitoring and reporting of environmental impacts associated with construction or operational activities.

As part of its environmental awareness training program, PG&E includes specific information on protecting water quality, such as legal requirements to protect water quality, work practices that could adversely affect water quality, water quality permitting requirements and thresholds, and BMPs to minimize the potential for water quality effects. A Water Quality Pollution Prevention training program is given to employees who regularly implement water quality BMPs.

BMPs for the protection of surface waters (including water bodies with defined bed/banks as well as vernal pools and swales) are described in the company's *Draft Water Quality Construction Best Management Practices (BMP) Manual* and *Spill Prevention Control and Countermeasures (SPCC) Manual*. The BMP manual is organized into three main sections: BMP program overview; BMP selection and implementation; and BMP details. The BMP details section is divided into five functional BMP categories: sediment controls, waste management and materials controls, non-stormwater discharge controls, erosion

control and soil stabilization, and vehicle and equipment maintenance. The manual includes a wide variety of measures (34 total, with additional site-specific measures to be created if a need is identified) that are implemented based on site conditions and the nature of the activity. Commonly used examples include the following.

- During the rainy season (October 1–May 1 in most of California, and August 1–May 30 in the state's desert regions) limit the extent of soil disturbance to the acreage that can be protected before a forecasted rain event.
- Whenever possible, minimize disturbed areas by locating temporary roadways to avoid stands of trees and shrubs, and follow existing contours to reduce cutting and filling.
- Stockpiles should be covered, stabilized, or protected with a perimeter sediment barrier (berms, silt fences, fiber rolls, sand/gravel bags, or straw bale barriers) before the onset of precipitation.
- Do not apply asphalt, concrete paving, seal coat, tack coat, slurry seal or fog seal if rain is expected during the application or curing period.
- Do not wash residue or particulate matter into a storm drain inlet or watercourse.
- When using storm drain inlet protection, remove the sediment behind the barrier when it reaches 1/3 the height of the barrier. Removed sediment should be incorporated in the project or disposed of at a PG&E-approved disposal site.

In addition, where appropriate, disturbed areas are typically reseeded following the completion of work.

The BMP manual provides specific information on when and how to implement the BMPs. Maintenance and inspection information are also provided for each BMP. PG&E's general protocol for implementing its BMPs includes (1) identifying activities, pollutants, and issues of concern; (2) evaluating site conditions and selecting BMPs; and (3) implementing, monitoring, and maintaining the BMPs. The SPCC manual provides spill prevention measures, spill containment measures, safety measures, and notification procedures.

Use and Disposal of Water

All activities requiring the use or disposal of water are conducted in compliance with current regulatory requirements. These include the federal Clean Water Act; California's Porter-Cologne Water Quality Control Act and requirements of the State Water Resources Control Board and Regional Water Quality Control Boards; and local (county and/or city) regulations and policies.

Storm Water Pollution Prevention Plans

Under Section 402 of the federal Clean Water Act and the National Pollutant Discharge Elimination System (NPDES) permitting process, all construction projects that disturb more than 1 acre of land are required to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP, pronounced

"swip").[18] 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 Regional Water Quality Control Board with jurisdiction over the work site. Because these are federal provisions, they apply to all PG&E projects meeting the acreage criterion.

A SWPPP includes the following information and stipulations.

- **A description of site characteristics,** including runoff and drainage characteristics and soil erosion hazard.
- **A description of proposed construction procedures and construction-site housekeeping practices,** including prohibitions on discharging or washing any of the following materials into streets, shoulder areas, inlets, catch basins, gutters, natural or modified drainages, or agricultural drainages: concrete; solvents and adhesives; thinners; paints; fuels; sawdust; dirt; gasoline; asphalt and concrete saw slurry; and chlorinated water.
- **A description of measures that will be implemented for erosion and sediment control,** including requirements to
  - conduct major construction activities involving excavation and spoils haulage during the dry season, to the extent possible;
  - conduct all construction work in accordance with site-specific construction plans that minimize the potential for increased sediment inputs to storm drains and surface waters;
  - grade and stabilize spoils sites to minimize erosion and sediment input to surface waters and generation of airborne particulate matter (see discussions under Measures to Protect Air Quality below); and
  - 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. Note that monofilament materials will not be used in areas known to support covered amphibian or reptile species.

    Note that some of these measures overlap with PG&E's routine water quality BMPs, as described above.

- **A Spill Prevention and Response Plan** that identifies the hazardous materials to be used during construction; describes measures to prevent, control, and minimize the spillage of hazardous substances; describes

[18] This requirement was established under the statewide NPDES General Storm Water Permit for Storm Water Discharges Associated with Construction Activities, created by Water Quality Order 99-08-DWQ, and applies to all construction activities that disturb more than 1 acre of land and are not covered by any other NPDES permit. A new general permit under Water Quality Order 2003-0007-DWQ applies specifically to small linear underground and overhead projects that disturb a total of more than 1 acre but less than 5 acres ("small LUPs"). Note that linear projects disturbing more than 5 acres must still obtain coverage under the General Construction Permit. For additional information, see Chapter 8 (*Water Resources*).

transport, storage, and disposal procedures for these substances; and outlines procedures to be followed in case of a spill of a hazardous material.

Drainage Plans and Restoration of Surface Drainage

PG&E's typical practice for O&M and minor construction is to implement erosion control during ground disturbing activities (see discussion of water quality BMPs in *Overview* above), 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, CPUC regulations and the company's SPCC manual (see above) require that a site be graded to provide interior drainage and/or passive water treatment to prevent spills from contaminating surface waters.

For some of its new facilities, PG&E develops a drainage and/or runoff quality control plan. For example, when the company is required to obtain a local jurisdiction (County or City) grading permit, the terms of the permit may require a drainage plan. When a drainage plan is developed, the goal is to achieve consistency with accepted engineering standards of care, and to ensure that

- construction earthwork does not adversely modify existing surface drainage patterns; and that
- where surface drainage must be altered to accommodate construction, measures are implemented to
  - maintain flow in natural, modified, and constructed channels; and
  - ensure that postconstruction 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.

Cultural Resources Program

PG&E complies to the extent feasible with all federal and state regulations protecting cultural resources. The company's cultural resource program includes

- educational training of its employees, including dissemination of cultural resource educational materials throughout the company;
- database searches to identify sites that are sensitive for cultural resources;
- BMPs to avoid and minimize disturbance to cultural resources; and
- implementation of conservation and protection techniques as necessary at worksites.

PG&E employs cultural resources specialists to assist in identifying the need for cultural resources conservation and protection and to oversee implementation of cultural resources BMPs. In addition, the company provides specific examples of sensitive resources in each of its different regional trainings, and also

promotes its cultural resources program through worksite tailboards, brochures, and the company website. As part of its environmental awareness training program, PG&E includes information on cultural resources, such as definitions of cultural resources, a list of issues to consider when conducting O&M and construction activities, procedures to follow if cultural resources are encountered, and a program of BMPs to minimize the potential for disturbance of cultural resources.

PG&E performs database searches for areas where new construction has been proposed, and for some other types of activities, depending on their nature and location; this includes larger O&M activities in generally undisturbed areas, and some smaller projects where specific information suggests that cultural resources may be present in the judgment of the project manager or cultural resources personnel. Information that could trigger a records search includes data contained in PG&E's files or databases, information provided to PG&E from local sources, and/or visible features at a project site suggesting the presence of cultural materials. PG&E maintains a confidential database of cultural resources sites that is made available on a limited basis to qualified cultural resources experts to assess potential cultural resource impacts from PG&E activities. Limited, relevant information from the database is provided to PG&E crews so that harm to known cultural resources can be avoided.

General cultural resources BMPs required for all PG&E efforts include: 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 PG&E cultural resources specialists, 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), work stops within 100 feet of the find until a qualified archaeologist 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, and, if the Coroner determines that the remains are Native American,

1. the Coroner has contacted the Native American Heritage Commission;

2. the Native American Heritage Commission has identified the person or persons it believes to be the most likely descended from the deceased Native American; and
3. the most likely descendent has made recommendations to the landowner or the person responsible for the excavation work for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods, unless the Native American Heritage Commission 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 protect 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 minimize impacts and avoid additional damage in the future. These 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, PG&E representatives and the qualified archaeologist will meet to determine the appropriate course of action. All significant cultural resource materials recovered are subject to scientific analysis and professional museum curation, and are documented in a report prepared by the qualified archaeologist according to current professional standards.

Transportation and Circulation Practices

PG&E implements a variety of traffic control measures and commitments for all O&M and minor construction activities to ensure that they do not unduly impede traffic flow or affect emergency response. These include the following.

- Providing through access for emergency vehicles at all times. If lane closures must occur during the course of construction, local fire and police departments are notified to allow the design of alternative evacuation and emergency access and evacuation routes. PG&E makes every effort to allow emergency service providers adequate lead time to ensure that emergency access and response times are maintained during work periods.
- Maintaining access for private roads.
- Providing adequate off-road parking and staging for vehicles, equipment, and materials throughout the work period.
- Restricting all construction parking and staging to right-of-way (ROW) and pre-approved staging areas. Keeping construction equipment in designated staging areas when not in use.
- Posting construction warning signs in advance of the construction area and at intersections that provide access to the construction area.
- Restricting all non-emergency 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.

- Avoiding key commute routes and "rate-limiting" intersections during peak traffic periods, either by traveling different routes or by traveling at non-peak times. Working with local jurisdictions to identify the routes and intersections that should be avoided, and appropriate alternate travel routes or times.
- Providing adequate parking for new or expanded facilities.

Noise and Vibration Practices

As part of its land use consultations for new construction, PG&E coordinates noise management issues with local agencies and jurisdictions. This is particularly important for substation construction in residential areas. For all activities, as required by CPUC, PG&E makes every feasible effort to comply with local noise and vibration standards. If local standards cannot be met, the company makes every effort to work out a mutually satisfactory compromise for noise abatement/mitigation.

During all O&M and minor construction activities, PG&E project managers and construction leads are responsible for implementing a variety of BMPs as needed, depending on the nature of the activity. Typical measures include

- conducting work during daytime hours;
- using standard equipment with noise control devices (e.g., mufflers) that meet manufacturers' specifications;
- using "quiet" equipment (i.e., equipment designed with noise control elements);
- installing portable barriers to shield compressors and other small stationary equipment where necessary;
- installing sound barriers for pile-driving activity, where practicable, by using an acoustic curtain or blanket around the point of impact;
- directing equipment exhaust stacks and vents away from buildings, when feasible;
- routing truck traffic away from noise-sensitive areas, where feasible;
- following a common-sense approach to vehicle use; and encouraging workers to shut off vehicle engines whenever possible;
- limiting pick-up trucks and other small equipment to an idling time of 5 minutes;
- identifying "sensitive receptors" who might be disturbed by construction noise and notifying them in advance of upcoming work; and
- responding promptly to complaints raised by adjacent residents.

Air Quality Program

PG&E complies with all applicable federal and state air quality regulations. The company's air quality program consists of

- promotion and dissemination of air quality educational materials via training sessions and the company website, and on job sites as necessary; along with
- BMPs to avoid and minimize air quality effects.

As part of its general environmental awareness program, PG&E includes information on air quality, such as legal requirements, vehicle operation restrictions, and BMPs to minimize fugitive dust. Fugitive dust BMPs are typically designed and implemented to meet the requirements of local air quality management districts. For example, in the action area, PG&E must satisfy applicable requirements of the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD), presented in Table 2-2.

Table 2-2. SJVUAPCD Regulation VIII Control Measures for Construction Emissions of PM10[19]

The following controls are required to be implemented at all construction sites.
■ All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover.
■ All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant. *Note that PG&E uses soil stabilizers in conjunction with appropriate erosion and sediment control measures, and is committed to the use of stabilizers approved for use in wetlands, where this is appropriate.*
■ All land clearing, grubbing, scraping, excavation, land leveling, grading, cut & fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.
■ With the demolition of buildings up to six stories in height, all exterior surfaces of the building shall be wetted during demolition.
■ When materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.
■ All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.
■ Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.
■ Within urban areas, trackout shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday.
■ Any site with 150 or more vehicle trips per day shall prevent carryout and trackout.

[19] *PM10* refers to particulate matter with a diameter of 10 microns or less. PM10 represents a health concern because particles of this size are small enough to be drawn deeply into the lungs when inhaled. Additional information on PM10 hazards is provided in Chapter 13 (*Air Quality*).

Enhanced Control Measures. The following additional measures should be implemented when required to mitigate significant PM10 impacts.

- Limit traffic speeds on unpaved roads to 15 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than 1%.

Additional Control Measures. The following measures are strongly encouraged at construction sites that are large in area, located near sensitive receptors, or which for any other reason warrant additional emissions reductions.

- Install wheel washers for all exiting trucks, or wash off all trucks and equipment leaving the site.
- Install wind breaks at windward side(s) of construction areas.
- Suspend excavation and grading activity when winds exceed 20 mph.
- Limit the area subject to excavation, grading and other construction activity at any one time.

Notes: Regardless of wind speed, an owner/operator must comply with Regulation VIII's 20% opacity limitation. All commitments will be implemented in a manner that minimizes effects on habitats on and around the site.

Source: San Joaquin Valley Unified Air Pollution Control District 2002.

Note that Table 2-2 is a comprehensive summary of the SJVUAPCD's Regulation VIII measures, which were developed to cover a broad range of construction activities in the San Joaquin Valley. Short-duration (<30 days) emergency activities necessary to ensure public health and safety or restore service during outages are exempt from these provisions, although work sites must be brought into compliance following the completion of work. In addition, because of the focused scope of the O&M and minor construction activities enabled under the proposed action, some activities would be exempt from some requirements; for example, O&M and minor construction are not expected to trigger the carryout/trackout measure that applies to sites with 150 or more vehicle trips per day, and some activities involving work on existing infrastructure are exempt because they do not qualify as construction *per se*.

PG&E also has a number of specific programs in place to minimize pollutant emissions and ensure compliance with air quality regulations. For example, the company's Fleet Department maintains company vehicles to ensure that tailpipe emissions are at or below applicable state and federal standards. In addition, the Fleet Department, Environmental Affairs, and Utility Operations work together to ensure compliance with mobile-source airborne toxic control measures (ATCM) for diesel particulate matter to determine potential impacts as a result of company activities, and ensure compliance.

Hazardous Materials Program

General Practices

PG&E complies with all applicable state and federal laws, regulations, and requirements pertaining to hazardous materials and hazardous wastes. Relevant regulations include the following.

- Federal Toxic Substances Control Act; Insecticide, Fungicide, and Rodenticide Act (FIFRA); Clean Water Act; Clean Air Act; Solid Waste

Disposal Act; Comprehensive Environmental Responsibility, Compensation, and Liability Act (CERCLA, or "Superfund Act"); Superfund Amendments and Reauthorization Act; and Emergency Planning and Community Right to Know Act.

- Code of Federal Regulations, Title 40 (*Protection of Environment*), Part 112 and Parts 260–299, 300–399, and 700 –789.
- California Code of Regulations—Title 8 (*Health and Safety Code*); Title 13 (*Transportation*); Title 19 (*Office of Emergency Services*); Title 22 Division 4.5 (*Environmental Health Standards for the Management of Hazardous Waste*); and Title 23 (*Water Code*);
- California Hazardous Materials Release Response Plan and Inventory Act (Business Plan Act), Toxic Pits Cleanup Act, and Toxic Injection Well Control Act.

PG&E's hazardous materials program consists of

- promotion and dissemination of educational materials via training sessions, and the company website, and on job sites as necessary;
- implementation of legal protocols for hazardous materials handling to avoid and minimize public, worker, and environmental exposure; and
- monitoring and reporting of environmental impacts associated with construction or ongoing operational activities.

As part of its environmental awareness training program, PG&E includes specific information on hazardous materials, such as definitions of hazardous materials; legal requirements for hazardous materials storage, transportation, and handling; agency oversight; and BMPs to minimize the potential for hazardous materials effects.

Following are examples of the types of measures PG&E implements to reduce the potential for spills and releases of hazardous substances during their O&M and minor construction activities.

- Fueling and servicing all vehicles offsite.
- Following standard BMPs when handling any hazardous or potentially hazardous substances.
- To the extent practicable, avoiding storage of hazardous substances such as paints, solvents, epoxies, etc., at the work site and in the staging area. If such substances must be stored onsite, quantities are minimized and materials are securely stored in closed containers located away from drainage courses, storm drains, and areas of stormwater infiltration.
- Removing litter and construction-related materials from the job site following completion of work.

- Ensuring that maintenance and construction personnel have been trained in current procedures and best available technology (BAT) for spill prevention and cleanup of accidental spills.
- Keeping a spill kit or kits at the worksite at all times when hazardous materials are in use, and ensuring that all personnel know how to access and use the kit(s).

In the event of a spill or release of hazardous materials, work is stopped immediately, and cleanup measures are implemented as necessary to remediate the spill and protect terrestrial ecosystems, surface water quality and aquatic ecosystems, groundwater quality, and human health. Adjacent land uses and emergency responders are notified immediately in the event of a substantial spill or release.

Herbicide Use

Where appropriate, PG&E uses herbicides as part of its CPUC-mandated vegetation control program. Herbicide use is typically restricted to ROWs; herbicides are not used for any purpose on privately held lands unless the landowner agrees. A variety of herbicides are used, depending on site-specific needs and conditions. They include selective and nonselective, contact and systemic, and preemergent and postemergent types. All herbicides are used in strict accordance with FIFRA label requirements[20] and, as appropriate, with the U.S. Environmental Protection Agency's regulations for application of herbicides in endangered species habitat. Herbicides are transported, handled, applied, and, when necessary, disposed of by qualified personnel only.[21]

Herbicide use would not be covered under the HCP, but is discussed here for completeness.

Environmental Justice Program

Environmental justice refers to the concept that adverse effects of agency activities should not be disproportionately visited on disadvantaged communities. PG&E's environmental justice program includes

- conducting educational training regarding environmental justice issues; promotion and dissemination of environmental justice educational materials throughout the company;

[20] The Federal Insecticide, Fungicide, and Rodenticide Act (7 USC 136 *et seq*.)—originally passed in 1947 and notably amended in 1972 and again in 1996—establishes federal jurisdiction over the distribution, sale, and use of pesticides and herbicides. Key provisions of FIFRA create a review and registration process for new pesticide products; require thorough and understandable labeling that includes detailed instructions for use; and require pesticide applicators to pass a licensing examination for status as "qualified applicators."

[21] In this context, *qualified personnel* is understood to refer to persons holding a current Qualified Pesticide Applicator License (QAL) or Qualified Pesticide Applicator Certificate (QAC) from the California Department of Pesticide Regulation.

- identifying potentially significant existing and future environmental justice concerns; and
- coordinating and planning outreach to affected interest groups to evaluate potential measures to minimize, avoid, or mitigate environmental justice concerns.

PG&E's Environmental Affairs and Law Departments are responsible for implementing the program, and for keeping regulatory agencies apprised of the status of these efforts.

Cleanup and Restoration of Work Areas

Installation of underground natural gas or electric utilities can result in substantial surface disturbance. Consequently, the final phase of PG&E's facilities installation includes cleanup, restoration, and revegetation of the ROW and any additional laydown areas. Restoration and revegetation of the construction area are completed to the satisfaction of the landowner.

In general, disturbed areas are restored to the preexisting grade. Several activities may be involved, depending on the nature of the site and the type of installation that took place. For example, placement of a pipeline or other infrastructure in a trench results in surplus excavated materials that cannot be returned to the trench. These are normally distributed evenly over the ROW, but if the property owner prefers, spoils can be disposed offsite at a local landfill or another appropriate site. Restoration of the ROW surface involves smoothing it with graders or disc harrows and may also require stabilizing slopes by recontouring, creating slope breaks or diversion ditches, or placing riprap, dirt- or sandbags, or other materials. On cultivated or improved lands, measures are taken to remove rocks and leave the ground surface in a condition satisfactory to landowners. Finally, disturbed areas are mulched, reseeded, and fertilized as needed, per agreement with the landowner. The goal of revegetation is to achieve compatibility with preexisting vegetative conditions, in accordance with CFR Title 18, Part 2.69 and standard procedures approved by jurisdictional authorities.

BMPs for Vegetation Management

In concert with the company's obligations under CPUC General Order 95, PG&E's best management practices (BMPs) for vegetation management activities near electrical facilities are designed to protect wildlife, groundwater, surface water, soils, utility customers, utility workers, and the general public, while facilitating safe and reliable electrical transmission operations. Table 2-3 presents BMPs that apply to all vegetation management for electric transmission infrastructure, including manual, mechanical, cultural, and biological techniques as well as herbicide applications.[22] These guidelines function as a supplement to General Order 95 requirements, the California Public Resources Code, and regulations and guidelines issued by the California Independent System Operator (ISO) and the Federal Energy Regulatory Commission (FERC). Table 2-4

[22] Note that herbicide application would not be covered under the proposed HCP.

presents additional BMPs for mechanical clearing of transmission and distribution ROWs. Table 2-5 shows BMPs for herbicide use; these are intended as a supplement to precautions required by Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) labeling and other applicable laws, rules, and regulations, discussed above.

Environmental Commitments Enacted by the Proposed HCP

Table 2-6 lists the special-status plant and wildlife species (23 wildlife species and 42 species of plants) covered by the proposed San Joaquin Valley O&M HCP.

The HCP's conservation strategy uses three mechanisms to address the potential effects of O&M activities on these species and their habitat, as follows.

- General measures to avoid and minimize impacts ("avoidance and minimization measures," or **AMMs**).
- **Surveys** to assess potential impacts on particular species, when warranted.
- **Compensation** for impacts that cannot be avoided.

This strategy was developed in keeping with eight guiding principles.

1. The highest priority is to avoid and minimize adverse effects; AMMs should be implemented to the fullest extent practicable before compensation is undertaken. To that end, general AMMs are implemented on all projects. The need for additional AMMs is identified based on survey results.
2. Compensation should be coordinated with and incorporated into other regional conservation efforts.
3. Preserving habitat on site and in kind is preferable to mitigating or preserving habitat off site.
4. Preserving a small number of large, contiguous habitat areas is preferable to preserving a greater number of small, discrete areas. Habitat should be preserved at sites that are surrounded by compatible land uses.
5. Compensation should satisfy applicable state and federal goals, policies, and standards for wetlands.
6. Land management activities must maintain habitat quality for covered species.
7. Monitoring provides the feedback loop to support the adaptive management component of the conservation strategy.
8. Adaptive management continually assesses, evaluates, and adapts management prescriptions to achieve the HCP's biological goals and objectives.

Table 2-3. General Best Management Practices for PG&E Vegetation Management Activities

The following BMPs shall be implemented for all vegetation management activities.

1. PG&E Employees and Vegetation Management (VM) contractors performing VM activities shall receive ongoing environmental orientation. Orientation shall include review of environmental laws and guidelines that must be followed by all PG&E employees and VM Contractor personnel to reduce or avoid effects on covered species during VM activities.
2. Notify federal and state land managers of pending work and schedule annual meetings with these land managers, as requested. Notify local agency land managers of pending work as requested, or as sensitive issues arise.
3. Vehicles and equipment shall be parked on pavement, existing roads, and previously disturbed areas to the extent practicable.
4. Vehicles shall not exceed a speed limit of 15 mph on low-use unpaved roads such as agricultural field roads, transmission ROW roads, non-system numbered USFS roads with locked gates. Travel on high-use unpaved roads such as USFS logging roads shall be as slow as local traffic conditions allow.
5. No vehicles or equipment shall be refueled within 100 feet of a stream with a defined stream channel or bank, a wetland, or a pond unless a bermed and lined refueling area is constructed. Any vehicles driven and/or operated within or adjacent to streams shall be checked and maintained daily to prevent leaks of materials that, if introduced to the water, could be deleterious to aquatic life.
6. Hunting, firearms, open fires (such as barbecues) not required by the VM activity, and pets (except for safety in remote locations) shall be prohibited in VM work activity sites. All trash, food items and human generated debris shall be properly contained and/or removed from the site.
7. All roads, fences, and structures damaged as a result of vegetation management operations shall be repaired. All gates shall be left open if found open or locked if found locked.
8. Contractor shall have a working cell phone or radio on the job site at all times capable of communicating with PG&E. If reception is not available at the job site, the closest area of reception shall be identified, and all employees familiarized with that location.
9. All equipment shall be permitted by the Air Resources Board as required.
10. During fire season in designated State Responsibility Areas (SRAs), motorized equipment shall have federal or state approved spark arrestors; all vehicles shall be equipped with fire fighting tools as appropriate and in accordance with all applicable laws, rules, regulations, orders, and ordinances.
11. Contractor shall be responsible for checking daily Project Activity Level (PAL is a measure of fire weather conditions and, at certain levels, restricts activities otherwise permitted) during fire season when working on USFS property.
12. When routine VM activities are conducted in an area of potential Valley elderberry longhorn beetle (VELB) habitat, a qualified individual shall survey for the presence of elderberry plants within a minimum of 20 feet from the work site within the utility easement, ROW, franchise, or license, and shall note in VM Work Request documents to avoid or minimize potential impacts on elderberry plants. If elderberry plants have one or more stems 1 inch or more in diameter at ground level, additional measures identified in the VELB conservation plan shall be implemented. Otherwise, no additional minimization, avoidance, or protective measures are required.
13. All PG&E employees and contractors shall follow the VM Migratory Bird Process when applicable to VM activities to comply with Migratory Bird Treaty Act.
14. If cultural resources are found (i.e., old bottles, cans, buildings), they shall be left in place and undisturbed.
15. VM shall verify that the environmental screening process was followed prior to conducting VM activities associated with capital jobs and other non-VM work.

Continued on following page.

In addition to BMPS 1–15, BMPS 16–20 shall be applied to all distribution removal projects more than 100 feet in linear length and to electric transmission ROW clearing project activities including manual, mechanical, cultural, chemical, and biological techniques.

16. Prior to any ROW clearing project or any enhancement project, the California Natural Diversity Database (CNDDB) shall be checked for any records of threatened, endangered, or sensitive species.
17. Any locations identified through the CNDDB search shall be flagged and appropriate avoidance measures shall be put in place. Tailboards shall be held before work begins.
18. Sensitive habitats such as meadows, riparian areas, and serpentine outcrops shall be flagged and appropriate avoidance measures shall be put in place. Tailboards shall be held before work begins.
19. All existing roads shall be kept open and erosion control measures re-installed after the project is completed or during inclement weather.

In addition to BMPs 1–15, BMPs 20–25 shall be implemented for all VM activities that occur within a wetland a pond, or a stream with a defined stream channel or banks.

20. Vegetation removal shall be completed without the use of self-propelled mechanical equipment (i.e., Hydro-ax, Brontosaurus, Slashbuster, etc.).
21. The disturbance or removal of vegetation within the work area shall not exceed the minimum necessary to complete operations, subject to other public and health and safety directives governing the safe operations and maintenance of electric and gas facilities. Precautions shall be taken to avoid damage to non-target vegetation.
22. Cleared or trimmed vegetation and woody debris shall be disposed of in a legal manner. All cleared vegetation and debris shall be removed from the wetland, pond or stream with a defined stream channel or bank corridor and placed or secured where they cannot re-enter the watercourse.
23. Vegetation that at mature height does not pose a threat to the conductors shall not be removed except as required for compliance with CPRC 4292.
24. Vehicle access to streams and wetlands shall be limited to existing roads and crossings.
25. When practical, maintenance activities within the project area shall be completed when the area is dry or during periods of minimum flow.

Table 2-4. Best Management Practices for Mechanical Clearing of Electric Transmission and Distribution Rights of Way

1. Contractor shall clear all vegetation 10 feet around and under all towers/poles and guy wires. Only manual clearing work can occur within the above-mentioned 10 feet. ***No mechanical equipment shall be used within 10 feet of the above-mentioned structures***. All vegetation cut under and within 10 feet of the towers shall be removed from the area and mulched to a depth not greater than 12 inches.
2. Vegetation that is mowed shall be mulched to a depth not greater than 18 inches.
3. Trees greater than 12″ diameter at breast height (dbh) shall be hand-felled and then the top and limbs removed and the bole decked on the side of the right-of-way.
4. Contractor shall flag all guy wires 200 feet in advance of working an area using brightly colored flagging (a minimum of three flags per wire).
5. Contractor shall have a water source containing a minimum of 300 gallons of water and 250 feet of 1-inch hose on site at all times during operation. The water source must either be self-propelled or always attached to a vehicle capable of moving it to where it is needed. Where access/terrain allows contractor's water source must always be within 500 feet of the mowing/cutting operation. Excess water shall be disposed of in accordance with all laws and regulations.
6. Each mower shall have a minimum 10-lb. Class A,B,C fire extinguisher mounted in the cab.
7. Contractor must stay on site ½ hour after mowing operations end for the day to ensure fire safety. When extreme fire levels are reached, the following extra precautions must be implemented immediately:
   a. An additional support person shall be dedicated to follow the mower with an Indian Back Pump and McLeod. Mowing hours will be reduced to the hours of 5:00 a.m. through 12:30 p.m.
   b. The use of a humidity meter shall occur. A reading of less than (<) 20% humidity shall stop the mowing operation for the day. Readings shall be taken every 3 hours during operation.
8. Watercourse protection zones will be marked by the PG&E representative in charge with brightly colored flagging prior to the start of any mowing/timber operation. Water classes are defined by the California Forest Practice Rules: 14 CR 916.5.

Watercourse	Class I	Class II	Class III
Characteristics or Key Indicator Beneficial Use	1) Domestic supplies, including springs, on site and/or within 100 feet downstream of the operations area and/or 2) Fish always or seasonally present on site; includes habitat to sustain fish migration and spawning.	1) Fish always or seasonally present off site within 1,000 feet downstream and/or 2) Aquatic habitat of nonfish aquatic species 3) Excludes Class III waters that are tributary to Class I waters	No aquatic life present, watercourse showing evidence of being capable to sediment transport to Class I and II waters under normal high water flow conditions after completion of timber operations.

9. The following watercourse protection zone clearances must be maintained at all times:
   a. Class I & II watercourses with a slope < 30% — No heavy equip. within 50 feet
   b. Class I & II watercourses with a slope > 30% — No heavy equip. within 75 feet
   c. Class III watercourse — No heavy equip. within 25 feet

   No mowing shall be allowed within above distances. Trees within the buffer shall be removed manually. Brush and other small vegetation shall be left for a shade canopy on the watercourse. The actual width of the watercourse protection zone may vary based on a PG&E representative's judgment in the field. All impaired watercourses and their protection zone clearances shall be identified before the project begins.

Table 2-5. Best Management Practices for Herbicide Use*

1. All herbicide applications performed by vegetation management (VM) contractors shall be made in compliance with label requirements as well as all appropriate federal, state and local laws, rules and regulations.
2. Only federal and California Environmental Protection Agency–registered herbicides shall be applied.
3. During the performance of VM right-of-way (ROW) Enhancement Operations, operator ID numbers and Site ID numbers shall be obtained for each facility as required by the County Agricultural Commissioner.
4. Each application shall be covered by a written "Pest Control Recommendation."
5. A Licensed Pest Control Advisor shall oversee all herbicide and tree growth regulator applications. A qualified applicator shall supervise contractors making herbicide and tree growth regulator applications for VM.
6. County Agricultural Commissioners shall be invited to inspect the applicator and application operations when appropriate.
7. The Pest Control Business License holder (applicator) shall report herbicide use monthly to the County Agricultural Commissioner.
8. Contractor shall conduct annual worker safety training sessions for all contractor employees involved in the herbicide applications and manual/mechanical clearing. As requested, documentation of this training shall be on file with the PG&E Representative that administers their contract.
9. Selective application techniques should be used for VM ROW Enhancement Operations wherever practical so that desirable vegetation is not adversely affected.
10. Buffer widths shall apply as shown below.

Herbicide/Adjuvant Toxicity	Buffer Width from Stream, Wetland, or Other Sensitive Habitat[1]		
	Cut Stump, Hack & Squirt, Injection	Foliar Application	Mixing, Loading, Cleaning
Practically Nontoxic to Slightly Toxic	Up to edge[2,3]	Up to edge[2,3]	200 feet[4]
Moderately Toxic	25 feet[2,3]	25 feet[2,3]	200 feet[4]
Highly Toxic to Very Highly Toxic, or if Label Advisory for Ground/ Surface Water	35 feet on each side of the stream, measured from the bankfull edge of the stream	35 feet on each side of the stream, measured from the bankfull edge of the stream	200 feet [4]

[1] Using ultra low volume (ULV) nozzles with orifice size and spray pressure set to produce droplets as a minimum of 150 microns, nozzle heights at the lowest possible height, and assuming crosswind speed of less than 10 mph.

[2] Goodrich-Mahoney, J. W. 1999. *Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality*. (Report No. TR-113160.) September. Electric Power Research Institute.

[3] Calculated from *A Summary of Ground Application Studies* (Spray Drift Task Force 1997).

[4] PG&E best management practice.

11. Applicator shall have a spill prevention and cleanup kit on site.
12. Backpack equipment or light capacity power equipment shall be used for all directed foliar applications.
13. Herbicide containers shall be triple rinsed and disposed of in a proper manner.
14. Minimum operating pressures shall be used. Nozzle tips that produce a coarser droplet should be used to minimize drift.

* Note that herbicide use would not be covered under the proposed HCP.

15. Pesticides shall not be transported in the same compartment with persons, food, or feed. Pesticide containers shall be secured to the vehicle during transportation in a manner that shall prevent spillage into or off the vehicle.
16. The contractor shall have a written training program for employees who handle pesticides. The written program must describe the materials and the information that shall be provided and used to train the employees.
17. Training must be completed before an employee is allowed to handle any pesticide and be continually updated to cover any new pesticides that shall be handled. Training must be repeated at least annually thereafter.
18. These special precautions shall be observed during periods of inclement weather:
    - Applications shall not be made in, immediately prior to, or immediately following rain when runoff could be expected.
    - Applications shall not be made when wind and/or fog conditions have the potential to cause drift.
    - Basal bark applications shall not be made when stems are wet with rain, snow or ice.

Table 2-6. Species Covered by San Joaquin Valley O&M Habitat Conservation Plan—Proposed Action

Wildlife	Plants	
Vernal pool fairy shrimp	Large-flowered fiddleneck	Legenere
Midvalley fairy shrimp	Lesser saltscale	Panoche pepper-grass
Vernal pool tadpole shrimp	Bakersfield smallscale	Congdon's lewisia
Valley elderberry longhorn beetle	Big tarplant	Mason's lilaeopsis
California tiger salamander	Mariposa pussypaws	Mariposa lupine
Limestone salamander	Tree-anemone	Showy madia
California red-legged frog	Succulent owl's-clover	Hall's bush mallow
Blunt-nosed leopard lizard	California jewelflower	San Joaquin woollythreads
Giant garter snake	Hoover's spurge	Pincushion navarretia
Swainson's hawk	Slough thistle	Colusa grass
White-tailed kite	Mariposa clarkia	Bakersfield cactus
Golden eagle	Merced clarkia	San Joaquin Valley Orcutt grass
Bald eagle	Springville clarkia	Hairy Orcutt grass
Western burrowing owl	Vasek's clarkia	Hartweg's golden sunburst
Bank swallow	Hispid bird's-beak	San Joaquin adobe sunburst
Tricolored blackbird	Palmate-bracted bird's-beak	Keck's checkerbloom
Buena Vista Lake shrew	Kern mallow	Oil neststraw
Riparian brush rabbit	Congdon's woolly sunflower	Greene's tuctoria
Riparian (San Joaquin Valley) woodrat	Delta button-celery	King's gold
Tipton kangaroo rat	Striped adobe-lily	
Giant kangaroo rat	Bogg's Lake hedge-hyssop	
San Joaquin (Nelson's) antelope squirrel	Pale-yellow layia	
San Joaquin kit fox	Comanche Point layia	

O&M activities affect the environment to varying degrees, depending on what is involved—for instance, whether there is surface disturbance or vegetation removal—whether the activity takes place in an existing ROW or not, and which species are likely to be present in the area. The appropriate conservation response to each type of activity depends on the anticipated level of effect, as summarized in Table 2-7.

A cornerstone of the conservation strategy is full integration of the HCP commitments into PG&E's operations. The Environmental Affairs Department will administer the HCP and will retain all program records; Table 2-8 summarizes specific responsibilities.

The following sections describe the HCP's provisions for AMMs to avoid and minimize adverse impacts; preactivity surveys; and compensation for impacts that cannot be avoided.

Avoidance and Minimization Measures

Overview of Approach

Table 2-9 lists the AMMs included in the HCP. As discussed in Chapter 3 (*Calculation Of Disturbance Acreages For Land-Cover Types*) and Chapter 4 (*Conservation Strategy*) of the proposed HCP (see Appendix B of this EIS/EIR), the HCP analysis of effects identified four levels of disturbance associated with O&M activities and minor construction, as follows. ~~For all activities, avoiding impacts is preferable to minimizing them, and AMMs will be implemented as practicable.~~

- ***Small disturbance*** results from activities that typically disturb less than 0.1 acre per event and that are considered to have a very low potential for effects or would only have very limited effects.
- ***Medium disturbance*** results from activities that typically disturb more than 0.1 acre but less than 0.5 acre, and are considered to have a potential for minor or greater effects (HCP Table 3-1).
- ***Large disturbance*** could result from activities that typically disturb 0.5 acre or more and that are considered to have a potential for greater effects (HCP Table 3-1).
- ***"Other disturbance"*** results from activities that do not cause habitat loss but may nonetheless have the potential to result in take in some situations.

For all activities, avoiding impacts is preferable to minimizing them, and AMMs will be implemented as practicable, in addition to the measures already required by PG&E's existing environmental programs and practices, which would continue under the proposed action.

All small-, medium-, and large-disturbance O&M activities will be subject to AMM 1 through AMM 11. For "other disturbance" activities, PG&E will continue to implement its existing environmental practices and may also implement AMMs 1 through 11 as part of this BMP program. Activities with the

potential to disturb 0.1 acre or more will also be subject to AMM 12 through AMM 21 and 22 through 30, based on the results of preactivity surveys, and additional measures may be implemented if needed. In general, activities that disturb less than 0.1 acre of natural vegetation will presume the presence of sensitive species and the full area of impact will be mitigated. When activities with the potential to disturb less than 0.1 acre (small disturbance activities) occur in ~~"hot zones"~~particularly sensitive habitats ~~(~~such as wetlands, vernal pools, and other areas of known sensitivity~~)~~, they will be screened to assess the level of risk to covered species, and AMMs 12–30 will be selectively applied based on the results of the screening (see HCP Figure 4-1 for an overview of the screening process).

PG&E will document the implementation of AMMs for O&M activities that are performed in areas of natural vegetation. Except for activities in the "other disturbance" level of effect category, each O&M activity will be assigned a unique identification number before the activity is performed so that AMM compliance can be tracked. PG&E will expand its database to track implementation of avoidance and minimization measures; standard information to be documented for each O&M activity includes the following.

- The type and location of the activity, and its identification number.
- The name of the activity manager or field supervisor responsible for the activity.
- The AMMs that were implemented.
- Any additional pertinent information regarding site conditions, project effects, or variations in adherence to AMMs.

AMMs for Activities that Disturb <0.1 Acre

The HCP incorporates an approach for systematically identifying the small-disturbance activities for which AMMs are warranted, and selecting the appropriate palette of AMMs to protect the species at a given work site.

In general, application of AMMs to small-disturbance activities is based on the potential for the activity to result in take of species known or likely to be present at a work site, based on the habits and needs of the species and the nature of the activity. Because DFG cannot under any circumstances authorize take of species identified as fully protected by the California Fish and Game Code, the known presence of any fully protected species requires implementation of AMMs particular to that species' needs. Similarly, the presence of any species for which even limited take could result in longer-term effects on regional populations requires implementation of AMMs. Such species include those that are exceedingly rare and/or localized in the action area, such as riparian brush rabbit; those that tend to congregate, with many individuals in a very small area (e.g., colonial birds such as the bank swallow and tricolored blackbird); and those for which take at certain times of year could result in disproportionate adverse effects, such as rare plant species that could be eradicated from an area as a result of take during the reproductive period.

Table 2-7. Level of Effect and Conservation Approach—Proposed Action

Level of Effect	Definition	Conservation Approach Under Proposed Action
Small disturbance	Activity disturbs less than 0.1 acre per event and has a very low potential to result in adverse effects on habitat, or would result in very limited adverse effects. Includes vegetation management activities, which disturb habitat by removing or reducing vegetation, but do not result in ground disturbance.	PG&E's existing environmental programs and commitments apply.[a]
		Preactivity surveys required in a few cases, based on potential for take and species' biological susceptibility.[b]
		General AMMs required. Additional species-specific AMMs may be required in some cases.
		Compensation required in natural vegetation, wetlands, and vernal pools; compensation acreage is based on presumption of take.
Medium disturbance	Activity disturbs 0.1–0.5 acre per event, on average, and could result in minor or greater adverse effects on habitat.	PG&E's existing environmental programs and commitments apply.
		Preactivity surveys required.
		General AMMs required.
		Additional, more comprehensive AMMs required.
		Compensation required in natural vegetation, wetlands, and vernal pools.
Large disturbance	Activity disturbs more than 0.5 acre per event and has the potential for greater adverse effects on habitat.	PG&E's existing environmental programs and commitments apply.
		Preactivity surveys required.
		General AMMs required.
		Additional, more comprehensive AMMs required.
		Compensation required in natural vegetation, wetlands, and vernal pools.
Other disturbance	Activity does not result in habitat loss.	PG&E's existing environmental programs and commitments apply.
		No preactivity surveys required.
		General AMMs required.
		No compensation necessary.

[a] See *PG&E's Existing Environmental Programs and Practices* above for a description of the training and best management practices (BMPs) entailed.

[b] Additional information on when preactivity surveys are required for small disturbance activities is provided in the following section. See Chapter 4 (*Conservation Strategy*) of the proposed HCP, presented as Appendix B of this EIS/EIR, for additional information.

Table 2-8. Responsibilities for Implementing HCP Measures

Position	Responsibility
HCP administrator	■ Manages HCP implementation and databasing. ■ Schedules biological surveys. ■ Develops and schedules HCP training. ■ Oversees HCP monitoring, reporting, and adaptive management program. ■ Tracks acquisition of compensation lands. ■ Coordinates assessment (audit) activities to assess/verify HCP compliance. ■ Prepares annual report to USFWS and DFG.
Operation managers	■ Ensure that field supervisors and crews receive training needed to implement HCP measures. ■ Responsible for annual forecasting of O&M work.
Field supervisors	■ Ensure that field crews are trained in appropriate methods and techniques. ■ Responsible for entry of data into database. ■ Request preactivity surveys if needed, and ensure compliance during activities. ■ Assist with annual forecasting of O&M work.
Field crews	■ Attend environmental training. ■ Implement AMMs specified for each job.
Environmental affairs field specialists	■ Deliver environmental training. ■ Perform assessments (audits) to assess/verify HCP compliance.
Biologists (PG&E or contract)	■ Conduct preactivity surveys of work areas and assess potential impacts. ■ Monitor activities in sensitive habitat. ■ Enter survey data into database.

Table 2-9. Avoidance and Minimization Measures in San Joaquin Valley Habitat Conservation Plan—Proposed Action

Code	Avoidance and Minimization Measure
AMM 1	Employees and contractors performing O&M activities will receive ongoing environmental education. Training will include review of environmental laws and guidelines that must be followed by all personnel to reduce or avoid effects on covered species during O & M activities.
AMM 2	Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas to the extent practicable.
AMM 3	The development of new access and ROW roads by PG&E will be minimized, and clearing vegetation and blading for temporary vehicle access will be avoided to the extent practicable.
AMM 4	Vehicles will not exceed a speed limit of 15 mph in the ROWs or on unpaved roads within sensitive land cover types.
AMM 5	Trash dumping, firearms, open fires (such as barbecues) not required by the O&M activity, hunting, and pets (except for safety in remote locations) will be prohibited in O&M work activity sites.
AMM 6	No vehicles will be refueled within 100 feet of a wetland, stream, or other waterway unless a bermed and lined refueling area is constructed.
AMM 7	During any reconstruction of existing overhead electric facilities in areas with a high risk of wildlife electrocution (e.g., nut/fruit orchards, riparian corridors, areas along canal or creek banks, PG&E's raptor concentration zone [RCZ]), PG&E will use insulated jumper wires and bird/animal guards for equipment insulator bushings or will construct lines to conform to the latest revision of PG&E's Bird and Wildlife Protection Standards.
AMM 8	During fire season in designated State Responsibility Areas (SRAs), all motorized equipment will have federal or state approved spark arrestors; a backpack pump filled with water and a shovel will be carried on all vehicles; and fire-resistant mats and/or windscreens will be used when welding. In addition, during "red flag" conditions as determined by CDF, welding will be curtailed, each fuel truck will carry a large fire extinguisher with a minimum rating of 40 B:C, and all equipment parking and storage areas will be cleared of all flammable materials.
AMM 9	Erosion control measures will be implemented where necessary to reduce erosion and sedimentation in wetlands and habitat occupied by covered animal and plant species when O&M activities are the source of potential erosion problems.
AMM 10	If an activity disturbs more than 0.25 acre in previously undisturbed natural vegetation, and the landowner approves or it is within PG&E rights and standard practices, the area should be returned to pre-existing conditions and broadcast seeded using a commercial seed mix. Seed mixtures/straw used for erosion control within sensitive land-cover types will be certified weed-free.
AMM 11	When routine O&M activities are conducted in an area of potential VELB habitat, a qualified individual will survey for the presence of elderberry plants within a minimum of 20 feet from the work site. If elderberry plants have one or more stems measuring 1 inch or more in diameter at ground level, the qualified individual will flag those areas to avoid or minimize potential impacts on elderberry plants. If impacts (pruning/trimming, removal, ground disturbance or damage) are unavoidable or occur, then additional measures identified in the VELB conservation plan and compliance brochure will be implemented. The VELB compliance brochure must be carried in all vehicles performing O&M activities within the potential range of VELB.
AMM 12	If a covered plant species is present, a qualified biologist will stake and flag exclusion zones of the maximum practicable distance up to 100 feet around individuals of the covered species prior to O&M activities.* (Note: AMM 12 addresses elderberry plants and Valley elderberry longhorn beetle [VELB].)
AMM 13	If a covered annual plant species is present, O&M activities will occur after plant senescence and prior to the first significant rain to the extent practicable.

Code	Avoidance and Minimization Measure
AMM 14	If a covered plant species is present, the upper 4 inches of topsoil will be stockpiled separately during excavations. When this topsoil is replaced, compaction will be minimized to the extent consistent with utility standards.
AMM 15	If vernal pools are present, a qualified biologist will stake and flag an exclusion zone prior to O&M activities. The exclusion zone will encompass the maximum practicable distance from the worksite up to 100 feet where pools are upslope from the worksite and 250 feet where the pools are downslope from the worksite.* Work will be avoided after the first significant rain until June 1, or until pools remain dry for 72 hours.
AMM 16	If suitable habitat for giant garter snake or California red-legged frog is present and protocol-level surveys have not been conducted, a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 250 feet around the habitat prior to O&M activities.* Work will be avoided within this zone from October 1 to May 1 for giant garter snake and from the first significant rain to May 1 for California red-legged frog.
AMM 17	If suitable habitat for covered amphibians and reptiles is present and protocol-level surveys have not been conducted, a qualified biologist will conduct preconstruction surveys prior to O&M activities involving excavation. If necessary, barrier fencing will be constructed around the worksite to prevent reentry by the covered amphibians and reptiles. A qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 50 feet around the potentially occupied habitat.* No monofilament plastic will be used for erosion control in the vicinity of listed amphibians and reptiles. Crews will also inspect trenches left open for more than 24 hours for trapped amphibians and reptiles. A qualified biologist will be contacted before trapped amphibians or reptiles (excluding blunt-nosed leopard lizard and limestone salamander) are moved to nearby suitable habitat.
AMM 18	If western burrowing owls are present at the site, a qualified biologist will work with O&M staff to determine whether an exclusion zone of 250 feet can be established. If it cannot, an experienced burrowing owl biologist will develop a site-specific plan (i.e., a plan that considers the type and extent of the proposed activity, the duration and timing of the activity, the sensitivity and habituation of the owls, and the dissimilarity of the proposed activity with background activities) to minimize the potential to affect the reproductive success of the owls.
AMM 19	If a Swainson's hawk nest or white-tailed kite nest is known to be within 0.25 mile of a planned worksite, a qualified biologist will evaluate the effects of the planned O&M activity. If the biologist determines that the activity would significantly disrupt nesting, a buffer and limited operation period (LOP) during the nesting season (March 15–September 15) will be implemented. Evaluations will be performed in consultation with the local DFG representative.
AMM 20	If active potential burrows for San Joaquin antelope squirrel or giant or Tipton kangaroo rat are present, a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 30 feet around the burrows prior to O&M activities at the job site.*
AMM 21	If potentially occupied San Joaquin kit fox dens are present, their disturbance and destruction will be avoided where possible. However, if potentially occupied dens are located within the proposed work area and cannot be avoided during construction, qualified biologists will determine if the dens are occupied. If unoccupied, the qualified biologist will remove these dens by hand excavating them in accordance with USFWS procedures (U.S. Fish and Wildlife Service 1997). Exclusion zones will be implemented following USFWS procedures (U.S. Fish and Wildlife Service 1997) or the latest USFWS procedures. The radius of these zones will follow current standards or will be as follows: Potential Den—50 feet; Known Den—100 feet; Natal or Pupping Den—to be determined on a case-by-case basis in coordination with USFWS and DFG. Pipes will be capped and exit ramps will also be installed in these areas to avoid direct mortality.

Code	Avoidance and Minimization Measure
AMM 22	All vegetation management activities will implement the nest protection program to avoid and minimize effects on Swainson's hawk, white-tailed kite, golden eagle, bald eagle, and other nesting birds. Additionally, trained pre-inspectors will use data from DFG and CNDDB from the past 5 years to determine whether active Swainson's hawk, golden eagle, or bald eagle nests are located near proposed work. If pre-inspectors identify an active nest near a proposed work area, they will prescribe measures to avoid nest abandonment, including working the line another time of year, maintaining a 500-foot setback, or if the line is in need of emergency pruning, contacting the HCP Administrator.
AMM 23	If activities take place at a previously known or current breeding colony of tricolored blackbirds or bank swallows, a qualified biologist will evaluate the site prior to work during the breeding season (April 1–July 31). If an active colony of either species is present, the biologist will stake and flag an exclusion zone of the maximum practicable distance up to 350 feet around the colony prior to O&M activities at the site. Work will be avoided in this zone during April 1–July 31.*
AMM 24	If activities take place in blunt-nosed leopard lizard habitat and outside the road ROW, PG&E staff will identify if burrows are present and if work can avoid burrows. If work cannot avoid the burrows, a qualified biologist will evaluate the site for occupancy and stake and flag an exclusion zone of the maximum practicable distance up to 50 feet around the burrows prior to O&M activities at the job site.*
AMM 25	If activities take place in designated occupied habitat[a] of Buena Vista Lake shrew, a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 100 feet, and PG&E staff will minimize the use of mechanical equipment and the area of ground disturbance.
AMM 26	If activities take place in designated occupied habitat[a] of the riparian brush rabbit, a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 100 feet, and PG&E staff will minimize the use of mechanical equipment and the area of ground disturbance. Work will be avoided during the reproductive period (January 1 to May 31).
AMM 27	If activities take place in designated occupied habitat[a] of the riparian woodrat, a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 100 feet around the habitat, and PG&E staff will minimize the use of mechanical equipment and the area of ground disturbance.
AMM 28	If activities take place in designated occupied habitat[a] of the limestone salamander, a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 100 feet around the habitat, and PG&E staff will minimize the use of mechanical equipment and minimize the area of ground disturbance.
AMM 29	No herbicide will be applied within 100 feet of exclusion zones, except when applied to cut stumps or frilled stems or injected into stems.
AMM 30	Trees being felled in the vicinity of an exclusion zone will be directionally felled away from the zone, where possible. If this is not feasible, the tree will be removed in sections.

* If an exclusion zone cannot extend the specified distance from the habitat, the biologist will stake and flag a restricted activity zone of the maximum practicable distance from the exclusion zone around the habitat. This exclusion zone distance is a guideline that may be modified by a qualified biologist, based on site-specific conditions (including habituation by the species to background disturbance levels). Measures are practicable where physically possible and not conflicting with other regulatory obligations or safety considerations; O&M activities will be prohibited or greatly restricted within restricted activity zones. However, vehicle operation on existing roads and foot travel will be permitted. A qualified biologist will monitor O&M activities near flagged exclusion and restricted activity zones. Within 60 days after O&M activities have been completed at a given worksite, all staking and flagging will be removed.

a *Designated occupied habitat* is defined as all land within 2 miles of a CNDDB occurrence and suitable land within 5 miles of a CNDDB occurrence.

Table 2-10 summarizes the AMMs required for small-disturbance activities and vegetation management, depending on which HCP-covered species are present. Note that AMMs are applied only where screening indicates that they would be effective in preventing take, given site-specific conditions and the nature of the activity in question. Additional AMMs may be required if conditions warrant and they are evaluated as likely to be successful.

AMMs for Activities that Disturb 0.1 Acre or More

For activities that may disturb 0.1 acre or more of natural vegetation, preactivity surveys will be conducted to evaluate the likelihood that a work site is occupied by covered species. If preactivity surveys identify the need for AMMs 12 through 21, a qualified biologist will be brought onsite to conduct additional preconstruction surveys, if necessary; to stake and flag exclusion zones, and in some cases to monitor the activity as well. Preactivity (preconstruction) surveys will be conducted within 30 days of the start of work. Construction monitoring will be required when one or more covered species are known to be present on the site, and where there is some potential for direct mortality even with the AMMs in place.

Preactivity Surveys

Preactivity surveys will be conducted before beginning any medium- or large-disturbance activity (i.e., any activity with the potential to disturb 0.1 acre or more of habitat) in an area of natural vegetation. Table 2-11 lists these activities.

Table 2-11. O&M Activities Requiring Preactivity Surveys

Natural Gas System	Remedial maintenance
	Pipeline valve recoating
	Pipeline valve replacement
	Pipeline cathodic protection
	Pipeline lowering
	Pipeline coating replacement
	Pipeline replacement
	Telecommunication site maintenance
	Pressure limiting station construction
	Pipeline valve installation
	New/replacement pipeline construction
Electric System	Electric line reconductoring
	Electric pole line construction/relocation
	Tower line construction
	Substation expansion

In addition to the medium- and large disturbance activities listed in Table 2-11, preactivity surveys will also be conducted for small disturbance activities (those with the potential to disturb 0.1 acre or less of natural habitat) when

- they occur in ~~"hot zones" (~~wetlands, vernal pools, or other areas of known sensitivity, including designated occupied habitat[23]~~),~~ [24]; or
- biologically susceptible covered species are known to be present.

The specific design of all preactivity surveys will be based on the species that could be present at the site—i.e., the species being surveyed for. However, all surveys will be sufficient to

- document the percentage of the site suitable for wildlife and plant species covered by the HCP,
- quantify the likely habitat loss(es), and
- identify appropriate avoidance and minimization measures.

Table 2-12 summarizes survey procedures for wildlife species other than Valley elderberry longhorn beetle (VELB), which is discussed in Appendix D of the proposed HCP (HCP is included as Appendix B of this EIS/EIR). In most cases, wildlife surveys will be conducted 30 days before work begins to maximize the relevance of survey results to actual conditions when work is in progress. Depending on survey results, AMMs will be recommended as necessary, as discussed above. Construction monitoring may also be identified as a requirement.

All plant surveys will be conducted by a qualified botanist in accordance with accepted methodology. To the extent feasible, plant surveys will be performed during the flowering period, which is the best time for accurate identification (Table 2-13; follows Table 2-12). However, scheduling of some work activities—emergency repairs, for example—is inherently unpredictable, and it is not always possible to conduct plant surveys for these activities during the preferred time window. If surveys cannot be scheduled during the flowering period, PG&E will assume that the effect on covered plants is proportional to the percentage of occupied habitat identified in surveys conducted elsewhere in the plan area during the appropriate seasonal window.

When individuals of a covered plant species are found, occupied habitat will be mapped using a GPS unit, and AMMs will be recommended. If it is not possible to avoid all of the occupied habitat, the area of anticipated disturbance will also be mapped during the survey. In addition, if the landowner provides written

~~[23] *Designated occupied habitat* is defined as all land within 2 miles of a CNDDB occurrence and suitable land within 5 miles of a CNDDB occurrence.~~

[24] *Designated occupied habitat* is defined as all land within 2 miles of a CNDDB occurrence and suitable land within 5 miles of a CNDDB occurrence.

Table 2-10. AMMs for Small-Disturbance Activities, by Species

Species	AMM Trigger	Applicable AMM(s)
Swainson's hawk, white-tailed kite, golden eagle, bald eagle, other nesting birds (fully protected species and species protected by federal Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act)	AMM required for all activities in all locations	AMM 22
Blunt-nosed leopard lizard (fully protected species)	AMM required for all activities in all locations	AMM 24
Buena Vista Lake shrew, riparian brush rabbit, riparian woodrat, limestone salamander (species with small populations and restricted ranges, vulnerable to small disturbances)	AMMs required for all activities in designated occupied habitat[a]	AMM 25, AMM 26, AMM 27, AMM 28
Western burrowing owl, bank swallow, tricolored blackbird, rarer plant species (geographic extent of suitable habitat for species cannot be defined in a predictable manner; preconstruction surveys are thus impracticable)	AMMs required for all activities in areas with known occurrences of the species, based on CNDDB	AMM 18, AMM 19, , AMM 12, AMM 13, AMM 14
"No Take" plant species currently known from less than 10 locations (large-flowered fiddleneck, Bakersfield small-scale, Mariposa pussypaws, tree-anemone, Merced clarkia, Vasek's clarkia, pale-yellow layia, Comanche Point layia, Jared's pepper-grass, Congdon's lewisia, Mariposa lupine, showy madia, Hall's bush mallow, pincushion naverretia, Keck's checkerbloom, Kings gold)	Non-emergency ground-disturbing activities	Prohibited in any habitat known to be occupied by any "No Take" plant species
	All emergency activities	AMM 11, AMM 13, AMM 14

[a] *Designated occupied habitat* is defined as all land within 2 miles of a CNDDB occurrence and suitable land within 5 miles of a CNDDB occurrence.

Common and Scientific Name	Legal Status[1]		Survey Approach[2]	Survey Timing
	Federal	State		
Vernal pool fairy shrimp *Branchinecta lynchi*	T	–	During preactivity surveys, a qualified biologist will determine whether vernal pools are present. If vernal pools are present, the biologist will recommend avoidance and minimization measures (AMMs) (from Table 2-9). Any additional surveys to determine the presence of vernal pool fairy shrimp will be conducted by a biologist having successfully completed USFWS fairy shrimp training. If no surveys are conducted to determine the shrimp's presence, vernal pools will be considered occupied by the species.	No restriction for habitat survey. December 1–March 15[3] for pool surveys for species' presence.
Midvalley fairy shrimp *Branchinecta mesovallensis*	SC	–	During preactivity surveys, a qualified biologist will determine whether vernal pools are present. If vernal pools are present, the biologist will recommend AMMs (from Table 2-9). Any additional surveys to determine the presence of vernal pool fairy shrimp will be conducted by a biologist having successfully completed USFWS fairy shrimp training. If no surveys are conducted to determine the shrimp's presence, vernal pools will be considered occupied by the species.	No restriction for habitat survey; December 1–March 15[3] for pool surveys for species' presence
Vernal pool tadpole shrimp *Lepidurus packardi*	E	–	During preactivity surveys, a qualified biologist will determine whether vernal pools are present. If vernal pools are present, the biologist will recommend AMMs (from Table 2-9). Any additional surveys to determine the presence of vernal pool tadpole shrimp will be conducted by a biologist having successfully completed USFWS tadpole shrimp training. If no surveys are conducted to determine the shrimp's presence, vernal pools will be considered occupied by the species.	No restriction for habitat survey. December 1–March 15[3] for pool surveys for species' presence
California tiger salamander *Ambystoma californiense (=A. tigrinum c.)*	T	SSC	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will conduct a survey to determine whether potential aquatic habitat for California tiger salamander is present at the worksite or on accessible lands within 0.25 miles, and if potentially suitable habitat is present, will recommend AMMs from those listed in Table 4-1. Photodocumentation will be made of any habitat identified. Assessment of aquatic habitat will include recording water depth, vegetation present, other	No restriction for habitat survey.

Common and Scientific Name	Legal Status[1]		Survey Approach[2]	Survey Timing
	Federal	State		
			amphibians observed, connection to other water sources, and observations of any fish and crayfish.	
Limestone salamander *Hydromantes brunus*	SC/T	FP	During preactivity surveys, a qualified biologist will conduct a survey for potential habitat (i.e., limestone rock outcrops and talus) at the worksite, and if potentially suitable habitat is present, will recommend AMMs from those listed in Table 4-1.	No restriction for habitat survey.
California red-legged frog *Rana aurora draytonii*	T	SSC	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search the worksite, and accessible areas within 300 feet of it, for aquatic habitat for California red-legged frog, and if potentially suitable habitat is present, will recommend AMMs from those listed in Table 4-1. Photodocumentation will be made of any habitat identified at the site. Assessment of aquatic habitat will include recording water depth, vegetation (emergent and submergent) present, other amphibians observed, connection to other water sources, and observations of any fish and crayfish.	No restriction for habitat survey.
Blunt-nosed leopard lizard *Gambelia (=Crotaphytus) silus*	E	E/FP	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will walk the worksite looking for burrows. If appropriately sized burrows are located on the project site, additional protocol surveys would be necessary to determine presence/absence of the species. If protocol surveys are not conducted, the habitat will be considered occupied, and the biologist will recommend applicable AMMs from those listed in Table 4-1. Protocol surveys involve systematic searches for active blunt-nosed leopard lizard burrows in all habitat at the worksite and within 30 feet of it. Biologists will conduct burrow searches by systematically walking 30- to 100-foot-wide transects throughout the area. Transect width will be adjusted based on vegetation height and topography.	No restriction for habitat survey. Protocol surveys must be conducted between April 15–June 30 and August 1–September 15; require ambient temperatures between 25°C and 35°C and soil temperatures between 30 and 50°C; and require six separate surveys of the site between 0900 and 1400 hours.

Common and Scientific Name	Legal Status[1]		Survey Approach[2]	Survey Timing
	Federal	State		
			A burrow will be considered active if a blunt-nosed lizard or signs of it are observed at the burrow. Active burrows will be assigned a number and mapped on topographic maps. Active burrows will be flagged in the field with pin flags marked with the burrow number. Information on the size of the burrow, signs of activity, surrounding terrain and land cover type, presence of special habitat features (e.g., washes), and distance to other burrows will be recorded.	
Giant garter snake *Thamnophis gigas*	T	T	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search the worksite, and accessible areas within 250 feet of it, for garter snake habitat in perennial marsh and open water cover types. The biologist will evaluate and record attributes, including water depth, presence of emergent and submergent vegetation, and connection to other water bodies. If potentially suitable habitat is present, the biologist also will recommend AMMs from those listed in Table 4-1.	No restriction for habitat survey.
Swainson's hawk *Buteo swainsoni*	SC	T	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will walk the worksite and an area within 0.25 miles of the worksite, and visually inspect all large trees with binoculars to document the presence or absence of active nests. If a potentially active Swainson's hawk nest is present, the biologist will recommend AMMs from Table 4-1.	March 15–September 15[4]; if the first survey is conducted in April, a second survey in May–July is recommended.
White-tailed kite *Elanus caeruleus*	SC	FP	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will walk the worksite and visually inspect all large trees with binoculars to document the presence or absence of active nests. If a potentially active white-tailed kite nest is present, the biologist will recommend AMMs from Table 4-1.	March 15–August 15[4]; if the first survey is conducted in April, a second survey in May–July is recommended.
Golden eagle *Aquila chrysaetos*	PR	SSC/FP	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will walk the worksite and visually inspect all large trees with binoculars to document the presence or absence of active nests. If a potentially	March–July.

Common and Scientific Name	Legal Status[1]		Survey Approach[2]	Survey Timing
	Federal	State		
			active golden eagle nest is present, the biologist will recommend AMMs from Table 4-1.	
Bald eagle *Haliaeetus leucocephalus*	T/PR	E/FP	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will walk the worksite and visually inspect all large trees with binoculars to document the presence or absence of active nests. If a potentially active bald eagle nest is present, the biologist will recommend AMMs from Table 4-1.	March–June.
Western burrowing owl *Athene cunicularia hypugea*	SC	SSC	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will determine if any burrows are present that have evidence of use by owls (i.e., owls present, pellets, whitewash, or prey remains); The survey will include all accessible habitat within 250 feet of the worksite. If a potentially active western burrowing owl burrow is present, the biologist will recommend AMMs from Table 4-1.	No restriction for habitat survey.
Bank swallow *Riparia riparia*	SC	T	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search the worksite, and accessible areas within 500 feet of it, for habitat and will visually inspect cliff faces to determine whether any swallows and/or swallow burrows are present. If any bank swallows or swallow burrows are present, the biologist will recommend AMMs from Table 4-1.	April 1–July 31.
Tricolored blackbird *Agelaius tricolor*	SC	SSC	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search the worksite for nesting habitat. If potentially suitable habitat is present, the biologist will recommend AMMs from those listed in Table 4-1.	April 1–July 31.[4]
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	E	E	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search all habitat at the worksite, and within 30 feet of it, for kangaroo rat burrows. Biologists will conduct burrow searches by systematically walking 30- to 100-foot-wide transects throughout the area where ground-disturbing activities will	No restriction for habitat survey.

Common and Scientific Name	Legal Status[1]		Survey Approach[2]	Survey Timing
	Federal	State		
			occur. Transect width will be adjusted based on vegetation height and topography. If a potentially active Tipton kangaroo rat burrow is found, and protocol surveys are not conducted, the burrow will be considered active and the biologist will recommend AMMs from Table 4-1. When a burrow or precinct is found, the biologist will measure the diameter of the burrow(s); evaluate the shape of the burrow entrance(s); and note tracks, scat, tail drags, or presence of haystacks at the site. Scat may be collected for later confirmation of species by known experts. All active and potential burrows or precincts will be assigned a number, mapped on topographic maps, and photographed. Burrows or precincts will be flagged in the field with pin flags marked with the burrow or precinct number and the species of kangaroo rat with which the structure is associated. Active and potential borrows or precincts will be distinguished from each other in the field by the pin flag color. Information on the size and number of burrows, signs of activity, surrounding terrain and habitat type, and distance to other burrows or precincts will be recorded.	
Giant kangaroo rat *Dipodomys ingens*	E	E	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search all habitat at the worksite, and within 30 feet of it, for kangaroo rat burrows. Biologists will conduct burrow searches by systematically walking 30- to 100-foot-wide transects throughout the area where ground-disturbing activities will occur. Transect width will be adjusted based on vegetation height and topography. If a potentially active giant kangaroo rat burrow is found, and protocol surveys are not conducted, the burrow will be assumed active and the biologist will recommend AMMs from Table 4-1. When a burrow or precinct is found, the biologist will measure the diameter of the burrow(s); evaluate the shape of the burrow entrance(s); and note tracks, scat, tail drags, or presence of haystacks at the site. Scat may be collected	No restriction for habitat survey.

Common and Scientific Name	Legal Status[1]		Survey Approach[2]	Survey Timing
	Federal	State		
			for later confirmation of species by known experts. All active and potential burrows or precincts will be assigned a number, mapped on topographic maps, and photographed. Burrows or precincts will be flagged in the field with pin flags marked with the burrow or precinct number and the species of kangaroo rat with which the structure is associated. Active and potential borrows or precincts will be distinguished from each other in the field by the pin flag color. Information on the size and number of burrows, signs of activity, surrounding terrain and habitat type, and distance to other burrows or precincts will be recorded.	
Buena Vista Lake shrew *Sorex ornatus relictus*	E	SSC	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search the worksite to determine whether suitable riparian habitat is present. If potentially suitable habitat is present, the biologist also will recommend AMMs from those listed in Table 4-1.	No restriction for habitat survey.
San Joaquin (Nelson's) antelope squirrel *Ammospermophilus nelsoni*	SC	T	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will conduct a single systematic search for San Joaquin antelope squirrel burrows in all suitable habitat at the worksite and within 30 feet of it. The biologist will conduct burrow searches by systematically walking 30- to 100-foot-wide transects throughout the area where ground-disturbing activities will occur. Transect width will be adjusted based on vegetation height and topography. If a potentially active San Joaquin antelope squirrel burrow is found, and protocol surveys are not conducted, the burrow will be considered active and the biologist will recommend AMMs from Table 4-1. When a burrow or precinct is found, the biologist will measure the diameter of the burrow(s); evaluate the shape of the burrow entrance(s); and note tracks, scat, tail drags, or presence of haystacks at the site. Scat may be collected for	No restriction for habitat survey.

Common and Scientific Name	Legal Status[1]		Survey Approach[2]	Survey Timing
	Federal	State		
			later confirmation of species by known experts. All active and potential burrows or precincts will be assigned a number, mapped on topographic maps, and photographed. Burrows or precincts will be flagged in the field with pin flags marked with the burrow or precinct number and the species of kangaroo rat with which the structure is associated. Active and potential borrows or precincts will be distinguished from each other in the field by the pin flag color. Information on the size and number of burrows, signs of activity, surrounding terrain and habitat type, and distance to other burrows or precincts will be recorded.	
Riparian (San Joaquin Valley) woodrat *Neotoma fuscipes riparia*	E	SSC	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search the worksite for riparian vegetation providing woodrat habitat. If potentially suitable habitat is present, the biologist also will recommend AMMs from those listed in Table 4-1	No restriction for habitat survey.
Riparian brush rabbit *Sylvilagus bachmani riparius*	E	E	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search the worksite for riparian vegetation providing brush rabbit habitat. If potentially suitable habitat is present, the biologist also will recommend AMMs from those listed in Table 4-1	No restriction for habitat survey.
San Joaquin kit fox *Vulpes macrotis mutica*	E	T	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search for habitat at the worksite and accessible areas within 250 feet of it. Habitat will be inspected for the presence of potential dens more than 5 inches in diameter. For active dens, in the absence of additional surveys, dens will be considered active and the biologist will recommend AMMs from Table 4-1. Additional surveys to determine San Joaquin kit fox use of a potential den will monitor dens for evidence of San Joaquin kit fox use by placing a tracking medium at the den's entrances for at least three consecutive nights. PG&E will notify USFWS and DFG immediately if a natal	No restriction for habitat survey.

Common and Scientific Name	Legal Status[1]		Survey Approach[2]	Survey Timing
	Federal	State		
			or pupping den is found in the survey area. PG&E will notify USFWS and DFG verbally of the results of preactivity den searches and den excavations within 5 days after these activities are completed and before the start of O&M activities in the area. PG&E will notify USFWS and DFG in writing of the results within 30 days after these activities are completed.	

Notes:

[1] Status explanations:

Federal

E = listed as endangered under the federal Endangered Species Act.
T = listed as threatened under the federal Endangered Species Act.
C = species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list.
SC = species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.
D = delisted under the federal Endangered Species Act.
P = proposed for listing as threatened or endangered under the federal Endangered Species Act.
PR = federally protected under the Bald and Golden Eagle Protection Act.
FS = U.S. Forest Service sensitive species.
– = no status.

State

E = listed as endangered under the California Endangered Species Act.
T = listed as threatened under the California Endangered Species Act.
FP = fully protected under the California Fish and Game Code.
SSC = species of special concern in California.
– = no status.

[2] All surveys will record the percentage of the worksite providing habitat. Vegetation management excluded from these surveys because of limited habitat effects on covered species and BMPs.

[3] Survey should be conducted after soaking rains.

[4] The survey for nests needs to be conducted only if habitat is present at the site and O&M activities are planned during the nesting period. (Survey timing also is based on the nesting period.)

Table 2-13. Timing of Surveys for Covered Plant Species

Species	Survey Season (Flowering Period)
Large-flowered fiddleneck *Amsinckia grandiflora*	April–May
Lesser saltscale *Atriplex minuscula*	May–October
Bakersfield smallscale *Atriplex tularensis*	June–October
Big tarplant *Blepharizonia plumosa* ssp. *plumosa*	July–October
Mariposa pussypaws *Calyptridium pulchellum*	April–August
Tree-anemone *Carpenteria californica*	July
Succulent owl's-clover *Castilleja campestris* ssp. *succulenta*	April–May
California jewelflower *Caulanthus californicus*	February–May
Hoover's spurge *Chamaesyce hooveri*	July–August
Slough thistle *Cirsium crassicaule*	May–August
Mariposa clarkia *Clarkia biloba ssp. australis*	May–July
Merced clarkia *Clarkia lingulata*	May–June
Springville clarkia *Clarkia springvillensis*	May–July
Vasek's clarkia *Clarkia tembloriensis* ssp. *calientensis*	April
Hispid bird's-beak *Cordylanthus mollis* ssp. *hispidus*	June–September
Palmate-bracted bird's-beak *Cordylanthus palmatus*	May–October
Kern mallow *Eremalche parryi* ssp. *kernensis*	March–May
Congdon's woolly sunflower *Eriophyllum congdonii*	May–June
Delta button-celery *Eryngium racemosum*	June–August
Striped adobe-lily *Fritillaria striata*	February–April
Bogg's Lake hedge-hyssop *Gratiola heterosepala*	April–August
Pale-yellow layia *Layia heterotricha*	March–June

Species	Survey Season (Flowering Period)
Comanche Point layia *Layia leucopappa*	March–April
Legenere *Legenere limosa*	April–June
Panoche pepper-grass *Lepidium jaredii* ssp. *album*	March–May
Congdon's lewisia *Lewisia congdonii*	April–June
Mason's lilaeopsis *Lilaeopsis masonii*	April–November
Mariposa lupine *Lupinus citrinus* var. *deflexus*	April–May
Showy madia *Madia radiata*	March–May
Hall's bush mallow *Malacothamnus hallii*	May–September
San Joaquin woollythreads *Monolopia congdonii*	February–May
Pincushion navarretia *Navarretia myersii*	May
Colusa grass *Neostapfia colusana*	May–August
Bakersfield cactus *Opuntia basilaris* var. *treleasei*	Year-round
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	April–September
Hairy Orcutt grass *Orcuttia pilosa*	May–September
Hartweg's golden sunburst *Pseudobahia bahiifolia*	March–April
San Joaquin adobe sunburst *Pseudobahia peirsonii*	March–April
Keck's checkerbloom *Sidalcea keckii*	April–May
Oil neststraw *Stylocline citroleum*	March–April
Greene's tuctoria *Tuctoria greenei*	May–September
Kings gold *Twisselmannia californica*	March

permission to PG&E, a California Native Species Field Survey Form will be completed and submitted to the California Natural Diversity Database (CNDDB).

Compensation

Where impacts cannot be avoided, the HCP provides a systematic process to ensure that they are compensated for in an appropriate manner.

Compensation will be proposed in 5-year increments. As activities occur over the 5-year period subsequent to advanced compensation, PG&E will track actual impact acreages, and any compensation surpluses will be addressed by adjusting the compensation requirement during the subsequent 5-year compensation period. Toward the end of each 5-year period, the amount of available advance compensation will decline. If it appears that the amount of compensation required will exceed the amount remaining in that 5-year increment, PG&E will either purchase the next 5-year increment early, or purchase sufficient compensation so that project compensation stays ahead of impacts. By providing compensation in 5-year increments and purchasing additional compensation lands early if it appears that they will run out of excess compensation, PG&E will stay ahead of project impacts.

There is some uncertainty with respect to actual effects for very limited distribution wildlife and very rare plants. The HCP is written to avoid, minimize, and mitigate effects to all covered species, but pre-activity surveys for the rarest wildlife species (i.e., riparian brush rabbit, Buena Vista lake shrew, riparian woodrat, and limestone salamander) will ultimately determine if there is the potential for an effect and if a particular activity needs to be mitigated; in these instances, ~~mitigation~~ compensation must occur in advance of the impact. Potential effects for the very rare plant species will need to be similarly determined. In instances where the rarest of plants could be affected, substantial efforts will be made to avoid and minimize effects, and if this is not possible, the effects will be mitigated as soon as possible within 2 years of the effect.

The following sections present the compensation ratios that will be used; discuss procedures to determine the area requiring compensation; and present the compensation options available.

Compensation Ratios[25]

Permanent losses of suitable habitat[26] other than wetlands will be compensated at a 3:1 ratio (3 acres created, restored, or conserved for every acre lost), and temporary losses of suitable habitat other than wetlands will be compensated at a ratio of 0.5:1. Permanent and temporary loss of wetlands, including vernal pools, will be compensated at a 3:1 ratio using existing mitigation banks. Temporary effects on agricultural ~~fields~~ lands (including orchards, vineyards, cultivated

[25] The rationale for the proposed compensation ratio is discussed on pages 4-15 and 4-16 of the HCP (see Appendix B of this EIS/EIR).

[26] *Suitable habitat* refers to habitat suitable for one or more of the species covered in the HCP.

croplands, and fallow fields) and developed or ruderal lands ~~are excluded from compensation~~would not be compensated, because such areas offer very low habitat value for most covered species, and are regularly disturbed as a result of agricultural activities, such that the ~~, and the~~ effects of intermittent, short-term O&M activities are expected to be consistent with existing conditions, including agricultural disturbance. Note however that temporary effects on grazed lands (including irrigated pasture)—which are considered grassland habitat rather than agricultural land, as discussed under *Land Cover Types in the Action Area* in Chapter 5 (*Biological Resources*)—will be compensated when suitable habitat for covered species is present.

Determination of Compensation Needs

Compensation—at different ratios, as described above—will be required both for temporary disturbance of habitat and for permanent habitat loss. As a result, it will involve a larger area than the habitat actually lost. Over the long term, the net area of habitat available will increase further, because the majority if not all of the temporary disturbance associated with O&M activities is expected to fully recover within several years.

For activities with the potential to disturb 0.1 acre or more (medium and large disturbance activities) in natural vegetation, habitat losses will be projected based on information collected during the required preactivity surveys. For activities that disturb less than 0.1 acre (small disturbance activities), and for medium disturbance activities that are not preceded by a survey (for example, emergency activities), the total area of disturbance will be calculated based on the typical acreage affected per event and the number of events expected to occur. To estimate the portion of the total disturbed area representing habitat suitable for a particular covered species—i.e., the area of habitat requiring compensation—the total disturbed area will be multiplied by the percentage of disturbed habitat identified as suitable for that species by biologists conducting preactivity surveys for other activities in the same area. The required compensation acreage will then be calculated based on the estimated habitat loss, using the compensation ratios presented in the preceding section.[27]

Compensation Options

Compensation lands must offer habitat characteristics similar to those of the lands disturbed or lost as a result of O&M activities. Depending on the species and habitat requiring compensation, it may be sufficient to provide suitable habitat; in other cases, habitat that is known to be occupied may be required. Selection of compensation lands will be subject to USFWS and DFG approval.

PG&E proposes several approaches to providing appropriate compensation lands:

- purchase of conservation lands,
- purchase of mitigation credits from existing mitigation banks,

[27] This methodology applies for all species except VELB. Losses of VELB habitat will be compensated as described in Appendix D of the proposed HCP (HCP is included as Appendix B of this EIS/EIR).

- establishment of conservation easements on lands currently in PG&E ownership, and
- purchase of conservation easements on non–PG&E lands.

Other options include exploring donations to conservation organizations, and using habitat enhancement as compensation. These approaches may be combined in different ways, but PG&E expects to emphasize purchase of compensation lands, purchase of credits from mitigation banks, and use of existing PG&E lands. The following sections provide additional information on each approach.

Purchase of Conservation Lands. This approach will involve purchase of suitable high-quality land (predominantly native or unimproved grassland) followed by establishment of conservation easements on the lands acquired. PG&E will then work with qualified organizations such as The Nature Conservancy, Wildlands, and the Center for Natural Lands Management to manage the properties.

PG&E is currently developing a checklist itemizing the characteristics of parcels under consideration for conservation purchase, which will be used to facilitate and systematize agency review and approval of conservation purchases. In general, preserve sites will be selected to maximize habitat values, based on the following types of characteristics.

- Proximity to other compensation lands or mitigation banks.
- Proximity to other important habitats such as wetlands, vernal pools, and riparian areas, even if these are not a direct target of compensation efforts.
- Minimal history of past disturbance, or high capacity for restoration/recovery.
- Demonstrated use by covered species, if possible.
- Overall habitat suitability and quality.

PG&E will work with USFWS and DFG to survey, evaluate, and rank potential conservation lands using these criteria.

Purchase of Credits from Existing Mitigation Banks. This approach will entail purchase of available mitigation credits from certified mitigation banks in the action area. In the fall of 2004, PG&E conducted an inventory of existing conservation and mitigation banking opportunities in the San Joaquin Valley. At that time there were 15 mitigation banks with credits available and several additional banks in development. Estimates suggested that sufficient mitigation bank credits would be available in the northern and southern San Joaquin Valley to meet PG&E's needs, but insufficient bank capacity in the central San Joaquin Valley.

Use of Existing PG&E Lands. Five of PG&E's land holdings in the San Joaquin Valley offer potential habitat for covered species, and conservation

easements could be established on these lands. Use of these parcels will be subject to review and approval by USFWS and DFG.

Purchase of Conservation Easements. It may not be feasible to purchase mitigation credits for all of the covered plant species from existing mitigation banks. Furthermore, because of the narrow time window when some of the rare covered species are optimally identifiable in the field, it may not be possible to establish the presence or absence of these species at the time a mitigation parcel is purchased. In such cases, PG&E will work to secure conservation easements from willing landowners. Management plans will be tailored to meet the needs of the landowners together with the biological goals for conservation of the covered species. Purchase of conservation easements will be subject to review and approval by USFWS and DFG.

Conservation Organization Donation. If rare plant compensation cannot be effected through any of the approaches described above, PG&E will donate money to a conservation organization such as The Nature Conservancy, a local land trust, or the U.S. Army Corps of Engineers' Wetland Plant Conservation Program to support acquisition, preservation, and restoration of wetland habitat. The amount of money donated will be based on the extent and severity of the disturbance to the plant population; current land values in the range of the target species; and the anticipated long-term management cost to maintain the parcel. Donations to conservation organizations are expected to be a very small percentage of the total conservation package. Donations will be subject to review and approval by USFWS and DFG, and will be required to occur within 2 years of impacts.

Enhancement as Compensation. Enhancement of covered plant habitat is another compensation tool that may be used if PG&E does not own suitable compensation lands, cannot purchase appropriate lands or mitigation credits, and cannot create a suitable conservation easement. If a covered plant species is identified within a ROW during preactivity surveys, a qualified biologist will identify actions—for example, control of invasive plant species—that would enhance habitat conditions. This will facilitate the use of enhancement as compensation, should it become necessary. In all cases, compensatory enhancement and its contribution to meeting compensation obligations will be subject to USFWS and DFG approval. This compensation approach will be quantified by documenting the density and extent of target species populations before and after enhancement. Specific survey and monitoring design, and the compensation value associated with enhancement, will be subject to advance approval by USFWS and DFG. If this option is selected, enhancement will be required to occur within 2 years of impacts.

Requirements of Master Streambed Alteration Agreement—Proposed Action

The proposed action would include development of a streambed alteration agreement between PG&E and DFG, pursuant to Section 1602 of the California

Fish and Game Code. As identified in Chapter 1 and above, DFG is currently revising the draft agreement to reflect the latest updates to the California Fish and Game Code. However, DFG anticipates that it will be a long-term, program-scale agreement that extends for the lifespan of the proposed HCP and permits. For convenience, this ~~draft~~ EIS/EIR refers to a *master streambed alteration agreement*.

The master streambed alteration agreement is expected to cover all O&M and minor construction activities enabled under the proposed action. Thus, it would cover the variety of operations-, maintenance-, and construction-related activities that take place within the bed, bank, and channel of intermittent and permanent waterways. Some examples include installations that require excavation or trenching in the bed, bank, or channel of a waterway; removal of riparian vegetation; temporary or permanent vehicle crossings; stream diversions; use of rip-rap; and jack and bore operations.

The purpose of the master streambed alteration agreement will be to describe procedures to which PG&E has committed to avoid and minimize the potential effects of O&M and minor construction activities on habitat in watercourses with a defined bed and bank geomorphology, and the fish and wildlife that rely on these resources. As the agreement is developed, it will identify the jurisdictional waters that could be affected under the proposed action, and which are therefore covered by the agreement. The master agreement is envisioned as an "umbrella" document embodying a set of provisions that would be implemented as a condition of working within the bed, bank, or stream of any covered water body. DFG anticipates that it will include a range of provisions and requirements generally similar to the following. Additional types of measures may also be developed for inclusion.

- Vehicle access to rivers, streams, and lakes will be limited to a predetermined ingress and egress corridor on existing roads. New access routes will be limited to the number and width required for safe operation for that location. Vehicle corridors will be flagged. All other natural areas will remain off-limits to vehicles.
- All fill will be limited to the minimal amount necessary to accomplish the activity. Excess material will be removed from the project site and disposed of in a legal manner.
- No native soil may be pushed into the watercourse's high flow channel. If grading of the banks is required, all material will be graded away from the watercourse.
- Grading of the bed and bank will be kept to a minimum to install facilities.
- The bank and streambed will be restored to near original condition as soon as appropriate upon completion of the stream zone activity.
- If the watercourse channel has been altered during the operations, its low flow channel will be returned as nearly as possible to its preactivity state, including its shape and gradient. If necessary, low-flow shape and gradient may be modified in order to maintain low flow.

- Discharge of sediment will be avoided to the maximum extent practicable. In no case will the discharge of sediment result in amounts deleterious to fish.
- If prolonged turbidity may be created, the flow will be diverted around the work area.
- If it is necessary to move equipment across a flowing watercourse, such operations will be conducted without causing a prolonged visible increase in watercourse turbidity. For repeated crossings, a bridge, culvert, or rock-lined crossing will be installed.
- Equipment may be operated in the channel of flowing watercourses only as may be necessary to construct crossings; install palisades; or install grout mats or any other protective structure.
- Temporary diversion structures used to isolate work areas will be constructed in a manner that prevents seepage from the work area. Said structures will be constructed of nonerodible materials. The structures, including any fill or trapped sediments, will be removed when the activity is complete.
- All wet fords will have unarmored portions of the approaches rocked with at least 4 inches compacted depth of rock, or will be paved or otherwise armored from the edge of the watercourse for a minimum of 25 feet, or to the nearest waterbar, to prevent tracking of soil into the crossing.
- Staging areas for equipment, materials, fuels, lubricants, and solvents will be located outside the stream channel and banks and away from all preserved aquatic resources. All stationary equipment—such as motors, pumps, generators, compressors, and welders—that must be within the stream zone will be positioned over drip pans.
- Equipment entering the stream zone will be inspected daily for leaks that could introduce deleterious materials into the watercourse.

A project-specific notification process will likely be set up to ensure that DFG concurs that a proposed activity is covered by the agreement. DFG may also use the notification process to incorporate any additional site-specific measures identified as appropriate.

Alternatives to the Proposed Action

The following sections describe the alternatives to the proposed action, including the No Action Alternative; summarize the process through which alternatives were developed and screened; and briefly describe the alternatives eliminated from further consideration along with the reasons for their dismissal.

NEPA and CEQA Requirements

NEPA and its implementing regulations require that an EIS evaluate a reasonable range of feasible alternatives to the proposed action. Although the No Action Alternative is not the baseline for evaluating environmental effects[28], the EIS must also evaluate the No Action Alternative, to allow decision makers to compare the effects of approving the proposed action with the effects of not approving it. Alternatives must be evaluated in the same level of detail provided for the proposed action (40 CFR 1502.14).

CEQA requires that an EIR consider alternatives that would avoid or reduce one or more of the significant impacts identified for the proposed project. Under the state's CEQA Guidelines, the EIR does not need to consider all possible alternatives; rather, the alternatives considered should be limited to a reasonable range that would meet the project objectives, appear to be feasible, and would avoid or substantially lessen at least one of the project's significant environmental effects. Like NEPA, CEQA requires analysis of the No Project Alternative to allow decision makers to assess the effects of not moving forward with the proposed project. CEQA does not require the alternatives to be evaluated in the same level of detail as the proposed project. However, EIRs are required to include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project or program (CEQA Guidelines Sec. 15126[d], 15126.6[a], 15126.6[f]).

Approach to Developing Alternatives

Take of special-status species may occur as a result of PG&E's ongoing O&M activities in the San Joaquin Valley. Under the federal and state Endangered Species Acts, PG&E must ensure that if take of state- or federally listed species occurs as a consequence of any of its activities, such take is minimized to the extent feasible and is fully compensated for by appropriate mitigation measures—and hence, that take will not endanger the long-term viability of any listed species or its habitat. This is the core of the purpose and need identified for the proposed action: to provide for the long-term conservation of threatened and endangered species and their habitats while allowing PG&E to continue a program of essential O&M activities that enable reliable delivery of natural gas and electricity service, as required by the company's CPUC mandate.

Consistent with the identified purpose and need, alternatives development focused on alternate strategies to ensure conservation of special-status species with the potential to be affected by the O&M program. Primary screening addressed conservation efficacy. Secondary screening addressed feasibility. Following are the screening criteria used to select approaches for EIS/EIR analysis; only alternatives meeting all three criteria were advanced.

[28] The baseline for impact analysis is defined as environmental conditions at the time the NOI/NOP was published.

1. The alternative would provide for the long-term conservation of threatened and endangered species with the potential to be affected by the O&M program.
2. The alternative has the potential to be feasibly implemented.
3. The alternative would support an effective and fiscally responsible O&M program.

Alternatives Analyzed in this EIS/EIR

In addition to the proposed action, this EIS/EIR analyzes the following "action" alternatives.

- Alternative 1—HCP with Reduced Take.
- Alternative 2—HCP with Enhanced Compensation.
- Alternative 3—HCP with Reduced Number of Covered Species.

As required by both NEPA and CEQA, this EIS/EIR also analyzes the No Action Alternative. Table 2-14 presents a summary comparison of the proposed action and alternatives.

Additional alternatives considered during the screening process but not carried forward for detailed EIS/EIR analysis are discussed in *Alternatives Eliminated from Further Consideration* below.

Alternative 1—HCP with Reduced Take

Description of Alternative 1

Like the proposed action, Alternative 1 would entail development of an HCP (referred to here as the Alternative 1 HCP) to support applications for federal and state permits and a master streambed alteration agreement.

As discussed above, USFWS has full discretionary authority over the issuance of Section 10 permits, and, having consulted with PG&E and reviewed the Alternative 1 HCP, could choose not to approve it, in which case no Section 10 permit would be issued. Similarly, following its review, DFG could elect to deny a state take permit and/or streambed alteration agreement. In order to fully analyze the potential environmental outcomes of Alternative 1, this EIS/EIR assumes that the Alternative 1 HCP would be approved, federal and state take permits would be issued, and a master streambed alteration agreement would be enacted. Based on these assumptions, Alternative 1 would include the following components.

Table 2-14. Comparison of Key Features, Proposed Action and Alternatives

	Proposed Action	Alternative 1—HCP with Reduced Take	Alternative 2—HCP with Enhanced Compensation	Alternative 3—HCP with Reduced Number of Covered Species	No Action
Components					
Federal	■ Approval of HCP and HCP implementation agreement ■ Issuance of Section 10 incidental take permit	■ Approval of HCP and HCP implementation agreement; AMMs applied more comprehensively than under proposed action ■ Issuance of Section 10 incidental take permit	■ Approval of HCP and HCP implementation agreement; compensation ratios higher than for proposed action ■ Issuance of Section 10 incidental take permit	■ Approval of HCP and HCP implementation agreement; fewer species covered than under proposed action ■ Issuance of Section 10 incidental take permit	None
State	■ Issuance of Section 2081 incidental take permit ■ Entry into master streambed alteration agreement with PG&E	■ Issuance of Section 2081 incidental take permit ■ Entry into master streambed alteration agreement with PG&E	■ Issuance of Section 2081 incidental take permit ■ Entry into master streambed alteration agreement with PG&E	■ Issuance of Section 2081 incidental take permit ■ Entry into master streambed alteration agreement with PG&E	None
Conservation Approach					
Small Disturbance Activities	■ PG&E's existing environmental programs and commitments apply. ■ Preactivity surveys required in a few cases, based on potential for take and species' biological susceptibility. ■ General AMMs required. Additional species-specific AMMs may be required in some cases. ■ Compensation required.	■ PG&E's existing environmental programs and commitments apply. ■ Preactivity surveys consistently required. ■ General and additional, more comprehensive AMMs required. ■ Compensation required. Triggers and ratios same as for proposed action.	■ PG&E's existing environmental programs and commitments apply. ■ Preactivity surveys and AMMs same as for proposed action. ■ Compensation at enhanced ratios required. Triggers same as for proposed action.	■ PG&E's existing environmental programs and commitments apply. ■ Preactivity surveys and AMMs essentially same as for proposed action, except fewer species covered. ■ Compensation required. Triggers and ratios same as for proposed action, but overall requirement less than proposed action because fewer species covered.	*Issues related to threatened and endangered species would be addressed on a case-by-case basis. Integrated, regionwide conservation planning would not be undertaken.*
Medium Disturbance Activities	■ PG&E's existing environmental programs and commitments apply. ■ Preactivity surveys required. ■ General AMMs and additional, more comprehensive AMMs required. ■ Compensation required.	■ PG&E's existing environmental programs and commitments apply. ■ Preactivity surveys required. ■ General AMMs and additional, more comprehensive AMMs required. ■ Compensation required. Triggers and ratios same as for proposed action.	■ PG&E's existing environmental programs and commitments apply. ■ Preactivity surveys and AMMs same as for proposed action. ■ Compensation at enhanced ratios required. Triggers same as for proposed action.	■ PG&E's existing environmental programs and commitments apply. ■ Preactivity surveys and AMMs essentially same as for proposed action except fewer species covered. ■ Compensation required. Triggers and ratios same as for proposed action, but overall requirement less than proposed	

	Proposed Action	Alternative 1—HCP with Reduced Take	Alternative 2—HCP with Enhanced Compensation	Alternative 3—HCP with Reduced Number of Covered Species	No Action
				action because fewer species covered.	
Large Disturbance Activities	■ PG&E's existing environmental programs and commitments apply. ■ Preactivity surveys required. ■ General AMMs and additional, more comprehensive AMMs required. ■ Compensation required.	■ PG&E's existing environmental programs and commitments apply. ■ Preactivity surveys required. ■ General AMMs and additional, more comprehensive AMMs required. ■ Compensation required. Triggers and ratios same as for proposed action.	■ PG&E's existing environmental programs and commitments apply. ■ Preactivity surveys and AMMs same as for proposed action. ■ Compensation at enhanced ratios required. Triggers same as for proposed action.	■ PG&E's existing environmental programs and commitments apply. ■ Preactivity surveys and AMMs essentially same as for proposed action except fewer species covered. ■ Compensation required. Triggers and ratios same as for proposed action, but overall requirement less than proposed action because fewer species covered.	
Other Disturbance Activities	■ PG&E's existing environmental programs and commitments apply. ■ No preactivity surveys required. ■ General AMMs required. ■ No compensation necessary.	Same as for proposed action.	Same as for proposed action.	Same as for proposed action.	

Definitions of Disturbance Levels:

Small Disturbance—Activity disturbs less than 0.1 acre per event and has a very low potential to result in adverse effects on habitat, or would result in very limited adverse effects. Includes vegetation management activities, which disturb habitat by removing or reducing vegetation, but do not result in ground disturbance.

Medium Disturbance—Activity disturbs 0.1–0.5 acre per event, on average, and could result in minor or greater adverse effects on habitat.

Large Disturbance—Activity disturbs more than 0.5 acre per event and has the potential for greater adverse effects on habitat.

Other Disturbance—Activity does not result in habitat loss.

- Federal components:
  - approval of Alternative 1 HCP and implementation agreement,
  - issuance of incidental take permit.
- State components:
  - issuance of Section 2081 incidental take permit,
  - entry into master streambed alteration agreement with PG&E.

As with the proposed action, approval of the Alternative 1 HCP, issuance of federal and state take permits, and adoption of the streambed alteration agreement would enable PG&E to continue its San Joaquin Valley O&M program, including all current BMPs, methods, and techniques. PG&E would also be committed to new environmental measures and protections enacted under the HCP; differences in these measures are the key distinction between the proposed action and Alternative 1—HCP with Reduced Take.

Activities Analyzed Under Alternative 1

Ongoing Operations and Maintenance Activities

PG&E's program of O&M and minor construction activities would be the same under Alternative 1 as that described above for the proposed action. In addition, as described for the proposed action, all of PG&E's standard methods, techniques, and procedures, including existing environmental programs and practices and BMPs, would continue to apply.

Environmental Commitments Enacted by Alternative 1 HCP—Provisions for Reduced Take

Like the proposed action, Alternative 1 would enact new environmental commitments. The conservation strategy embodied by the Alternative 1 HCP would be very similar to that described above for the proposed HCP, incorporating measures to avoid and minimize impacts; preactivity surveys to assess the potential level and nature of impact resulting from O&M activities, where warranted; and compensation for impacts that cannot be avoided. As with the proposed action, compensation would represent a last resort—the Alternative 1 HCP's conservation approach would emphasize the need to avoid and minimize impacts to the fullest extent possible.

The AMMs implemented under Alternative 1 would be the same as those described above for the proposed HCP, but they would be implemented more comprehensively. As with the proposed action, all activities except those in the "other disturbance" category would be required to implement AMMs 1–11. However, where the proposed HCP requires additional, comprehensive AMMs (AMMs 12–21 and 22–30) for certain activities in the small disturbance effect category and for all activities in the moderate and large disturbance categories, the Alternative 1 HCP would require their application for all small, moderate, and large disturbance activities, as summarized in Table 2-15. This additional

level of stringency, intended to reduce take below the level anticipated with the proposed action, is the key distinction between Alternative 1 and the proposed action.

Table 2-15. Level of Effect and Conservation Approach—Alternative 1

Level of Effect	Definition	Conservation Approach Under Alternative 1
Small disturbance	Activity disturbs less than 0.1 acre per event and has a very low potential to result in adverse effects on habitat, or would result in very limited adverse effects. Includes vegetation management activities, which disturb habitat by removing or reducing vegetation, but do not result in ground disturbance.	PG&E's existing environmental programs and commitments apply. Preactivity surveys required. General AMMs required. Additional, more comprehensive AMMs required. Compensation required.
Medium disturbance	Activity disturbs 0.1–0.5 acre per event on average, and could result in minor or greater adverse effects on habitat.	PG&E's existing environmental programs and commitments apply. Preactivity surveys required. General AMMs required. Additional, more comprehensive AMMs required. Compensation required.
Large disturbance	Activity disturbs more than 0.5 acre per event and has the potential for greater adverse effects on habitat.	PG&E's existing environmental programs and commitments apply. Preactivity surveys required. General AMMs required. Additional, more comprehensive AMMs required. Compensation required.
Other disturbance	Activity does not result in habitat loss.	PG&E's existing environmental programs and commitments apply. No preactivity surveys required. Some AMMs required. No compensation required.

Master Streambed Alteration Agreement—Alternative 1

Like the proposed action, Alternative 1 would include development of a master streambed alteration agreement between PG&E and DFG, pursuant to Section 1602 of the California Fish and Game Code. The purpose of this agreement would be to describe procedures to which PG&E has committed to avoid and minimize the potential effects of O&M and minor construction activities on habitat in watercourses with a defined bed and bank geomorphology. DFG anticipates that the streambed alteration agreement under Alternative 1 would include provisions and requirements similar to those discussed above for the proposed action.

Alternative 2—HCP with Enhanced Compensation

Description of Alternative 2

Like the proposed action, Alternative 2 would entail development of an HCP (referred to here as the Alternative 2 HCP) to support applications for federal and state permits and a master streambed alteration agreement.

As discussed above, USFWS has full discretionary authority over the issuance of Section 10 permits, and, having consulted with PG&E and reviewed the Alternative 2 HCP, could choose not to approve it, in which case no Section 10 permit would be issued. Similarly, following its review, DFG could elect to deny a state take permit and/or streambed alteration agreement. In order to fully analyze the potential environmental outcomes of Alternative 2, this EIS/EIR assumes that the Alternative 2 HCP would be approved, federal and state take permits would be issued, and a master streambed alteration agreement would be enacted. Based on these assumptions, Alternative 2 would include the following components.

- Federal components:
  - approval of Alternative 2 HCP and implementation agreement,
  - Section 10 consultation and issuance of incidental take permit.
- State components:
  - issuance of Section 2081 incidental take permit,
  - entry into master streambed alteration agreement with PG&E.

As with the proposed action, approval of the Alternative 2 HCP and implementation agreement, issuance of federal and state take permits, and adoption of the streambed alteration agreement would enable PG&E to continue its San Joaquin Valley O&M program, including all current BMPs, methods, and techniques. PG&E would also be committed to new environmental measures and protections enacted under the HCP; differences in these measures, and specifically in requirements for compensation, are the key distinction between the proposed action and Alternative 2—HCP with Enhanced Compensation.

Activities Analyzed Under Alternative 2

Ongoing Operations and Maintenance Activities

PG&E's program of O&M and minor construction activities would be the same under Alternative 2 as that described above for the proposed action. In addition, as described for the proposed action, all of PG&E's standard methods, techniques, and procedures, including existing environmental programs and practices and BMPs, would continue to apply.

Environmental Commitments Enacted by Alternative 2 HCP—Provisions for Enhanced Compensation

Like the proposed action and Alternative 1, Alternative 2 would enact new environmental commitments. The conservation strategy embodied by the Alternative 2 HCP would be similar to that described above for the proposed HCP, incorporating measures to avoid and minimize impacts; preactivity surveys to assess the potential level and nature of impact resulting from O&M activities, where warranted; and compensation for impacts that cannot be avoided. As with the proposed action, compensation would represent a last resort—the Alternative 2 HCP's conservation approach would emphasize the need to avoid and minimize impacts to the fullest extent possible.

The AMMs implemented under Alternative 2 would be the same as those described above for the proposed HCP, and would be implemented in essentially the same way, as summarized in Table 2-16. The key distinction between Alternative 2 and the proposed action is that Alternative 2 would provide enhanced compensation for impacts that cannot be avoided.

Table 2-16. Level of Effect and Conservation Approach—Alternative 2

Level of Effect	Definition	Conservation Approach Under Alternative 2
Small disturbance	Activity disturbs less than 0.1 acre per event and has a very low potential to result in adverse effects on habitat, or would result in very limited adverse effects. Includes vegetation management activities, which disturb habitat by removing or reducing vegetation, but do not result in ground disturbance.	PG&E's existing environmental programs and commitments apply. Preactivity surveys required in a few cases. General AMMs required. Additional species-specific AMMs may be required in some cases. Compensation at enhanced ratios required. Triggers same as for proposed action.
Medium disturbance	Activity disturbs 0.1–0.5 acre per event and could result in minor or greater adverse effects on habitat.	PG&E's existing environmental programs and commitments apply. Preactivity surveys required. General AMMs required. Additional, more comprehensive AMMs required. Compensation at enhanced ratios required. Triggers same as for proposed action.
Large disturbance	Activity disturbs more than 0.5 acre per event and has the potential for greater adverse effects on habitat.	PG&E's existing environmental programs and commitments apply. Preactivity surveys required. General AMMs required. Additional, more comprehensive AMMs required. Compensation at enhanced ratios required. Triggers same as for proposed action.
Other disturbance	Activity does not result in habitat loss.	PG&E's existing environmental programs and commitments apply. No preactivity surveys required.

Level of Effect	Definition	Conservation Approach Under Alternative 2
		General AMMs required. No compensation required.

As with the proposed action, the Alternative 2 HCP would require that PG&E propose compensation in advance 5-year increments, in order to ensure that compensation outpaces impacts. As activities occur over the 5-year period subsequent to advanced compensation, PG&E would track actual impact acreages. Any compensation surpluses would be addressed by adjusting the compensation requirement during the subsequent 5-year compensation period, and if it appears that the amount of compensation required would exceed the amount remaining in that 5-year increment, PG&E would either purchase the next 5-year increment early, or purchase sufficient compensation so that project compensation stays ahead of impacts. By providing compensation in 5-year increments and purchasing additional compensation lands early if it appears that they will run out of excess compensation, PG&E will stay ahead of project impacts.

As described for the proposed HCP, there is some uncertainty with respect to actual effects for very limited distribution wildlife and very rare plants. Like the proposed HCP, the Alternative 2 HCP would be written to avoid, minimize, and mitigate effects on all covered species, but pre-activity surveys for the rarest wildlife species (i.e., riparian brush rabbit, Buena Vista lake shrew, riparian woodrat, and limestone salamander) would ultimately determine the potential for an effect and whether a particular activity needs to be mitigated; in these instances, ~~mitigation~~ compensation would be required to occur in advance of the impact. Potential effects for the very rare plant species would need to be similarly determined. In instances where the rarest of plants could be affected, substantial efforts will be made to avoid and minimize effects, and if this is not possible, the effects would be mitigated as soon as possible within 2 years of the effect, as under the proposed HCP.

The following sections present the compensation ratios that would be used in the Alternative 2 HCP; discuss procedures to determine the area requiring compensation; and summarize the compensation options available under Alternative 2.

Compensation Ratios—Alternative 2

Under Alternative 2, both permanent and temporary losses of suitable habitat would be compensated at a 3:1 ratio, with 3 acres created or restored for every acre lost. Loss of wetlands, including vernal pools, would be compensated at a 3:1 ratio (3 acres restored or created for each acre directly affected) if compensation is accomplished through an existing mitigation bank, and at a 6:1 ratio (3 acres preserved and 3 acres created for each acre affected) if compensation takes place outside existing banks. Temporary effects on agricultural fields and developed or ruderal lands would ~~be excluded~~not be compensated ~~from compensation~~ under Alternative 2, as under the proposed

action, because such areas are regularly disturbed and the effects of O&M activities are expected to be consistent with existing conditions.

Determination of Compensation Needs—Alternative 2

Because compensation would be required both for temporary disturbance of habitat and for permanent habitat loss, ~~mitigation~~ compensation for O&M effects would typically involve a larger area than the habitat actually lost.[29]

The same process would be used to identify compensation needs under Alternative 2 as under the proposed action. For activities with the potential to disturb 0.1 acre or more, anticipated habitat losses would be calculated based on the results of preactivity surveys. For small disturbance activities, habitat losses would be estimated based on typical acreages affected per event, and the number of events expected to occur. The compensation need would then be identified based on the anticipated habitat loss and the compensation ratios presented in the preceding section, except for losses of VELB habitat, which are addressed in Appendix D of the proposed HCP (HCP is included as Appendix B of this EIS/EIR).

Compensation Options—Alternative 2

Desired characteristics of compensation lands would be the same under Alternative 2 as those presented for the proposed action. To qualify as compensation lands, a parcel would be required to offer habitat similar to the lands disturbed or lost as a result of O&M activities. Depending on the species and habitat requiring compensation, it might be sufficient to provide suitable habitat, but in other cases, habitat known to be occupied would likely be required. In all cases, selection of compensation lands would be subject to USFWS and DFG approval.

Several approaches are available for providing the compensation required under Alternative 2. These include

- purchasing lands for ~~mitigation~~ compensation use,
- purchasing mitigation credits from existing mitigation banks,
- using lands currently in PG&E ownership, and
- purchasing conservation easements; as well as
- making donations to conservation organizations, or using habitat enhancement as compensation.

Details of each approach would be the same as the descriptions provided above for the proposed action.

[29] As described above, compensation acreage would exceed the actual acreage of impact under the proposed HCP as well, but the margin of exceedance would be greater under Alternative 2 because of this alternative's enhanced compensation ratios.

The approaches could be combined in a variety of ways. Compensation is expected to emphasize purchase of compensation lands, purchase of credits from mitigation banks, and use of existing PG&E lands, but a broader palette of approaches could be necessary for some activities because of the increased compensation requirements that would be enacted under Alternative 2.

Master Streambed Alteration Agreement—Alternative 2

Like the proposed action, Alternative 2 would include development of a master streambed alteration agreement between PG&E and DFG, pursuant to Section 1602 of the California Fish and Game Code. The purpose of this agreement would be to describe procedures to which PG&E has committed to avoid and minimize the potential effects of O&M and minor construction activities on habitat in watercourses with a defined bed and bank geomorphology. DFG anticipates that the streambed alteration agreement under Alternative 2 would include provisions and requirements similar to those discussed above for the proposed action.

Alternative 3—HCP with Reduced Number of Covered Species

Description of Alternative 3

Like the proposed action and the other action alternatives, Alternative 3 would entail development of an HCP (referred to here as the Alternative 3 HCP) to support applications for federal and state permits and a master streambed alteration agreement.

As discussed above, USFWS has full discretionary authority over the issuance of Section 10 permits, and, having consulted with PG&E and reviewed the HCP, could choose not to approve it, in which case no Section 10 permit would be issued. Similarly, following its review, DFG could elect to deny a state take permit and/or streambed alteration agreement. In order to fully analyze the potential environmental outcomes of Alternative 3, this EIS/EIR assumes that the Alternative 3 HCP would be approved, federal and state take permits would be issued, and a master streambed alteration agreement would be enacted. Based on these assumptions, Alternative 3 would include the following components.

- Federal components:
  - approval of Alternative 3 HCP and implementation agreement,
  - issuance of incidental take permit.
- State components:
  - issuance of Section 2081 incidental take permit,
  - entry into master streambed alteration agreement with PG&E.

As with the proposed action, approval of the Alternative 3 HCP and implementation agreement, issuance of federal and state take permits, and adoption of the streambed alteration agreement would enable PG&E to continue its San Joaquin Valley O&M program, including all current BMPs, methods, and techniques. PG&E would also be committed to new environmental measures and protections enacted under the HCP. The principal difference between Alternative 3 and the proposed action is that the Alternative 3 HCP would cover fewer species than the proposed HCP, focusing on those identified as most likely to be affected by O&M–related take. If the need arose, potential take of other species would be addressed on a case-by-case basis.

The Alternative 3 HCP would cover 13 wildlife species and 31 species of plants, listed in Table 2-17. All of these species meet 2 criteria:

- they are listed under either the federal Endangered Species Act (ESA) or California Endangered Species Act (CESA), or both; and
- more than 2 acres of the species' habitat is likely to be disturbed by O&M activities each year.

Table 2-17. Species Covered by San Joaquin Valley O&M Habitat Conservation Plan—Alternative 3

Wildlife	Plants	
Valley elderberry longhorn beetle	Large-flowered fiddleneck	Congdon's woolly sunflower
California tiger salamander	Lesser saltscale	Delta button-celery
Limestone salamander	Bakersfield smallscale	Striped adobe-lily
Blunt-nosed leopard lizard	Big tarplant	Pale-yellow layia
Swainson's hawk	Mariposa pussypaws	Comanche Point layia
White-tailed kite	Succulent owl's-clover	Legenere
Golden eagle	California jewelflower	Mason's lilaeopsis
Bald eagle	Hoover's spurge	Mariposa lupine
California black rail	Slough thistle	Showy madia
Western burrowing owl	Mariposa clarkia	San Joaquin woollythreads
Giant kangaroo rat	Merced clarkia	Colusa grass
San Joaquin (Nelson's) antelope squirrel	Springville clarkia	Bakersfield cactus
San Joaquin kit fox	Hispid bird's-beak	San Joaquin Valley Orcutt grass
	Palmate-bracted bird's-beak	Hartweg's golden sunburst
	Kern mallow	San Joaquin adobe sunburst

The following species covered under the proposed HCP would not be covered under the Alternative 3 HCP: the vernal pool crustaceans, limestone salamander, California red-legged frog, giant garter snake, bank swallow, tricolored blackbird, Buena Vista Lake shrew, riparian brush rabbit, riparian woodrat,

Tipton kangaroo rat, and some 11 plant species. All other species covered under the proposed HCP (see Table 2-6) would be covered under Alternative 3.

Activities Analyzed Under Alternative 3

Ongoing Operations and Maintenance Activities

PG&E's program of O&M and minor construction activities would be the same under Alternative 3 as that described above for the proposed action. In addition, as described for the proposed action, all of PG&E's standard methods, techniques, and procedures, including existing environmental programs and practices and BMPs, would continue.

Environmental Commitments Enacted by Alternative 3 HCP

Except for commitments specific to species not covered under Alternative 3, the Alternative 3 HCP would enact the same environmental commitments as the proposed action. Environmental commitments would be triggered and implemented as described above for the proposed action.

Master Streambed Alteration Agreement—Alternative 3

Like the proposed action, Alternative 3 would include development of a master streambed alteration agreement between PG&E and DFG, pursuant to Section 1602 of the California Fish and Game Code. The purpose of this agreement would be to describe procedures to which PG&E has committed to avoid and minimize the potential effects of O&M and minor construction activities on habitat in watercourses with a defined bed and bank geomorphology. DFG anticipates that the streambed alteration agreement under Alternative 3 would include provisions and requirements similar to those discussed above for the proposed action.

Alternative 4—No Action/No Project

Description of No Action Alternative

Under the No Action Alternative, PG&E would continue to operate and maintain its natural gas and electricity facilities under the current scenario. No regional, programwide HCP would be developed for the San Joaquin Valley O&M program, and PG&E would not seek "umbrella" regional take permits from USFWS and DFG or a master streambed alteration agreement from DFG. Instead, PG&E would continue to address threatened and endangered species issues by consulting with USFWS and DFG and undertaking conservation planning and permit applications on a case-by-case basis.

Activities Analyzed Under No Action Alternative

Under the No Action Alternative, PG&E would move forward with the same program of O&M activities described for the proposed action, including all standard methods, techniques, programs, practices, and BMPs. As identified above, case-by-case consultation with USFWS and DFG would likely be required for many activities, and permit applications for individual activities or series of activities would require development of conservation plans. However, it is not possible to predict the outcomes of conservation planning, consultation, or permit applications at this time without circumventing the review and evaluation process mandated by the federal and state Endangered Species Acts and the California Fish and Game Code; although these processes would likely result in additional avoidance and mitigation measures applied to some activities, such measures cannot be identified at this time. Consequently, this EIS/EIR considers only the O&M activities described above in analyzing the impacts of the No Action Alternative. Additional NEPA and CEQA environmental review would likely be required in the event that federal or state permits are issued for future O&M activities under the No Action Alternative.

Alternatives Eliminated from Further Consideration

The alternatives development process pursued a variety of avenues to meet the identified purpose and need of providing for conservation of potentially affected species while supporting an effective and fiscally responsible O&M program. Alternatives considered during the screening process and eliminated from further detailed analysis in this EIS/EIR include: changing O&M practices; participating in existing HCPs; relying on compensation alone (implementing no AMMs); and providing temporary (short-term) compensation for recoverable effects. The following sections describe each approach and present the reasons for its dismissal.

Changed Practices

This approach was based on the idea that PG&E might be able to modify its O&M program sufficiently that it would not result in take, while still enabling efficient, cost-effective, and reliable natural gas and electric service. Various types of modifications were considered and ultimately eliminated from detailed analysis, including

- eliminating some activities from the program,
- modifying some activities,
- seasonally restricting some or all activities,
- conducting preactivity surveys for all activities, and
- conducting preactivity surveys for most activities.

Eliminating some activities from the program was evaluated as infeasible because most of the activities in the program are mandated by FERC or CPUC for public safety and system reliability. Specific activities could be omitted from any permit obtained, but these activities would still require case-by-case consultation with the resource agencies. PG&E also determined that eliminating some activities—either from the program or from permit coverage—had the potential to reduce the program's efficacy and/or conflict with regulatory requirements.

Modifying activities to minimize their effects on special-status species was also evaluated as infeasible. The program consists of activities identified as necessary to provide the level of service and safety required by FERC and CPUC regulations, and PG&E concluded that most program activities could not be modified sufficiently to eliminate the potential for take while still maintaining an acceptable level of effectiveness. Legal constraints also specifically limit PG&E's ability to modify some activities.

Seasonally restricting activities was evaluated as logistically and economically prohibitive. Narrowing the O&M working window enough to eliminate the potential for take would reduce it to several months per year, which would substantially hamper the company's ability to respond to system emergencies and could compromise the safety and reliability of natural gas and electric service. Such a restriction could also result in the underutilization of a large number of PG&E employees, which would have economic implications not just for the company but also for the communities where these workers reside. In some cases, the feasibility of seasonal restrictions is further limited by legal requirements.

Finally, **conducting preactivity surveys** for all or most of the program activities was evaluated as infeasible for financial reasons. Conducting preactivity surveys for all O&M activities would increase costs by at least an order of magnitude as compared with implementing an HCP, with corollary implications for PG&E ratepayers and their communities. In addition, an expanded program of preactivity surveys by itself would not appreciably reduce effects on special-status species—to reduce take effectively, preactivity surveys must be coupled with AMMs.

Participate in Existing San Joaquin Valley HCPs

In recent years, a number of local governments in the San Joaquin Valley area have been working to develop comprehensive habitat and multi-species conservation plans within the boundaries of their respective jurisdictions. PG&E considered participating in some or all of these existing plans as a means of meeting ESA and CESA requirements regarding take of listed species. However, although these plans provide for the protection and conservation of wildlife habitat and sensitive plant species, they generally address municipal concerns related to permanent loss of habitat as a result of development. By contrast, PG&E's facilities span many local government jurisdictions, and although it

leads to some permanent loss of habitat, the company's O&M program results primarily in temporary, recoverable habitat disturbance and unavailability. Consequently, the strategies appropriate for existing municipal conservation plans fail to provide a "best fit" for PG&E's O&M program. Moreover, PG&E operates—and is regulated—at a statewide scale; compliance with numerous local conservation plans could result in inconsistent policies and practices across the company.

Compensation Only

Due to the small, localized nature of many of O&M effects, PG&E considered a *compensation only* approach, which would provide larger tracts of mitigation lands in exchange for simpler logistics (fewer AMMs) and reduced administrative requirements (reduced need to administer and track AMMs). This strategy would offer the benefit of preserving more extensive tracts of habitat than the proposed action. However, the regulations implementing the federal ESA specifically require that the project proponent implement measures to minimize effects on federally listed species, as well as compensating for those that cannot be adequately reduced or avoided. The compensation only approach would not meet that requirement, and was accordingly eliminated from further analysis.

Temporary Compensation for Temporary Effects

Because the majority of the O&M program's effects are expected to continue to be temporary and recoverable, PG&E considered an alternative that would allow temporary compensation for recoverable habitat disturbance while requiring long-term compensation for permanent loss of habitat. Temporary compensation would be provided by renting mitigation credits through existing area mitigation banks. This approach was eliminated from detailed analysis because it is inconsistent with standard compensation practices.

Chapter 3

Land Use and Planning

Chapter 3
Land Use and Planning

This chapter analyzes the proposed action's potential effects related to land use and planning. Related discussions are found in Chapter 4 (*Agricultural Resources*), Chapter 5 (*Biological Resources*), and Chapter 15 (*Recreation*).

Key sources of information used in the preparation of this chapter include the following.

- The proposed HCP (Appendix B of this EIS/EIR).
- GIS mapping information for the action area (Appendix B).

Specific reference information is provided in the text.

Affected Environment

Regulatory Framework

Although new facilities are constructed in response to local need/demand, PG&E's land use planning is under the sole jurisdiction of the California Public Utilities Commission (CPUC). Nonetheless, PG&E consults and works in concert with local jurisdictions and other agencies to ensure that their service needs are met and their concerns are considered in project planning, construction, and operation; and to ensure that PG&E's facilities and projects are as consistent as possible with local planning guidelines. The following sections describe key programs and policies relevant to land use planning in the action area. The principal emphasis is on the city- and county-level general plan process. Information on CALFED's Bay-Delta Program is also provided, because this collaborative effort involves a wide variety of agencies with land use management responsibility in the action area.

Federal Regulations and Programs

CALFED

The CALFED Bay-Delta Program is a cooperative effort of more than 20 state and federal agencies working with local communities to develop and implement a long-term comprehensive plan to restore ecological health and improve water management for beneficial uses of the Bay-Delta System (Sacramento–San Joaquin River Delta and San Francisco Bay estuary). The objective of the collaborative planning process is to identify comprehensive solutions to the problems of water quality, ecosystem quality, water supply, and vulnerability of Delta functions. The CALFED Program extends over a broad geographic area: the Delta Region, the Bay Region, the Sacramento Valley Region, the San Joaquin River Region, and the Southern California Region. The CALFED planning area overlaps with the action area along the Delta margin.

Regional and Local Plans

Local General Plans

Land-use planning is the province of local governments in California. All cities and counties within California are required by the state to adopt a general plan establishing goals and policies for long-term development, protection from environmental hazards, and conservation of identified natural resources (California Government Code 65300). Local general plans lay out the pattern of future residential, commercial, industrial, agricultural, open-space, and recreational land uses within a community. To facilitate implementation of planned growth patterns, general plans typically also include goals and/or policies addressing the coordination of land use patterns with the development and maintenance of infrastructure facilities and utilities.

Government Code Section 65302 lists seven "elements" or chapters cities and counties must include in their general plans. Following are brief descriptions.

- **Land Use.** The land use element is typically considered the fundamental element of the general plan and has the broadest scope of the seven mandatory general plan elements. This central element correlates all land use issues within a local jurisdiction with the goals, objectives, policies, and programs of other general plan elements. It also describes the desired distribution, location, and extent of the jurisdiction's land uses, which may include housing; business; industry; open space, including agriculture, natural resources, recreation, and enjoyment of scenic beauty; education, public buildings and grounds; solid and liquid waste disposal facilities; and other public and private uses of land. The land use element is required to include a statement of the standards of population density and building intensity recommended for the region covered by the plan.

- **Circulation.** The circulation element is much more than a transportation plan. The provisions of this element support the goals, objectives, policies and proposals of the land use element by providing an infrastructure plan that concerns itself with the circulation of people, goods, energy, water, sewage, storm drainage, and communications. A key function of the circulation element is to establish traffic circulation goals and policies, but in many jurisdictions its scope is considerably broader. Local jurisdictions are required to coordinate with applicable state and regional transportation plans when developing the components of circulation element.
- **Housing.** The housing element includes a set of goals, policies, scheduled programs, and quantified objectives relating to the preservation, improvement, and development of housing in the plan area, based on existing and projected housing needs. The housing element also identifies adequate sites for various types of housing, including rental housing, factory-built housing, and mobile homes, and must provide for the existing and projected needs of all economic segments of the community.
- **Conservation.** The conservation element guides the conservation, development, and utilization of natural resources within a community. Key resources that must be addressed include water and erosion; rivers, harbors, and other water bodies; fisheries; forests; forests; soils; wildlife; and minerals. Other resources may be addressed as appropriate in each jurisdiction. Local jurisdictions are required to coordinate with any countywide water agency and with all district and city agencies that are involved in providing or controlling their water supply.
- **Open Space.** The California Government Code defines *open space* as "any parcel or area of land or water that is essentially unimproved and devoted to open-space use." The open space element guides the conservation and preservation of a community's open space lands for the following specific purposes: preservation of natural resources, managed production of resources, public health and safety, and recreational use. The Code suggests (but does not explicitly require) that this element discourage the unnecessary conversion of open space to urban uses as a matter of public interest.
- **Noise.** The noise element is used as a guide for establishing land use patterns within a community to minimize the exposure of residents to excessive noise. Desired land use patterns are based on identification and appraisal of noise problems within a community. The noise element includes measures and standards that address existing and foreseeable noise problems.
- **Safety.** The safety element provides for the protection of the community from economic, social, and physical risks associated with the effects of fires, floods, earthquakes, landslides, and other hazards. This element may also include locally relevant issues, including airport land use, emergency response, hazardous materials spills, and crime reduction.

Local jurisdictions implement their general plans by adopting zoning, subdivision, grading, and other ordinances. Zoning identifies the specific types of land uses that may be allowed on a given site and establishes the standards that will be imposed on new development. Zoning regulations vary from jurisdiction

to jurisdiction. However, typical standards promulgated in zoning ordinances include the siting of structures relative to parcel boundaries; architectural design (including height limitations); and the percentage of building coverage allowed relative to the overall square footage of a parcel. In some jurisdictions, the zoning ordinance permits construction "by right" (i.e., without the need for hearing) as an allowable use. In others, a conditional use permit or similar discretionary action is needed. Typically, discretionary actions require a noticed public hearing on the proposal. At the hearing, the local zoning board or zoning administrator considers the proposal, any public testimony, and the findings of a CEQA review. If approved, the proposed project is subject to conditions of design, appearance, and construction that ensure compliance with local ordinances and environmental quality requirements.

Local planning documents and zoning ordinances typically provide for the installation and O&M of utilities necessary to facilitate and support planned growth patterns. While many of PG&E's utility related activities are solely regulated by CPUC and are thus not subject to local zoning ordinances, PG&E consults with local cities and counties to ensure that local concerns and issues are considered during the project planning process; construction and O&M activities are developed and implemented in such a way as to comply with existing local zoning ordinances, when feasible.

Regional and Local Habitat Conservation Plans and Natural Community Conservation Plans

Pursuant to the requirements of the federal Endangered Species Act and California's Natural Community Conservation Planning Act respectively, HCPs and Natural Community Conservation Plans (NCCPs) are developed and implemented for a wide variety of projects and programs. Projects and programs covered by HCPs and NCCPs and the actions enabled under such plans can vary greatly in geographic scope. Following are brief descriptions of three major conservation plans that cover areas within the action area. In addition to these plans, numerous small project-specific HCPs and/or NCCPs have been developed to address localized effects of individual projects.

- **Metropolitan Bakersfield Habitat Conservation Plan.** The Metro-Bakersfield HCP addresses issues related to endangered species conservation as Bakersfield undergoes urban development. The HCP plan area covers 261,000 acres surrounding Bakersfield in the southern San Joaquin Valley (Kern County).
- **San Joaquin County Multi-Species Habitat Conservation and Open Space Plan.** The San Joaquin Multi-Species Habitat Conservation and Open Space Plan is a regional conservation plan that encompasses all of San Joaquin County except for federally owned lands. In total, the plan area covers approximately 900,000 acres.

- **CALFED Bay-Delta Program Multi-Species Conservation Strategy.** The CALFED Bay-Delta Program Multi-Species Conservation Strategy (MSCS) offers a comprehensive regulatory compliance strategy developed to assure that CALFED can complete actions in accordance with the federal Endangered Species Act (ESA), California Endangered Species Act (CESA), and National Community Conservation Planning Act.

Figure 3-1 shows the general areas covered by these three plans, as they relate to the action area.

Exemptions Under California Government Code

Article VII, Paragraph 5 of the California Constitution, through the state legislature, vests the CPUC with exclusive jurisdiction over the siting and design of gas and electrical facilities. 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 the field, PG&E is not subject to local land use planning or zoning requirements. Nonetheless, as described above, PG&E strives to ensure that its facilities are as consistent as possible with local jurisdictions' planning guidelines.

Existing Conditions

The land use context for the proposed action includes part of all of nine San Joaquin Valley counties: San Joaquin, Stanislaus, Merced, Fresno, Kings, Kern, Mariposa, Madera, and Tulare (Figure 1-1). Although the action area is located in the heart of California's most important agricultural region, land uses vary somewhat within each county and between counties; Table 3-1 shows the percentage of land in different land use categories within each county in the action area. As reflected in Table 3-1 and Figure 1-1, large-scale urban development in the action area is concentrated in a few centralized locations, with the majority of the action area consisting primarily of undeveloped agricultural fields and grassland.

The action area also includes a substantial amount of public land and open space, partially attributable to the presence of several large recreation facilities (see Chapter 15, *Recreation*, for additional information). Additionally, it is common for undeveloped grasslands that do not specifically carry an Agricultural land use designation to be classified as open space.

Environmental Consequences and Mitigation Strategies

Methodology for Impact Analysis

Impacts related to land use were assessed qualitatively based on professional judgment in light of the activities, methods, and techniques entailed by PG&E's San Joaquin Valley O&M program, and of the additional AMMs that would be enacted under the proposed HCP (see Chapter 2, *Proposed Action and Alternatives*). The impact analysis in this chapter focuses on evaluating potential impacts of the proposed action and alternatives on existing land uses and local land use plans. Information on related impacts is presented in Chapter 4 (*Agricultural Resources*) and in Chapter 15 (*Recreation*).

Note that because grazing is an important activity in much of the nine-county action area, the analysis presented in this chapter includes grazing as an agricultural land use. The proposed HCP's analysis of acreages of habitat disturbance and loss distinguishes between cultivated agricultural lands (croplands and orchards) and grasslands (including grazed grasslands), because cultivated agricultural lands and non-cultivated grasslands offer very different habitat values.

Significance Criteria

For the purposes of this analysis, an impact was considered to be significant and to require mitigation if it would result in any of the following.

- Physical division of an established community.
- Creation of land uses substantially incompatible with existing or reasonably foreseeable land uses in or adjacent to the action area.
- Conflicts with other applicable HCPs or NCCPs.

Because PG&E's operations are not subject to local zoning ordinances, inconsistencies with goals and policies set forth in city or county land use plans, or with local regulations or ordinances, would not in and of themselves result in a determination of a significant impact. For full disclosure, such impacts are nonetheless discussed qualitatively.

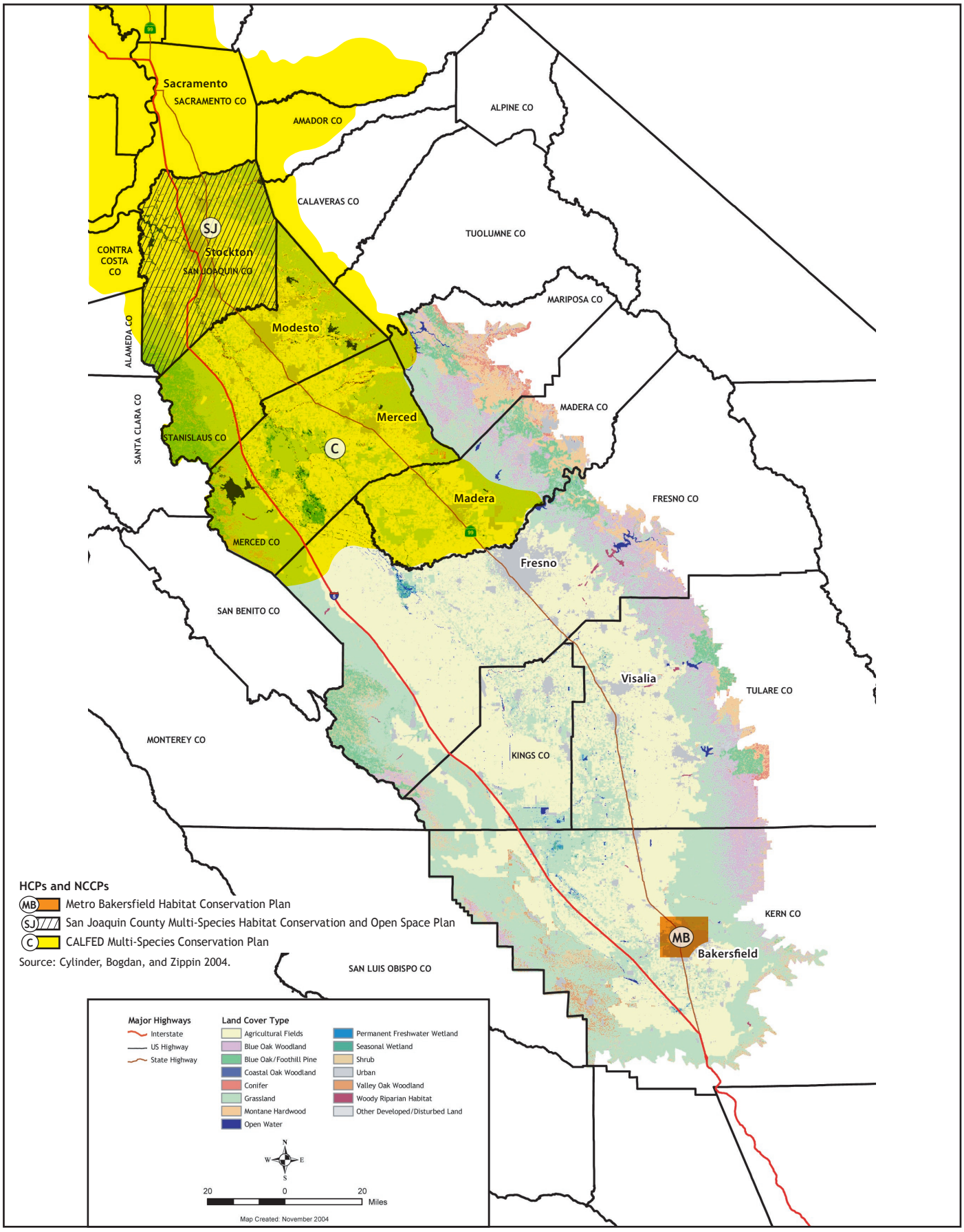

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Figure 3-1
Other Conservation Plans in Action Area

Table 3-1. Land Use in Action Area by County (Percentage of Total County Acreage)

	County								
Land Use	**Fresno**	**Kern**	**Kings**	**Madera**	**Mariposa**	**Merced**	**San Joaquin**	**Stanislaus**	**Tulare**
Agricultural and Grazing	86	74	92	79	52	94	77	89	84
High-Density Commercial	0	0	0	0	0	0	1	1	0
High-Density Residential	1	0	1	0	0	0	1	0	1
Industrial	1	1	1	1	0	1	3	1	0
Low-Density Commercial	0	1	1	0	0	1	2	0	0
Low-Density Residential	3	1	1	8	14	0	4	0	0
Medium-Density Residential	3	2	1	4	0	3	7	5	2
Mixed Use	0	0	0	0	0	0	0	0	3
Planned Development	0	0	0	0	0	0	0	0	0
Public Lands and Open Space	5	19	1	6	21	1	3	0	7
Undetermined	0	0	0	0	13	0	0	0	0
Urban Reserve	1	1	1	1	0	1	2	2	1
Water	0	0	0	0	0	0	0	0	0
Grand Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: State of California 2004.

Impacts and Mitigation Measures

Proposed Action

Impact LUP1—Potential for O&M and minor construction activities to result in physical division of an established community or inconsistency with existing or planned land uses. Non-construction activities associated with O&M of existing facilities and infrastructure would occur within existing rights-of-way (ROWs) and adjacent areas, and PG&E-owned properties. Because these activities would not require new ROW lands, they would not create new physical barriers, nor would they affect consistency with existing or planned land uses.

Expansion of existing PLS facilities and substations could take place within existing ROWs and PG&E-owned properties in some areas, but could require acquisition of new ROWs in others. The amount of new ROW required could vary widely. Most new aboveground facilities and structures would be limited to a footprint of 0.5 acre on average, although a facility expansion could require a footprint between 0.25 acre and 5 acres or more in some cases[1] to accommodate additional transformers, new distribution line outlets, and possibly also new fencing for safety and security. New buildings, where required (e.g., PLS facilities and substations), would typically be limited to one storey or a similar height. Thus, in many cases, the size of the expansion would not be sufficient to result in a physical barrier that would divide the community, and larger facilities are unlikely to be sited in existing communities unless space is available for them. In addition, planning for all facilities would be governed by PG&E's commitment to consult with local jurisdictions to address potential land use concerns to the extent feasible, as described in Chapter 2.

Extending service to new customers could involve the installation of as much as a mile of new pipeline or electric transmission or distribution line, and could require new ROW in some if not all cases. Some new or extended facilities (pipelines in particular, and possibly also some electric transmission and distribution lines) would be underground once construction is complete and would not result in new physical barriers. Even where aboveground, new towers and poles and their respective lines would probably be located in newly developed, developing, or undeveloped areas that applicable planning documents have identified for near-term development. Local jurisdictions typically carry out utilities infrastructure planning concurrent with land use planning, and installation of new utilities is specifically intended to support development patterns delineated in the general plan. Therefore, new or extended service would be very unlikely to result in a physical barrier dividing an established community, or in substantial land use inconsistencies.

In summary, O&M and minor construction activities enabled under the proposed action are not expected to result in new physical barriers that would divide an established community, or in substantial inconsistencies with existing or planned land uses. **This impact is considered less than significant.**

[1] A maximum of 5 acres is unlikely and would be subject to the maximum permanent loss identified in the HCP.

Mitigation Measure—No mitigation is required

Impact LUP2—Potential for compensation options to result in physical division of an established community. Under the proposed HCP, preserve and enhancement areas would be selected according to characteristics that maximize their habitat value, including but not limited to their proximity to other compensation lands and habitat areas. Lands identified for acquisition and preservation under the HCP's Conservation Strategy are unlikely to be located within or immediately adjacent to any established community; this is expected to occur only where existing documents and policies plan for land uses consistent with habitat preservation/conservation Contributions to existing mitigation banks and donations to conservation organizations would support existing or planned conservation uses and thus are also unlikely to foster division of existing communities. **This impact is expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact LUP3—Potential incompatibility of preserves with existing (onsite) land uses. The predominant land cover types that would be affected by compensation requirements under the proposed action include cultivated agricultural lands and grassland (see Appendix B). Cultivated agricultural lands are highly unlikely to be identified as appropriate for compensation use, because they are typically highly disturbed. Rather, the Conservation Strategy identifies high-quality grassland as the preferred land cover type for acquisition as compensation land (Appendix B).

Much of the grassland in the project area is used to support grazing at varying levels of intensity. Preserve use is not inherently inconsistent with all types of grazing; on many of the grazed grasslands acquired as compensation, grazing is likely to continue as a management tool and in some cases may be beneficial to the covered species. In other cases it may be necessary to modify or discontinue grazing practices to ensure compliance with the proposed HCP's conservation strategy and management framework. This would be the case regardless of whether preserve lands were acquired outright (in-fee) or through conservation easements. However, where grazed grasslands are acquired through conservation easements, management plans would be tailored to meet the needs of each landowner as well as the HCP's biological goals, reducing potential inconsistencies between grazing and preserve uses.

Another potential concern with regard to land use inconsistencies centers on the possibility that preserves might be established on lands that currently support designated recreational uses. However, institutionally recognized recreational facilities are not expected to be identified as primary sites for new preserves because incompatibility with existing recreational uses (human access, level of disturbance, etc.) would likely inhibit or preclude attainment of the HCP's biological goals. By contrast, enhancement sites—as distinct from new preserve sites—could be located within existing recognized recreational facilities, as discussed in Chapter 15. This also presents some possibility for land use inconsistencies, but PG&E is committed to consulting with local jurisdictions to address land use concerns, and no substantial conflict is anticipated.

In summary, establishment of preserves under the proposed action could necessitate minor changes in existing land uses, particularly in grazing and recreation. The anticipated level of change in grazing regimes is not considered a substantial inconsistency with existing or planned land uses. Additionally, as discussed above, the HCP's Conservation Strategy includes measures to reduce inconsistencies with other existing and planned land uses, including designated recreational uses; substantial inconsistencies are unlikely in light of these measures and PG&E's commitment to consult with local jurisdiction land managers. **This impact is considered less than significant.**

Mitigation Measure—No mitigation is required.

Impact LUP4—Potential incompatibility of preserves with adjacent land uses. As shown in Table 3-1, the action area supports a wide variety of land uses, including parks and open space, agriculture, and developed uses ranging from rural residential to industrial. Because of the need to ensure adequate protection of species and habitat, the proposed HCP's Conservation Strategy incorporates various measures to ensure that compensation lands are consistent with surrounding uses. In addition, the HCP prioritizes acquisition of lands adjacent to existing preserves. Thus, new preserves and enhancement areas established under the proposed HCP are unlikely to be located in or adjacent to developed, industrial, or commercial areas. Instead, they are more likely to be located near open space or agricultural lands.

Activities expected to occur on compensation (preserve and enhancement) lands include various types of maintenance and management activities such as patrols and vegetation management, consistent with the long-term plan for the parcel. Note that while all of these activities could occur, all activities would not necessarily be appropriate or necessary on any one parcel, and none are expected to be incompatible with adjacent land uses. Some compensation lands may also allow limited and strictly regulated passive recreational use, such as bird-watching. These types of activities are also expected to be compatible with adjacent land uses.

In summary, establishment of preserves, preserve management and potential passive recreational use would not result in substantial conflicts with adjacent land uses. **This impact is expected to be less than significant. To the extent that new preserve lands are located adjacent to existing preserves, there is a potential to benefit ecological health and function on existing preserve lands by providing a larger contiguous area of preserved habitat.**

Mitigation Measure—No mitigation is required.

Impact LUP5—Potential inconsistencies between preserve land acquisition and local land use plans and policies. As discussed above, expansion of existing facilities and construction of new facilities to provide new or upgraded service would take place in conjunction with local jurisdictions' planning processes, with the intent to support planned development. Establishment of preserves and enhancement areas is thus the principal activity that would result in changed land use with the potential for inconsistencies with local land use plans.

Acquisition of conservation lands could occur through in-fee acquisition or through purchase of conservation easements. As discussed in the proposed HCP's Conservation Strategy (see Appendix B of this EIS/EIR) and the previous impact discussions in this chapter, the majority of compensation lands acquired for preserve establishment are expected to be grassland, which may already be zoned to support agricultural uses such as grazing. Many lands acquired by conservation easement would be allowed to continue existing uses (with some potential modification of grazing practices), and preserve use would therefore not be substantially inconsistent with plans or policies. Grazing might be discontinued on some preserve lands in order to meet the biological needs of the wildlife species in the area, to avoid overgrazing, or to prevent trampling of plant species. However, as discussed above, PG&E is committed to consulting with local jurisdiction land managers to address land use concerns, including potential permanent effects on planned land uses as assigned in the applicable general plan.

Establishment of preserves under the proposed action could result in minor inconsistencies with local land use plans and policies. However, measures included in the proposed HCP to identify suitable compensation lands would reduce the potential for siting new preserves in locations that would result in incompatibilities with planned land uses. Evaluation of available land for inclusion in a preserve is expected to consider the long-term development plan for the surrounding area and related potential adverse effects on the biological goals and objectives of the proposed HCP. Further, as discussed above, PG&E is committed to consulting with local jurisdiction land managers to address land use concerns, including effects on planned land uses as assigned in the general plan.

This impact is thus considered less than significant.

Mitigation Measure—No mitigation is required.

Impact LUP6—Potential conflicts with existing HCPs or NCCPs. Because the specific locations of preserves and enhancement areas cannot be foreseen at this time, there is some potential that the proposed action could indirectly result in inconsistencies with an adopted HCP or NCCP. In practice, however, this is unlikely to occur. The proposed HCP (see Appendix B) acknowledges that there is an opportunity to enhance habitat for covered species by linking conserved lands or by locating preserves in close proximity to lands acquired under other conservation plans. The proposed HCP also acknowledges that coordinating the HCP Implementing Entity's activities with those of the implementing entities responsible for other conservation plans would enhance the effectiveness of the HCP's compensation strategy. Further, as discussed above, PG&E is committed to consulting with all appropriate planning agencies and other HCP/NCCP implementing agencies to avoid conflicts with existing conservation plans. Therefore land acquisition (in-fee or as easements) under the proposed action is not likely to result in conflict with conservation lands targeted by existing adopted HCPs or NCCPs. The proposed action is not expected to conflict with the biological goals and objectives or other conservation planning occurring in the project area, and **this impact is thus considered less than significant.**

Mitigation Measure—No mitigation is required.

Alternative 1—HCP with Reduced Take

Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action with minor differences specific to HCP commitments for the protection of biological resources. Specifically, under Alternative 1, compensation ratios for loss or disturbance of habitat would be the same as those described for the proposed action, but AMMs would be implemented more comprehensively. Although the level of take would be reduced because of the increased stringency in implementing the HCP's AMMs, compensation acreages are expected to be similar under both alternatives because compensation would be calculated based on acreage of disturbance, not level of take. Consequently, under Alternative 1, impacts related to land use would be similar to those described for the proposed action.

Alternative 2—HCP with Enhanced Compensation

Like Alternative 1, Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Differences between Alternative 2 and the proposed action center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action, as described in Chapter 2).

Alternative 2's emphasis on compensation would entail a greater compensation acreage at a given level of disturbance, and could result in the establishment of a greater number of preserves or preserves that encompass larger geographic areas by comparison with the proposed action. Nonetheless, consultation with appropriate local jurisdiction land managers would minimize or avoid substantial conflicts with existing and planned land uses and with applicable land use policies and plans. Therefore, impacts related to land use would be similar under Alternative 2 to those described for the proposed action, despite the greater geographic area potentially affected under Alternative 2.

Alternative 3—HCP with Reduced Number of Covered Species

Alternative 3 would enable the same program of O&M and minor construction activities described for the proposed action, and would enact the same additional environmental commitments for other resource areas identified in this EIS/EIR. The key difference between Alternative 3 and the proposed action relates to the number of species covered under Alternative 3 (reduced by comparison with the proposed action, as described in Chapter 2). Depending on their status at the time, other species might be subject to state, and possibly also federal,

requirements for impact assessment and compensation, which would need to be addressed on a case-by-case basis.

Reducing the number of HCP-covered species could result in the establishment of a smaller number of preserves or preserves that encompass smaller geographic areas by comparison with the proposed action. At the same time, additional, case-by-case assessment of compensation needs might be required for any individual activities identified as having the potential to affect noncovered special-status species. However, criteria for identifying suitable compensation lands would remain the same and selection of appropriate compensation lands would be subject to essentially the same agency approval process. Further, PG&E's commitment to consult with local jurisdictions regarding land use planning issues would carry forward. Thus, although it might be more difficult to achieve efficient land use planning and ensure consistency of compensation uses with other existing and planned uses, the net effect on land use under Alternative 3 would be similar to that identified for the proposed action.

Alternative 4—No Action

Under the No Action Alternative, PG&E would continue its existing program of O&M activities and current environmental programs and practices, including BMPs, unchanged. No HCP would be implemented, and no other new environmental commitments would be put in place.

Individual activities with the potential to affect threatened and/or endangered species would be assessed on a case-by-case basis through consultation with USFWS and DFG for level of effect and compensation needs. Because compensation requirements would be assessed on a case-by-case basis, smaller parcels of land would probably be identified for enhancement at any given time, but case-by-case assessment could also result in identification of a larger number of parcels for compensation use. This is similar to but more extreme than the scenario described above for Alternative 3, where most compensation would likely occur under the auspices of an HCP process.

Criteria for identifying suitable compensation lands would likely be similar to those described for the proposed action, and selection of appropriate compensation lands would be subject to the same agency approval process. Moreover, PG&E would still consult with local jurisdiction land managers in an attempt to minimize or avoid land use conflicts. Thus, outcomes for land use would probably be broadly similar under the No Action Alternative to those described for the proposed action. However, the area affected could vary, and with no HCP (and hence, no centralized conservation planning process) in place, it would probably be substantially more difficult to achieve efficient land use planning and ensure consistency of compensation uses with other existing and planned uses.

References Cited in this Chapter

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Chapter 4

Agricultural Resources

Chapter 4
Agricultural Resources

This chapter analyzes the proposed action's potential effects related to agricultural resources. Related discussions are found in Chapter 3 (*Land Use and Planning*) (impacts of proposed action on land use planning generally); Chapter 16 (*Socioeconomics*) (socioeconomic outcomes of converting very small acreages of agricultural land to nonagricultural uses); and Chapter 18 (*Cumulative Effects*) (analysis of agricultural conversions under the proposed action in the broader context of all agricultural conversions throughout the action area, over the entire permit term).

Key sources of data used in the preparation of this chapter include the following.

- The proposed HCP (Appendix B of this EIS/EIR).
- American Farmland Trust website.
- California Department of Conservation website.

Specific reference information is provided in the text.

Affected Environment

Regulatory Framework

The following sections provide a brief description of the major federal and state programs that regulate agricultural resources in the action area as well as a description of how agricultural resources are integrated into land use planning by local agencies. As identified elsewhere in this document, PG&E's land use planning is under the sole jurisdiction of the California Public Utilities Commission (CPUC), but PG&E consults with local jurisdictions and other agencies to ensure that their concerns are considered to the extent feasible in project planning, construction, and operation.

Federal Farmland Protection Policy Act

The Farmland Protection Policy Act (FPPA) of 1984 requires federal agencies to consider how their activities or responsibilities may affect farmland, in particular financing or assisting construction of improvement projects and acquiring, managing, or disposing of federal land and facilities. To comply with the provisions of the FPPA, the federal agency responsible for NEPA compliance must consult with the Department of Agriculture's Natural Resources Conservation Service (NRCS) and complete a Land Evaluation and Site Assessment (LESA) for each affected site or area. The federal lead agency is also responsible for coordinating completion of the Farmland Conversion Impact Rating Form (Form AD-1006) with the NRCS as part of the LESA process.

LESA is a point-based approach that rates the relative importance of agricultural land resources based on specific measurable factors (California Department of Conservation 2004). Under the LESA system, proposed project sites receive scores based on several criteria, including soil quality and existing land use. The resulting score is an indicator of the quantitative impact that the proposed action or program may have on important farmland. The lead federal agency may consider this information when deciding on implementation or modification of certain actions or programs.

State Programs and Regulations

Farmland Mapping and Monitoring Program

The California Department of Conservation's (DOC's) Farmland Mapping and Monitoring Program (FMMP), administered by the Division of Land Resource Conservation, is responsible for mapping and monitoring Important Farmlands for most of the state's agricultural areas. The FMMP updates its farmland maps every 2 years based on information from local agencies. FMMP maps show five categories of agricultural lands and three categories of nonagricultural lands, described in the following sections.

Agricultural Lands

Following are descriptions of the farmland mapping categories used by the state's FMMP. The minimum mapping unit for all agricultural land categories except Grazing Land is 10 acres. The minimum mapping unit for Grazing Land is 40 acres.

Note that Prime Farmland, Farmland of Statewide Importance, and Unique Farmland are the most suitable for agriculture and are considered especially important agricultural resources. They are often referred to collectively as *important farmland*. Grazing Land may also qualify as important farmland where grazing is a key component of the local economy. Consistent with this

trend, this EIS/EIR includes Grazing Land as important farmland because of the importance of grazing to the action area's economy.[1]

- *Prime Farmland* is defined by the state as "irrigated land with the best combination of physical and chemical features able to sustain long-term production of agricultural crops." Prime Farmland has the soil quality, growing season, and moisture supply needed to produce sustained high yields. To be designated as Prime Farmland, the land must have been used for production of irrigated crops at some time during the 4 years prior to the mapping date.
- *Farmland of Statewide Importance* is defined by the state as "irrigated land similar to Prime Farmland that has a good combination of physical and chemical characteristics for the production of agricultural crops." However, this land has minor shortcomings, such as steeper slopes or less ability to store soil moisture than Prime Farmland. In order for land to be designated as Farmland of Statewide Importance, it must have been used for production of irrigated crops at some time during the 4 years prior to the mapping date.
- *Unique Farmland* is considered to consist of lower-quality soils but nonetheless is used for production of the state's leading agricultural crops. Unique Farmland is usually irrigated, but may include nonirrigated orchards or vineyards in some climatic zones in California. To qualify for this designation, land must have been used for crops at some time during the 4 years prior to the mapping date.
- *Farmland of Local Importance* is land identified as important to the local agricultural economy by each county's board of supervisors and a local advisory committee.
- *Grazing Land* is land on which the existing vegetation is suited to the grazing of livestock. This category was developed in cooperation with the California Cattlemen's Association, the University of California Cooperative Extension, and other groups interested in the extent of grazing activities.

Nonagricultural Lands

Following are descriptions of the nonagricultural land mapping categories used by the FMMP. Mapping units for nonagricultural lands vary, as described below.

- *Urban and Built-Up Lands* consist of land occupied by structures with a building density of at least 1 structure to 1.5 acres, or approximately 6 structures to a 10-acre parcel. This type of land is used for residential, industrial, commercial, construction, institutional, and public administration purposes; railroad and other transportation yards; cemeteries; airports; golf courses; sanitary landfills; sewage treatment facilities; water control structures; and other developed purposes.

[1] Although Grazing Land was included as important farmland for the purpose of EIS/EIR analyses, because of the economic importance of grazing in many parts of the San Joaquin Valley, the proposed HCP treats grazed grasslands as grassland (not agricultural) habitat for ecological reasons; see related discussion in *Methodology for Impact Analysis* below.

- *Other Land* is land not included in any other mapping category. Examples include low-density rural developments and brush, timber, wetland, and riparian areas not suitable for livestock grazing. This category also includes vacant and nonagricultural land surrounded on all sides by urban development; confined livestock, poultry, or aquaculture facilities; strip mines; borrow pits; and water bodies smaller than 40 acres.
- *Water* includes perennial water bodies with an extent of at least 40 acres.

California Land Conservation Act (Williamson Act)

The California Land Conservation Act (Williamson Act) is one of the state's primary mechanisms for conserving farmland. The Williamson Act enables counties and cities to designate agricultural preserves (Williamson Act lands) and to offer preferential taxation to private agricultural landowners based on the income-producing value of their property in agricultural use, rather than on the property's assessed market value. In return for the preferential tax rate, the landowner is required to sign a contract with the county or city agreeing not to develop the land for a minimum 10-year period. Contracts are automatically renewed annually unless a party to the contract files for nonrenewal or petitions for cancellation. If the landowner chooses not to renew the contract, it expires at the end of its duration. Under certain circumstances, a county or city may approve a request for cancellation of a Williamson Act contract. Cancellation requires private landowners to pay back taxes and cancellation fees.

Land uses allowed on parcels under Williamson Act contracts are regulated by Government Code Section 51238. Government Code Section 51238(a)(1) states that

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

Thus, gas and electric facilities are "compatible" (i.e., allowable) uses in agricultural preserves as long as the facilities will not do either of the following.

> [S]ignificantly compromise the long-term productive agricultural capability of the subject contracted parcel or parcels or on other contracted lands in agricultural preserves …
>
> [S]ignificantly displace or impair current or reasonably foreseeable agricultural operations on the subject contracted parcel or parcels or on other contracted lands in agricultural preserves …

Each city and county has the discretion to determine which land uses are compatible with Williamson Act contracts within their jurisdiction, provided these uses are not prohibited under the Act.

Local Regulations

General Plan Process and Agricultural Lands

All cities and counties within California are required to adopt a general plan establishing goals and policies for long-term development, protection from environmental hazards, and conservation of identified natural resources (California Government Code 65300). Local general plans lay out the pattern of future residential, commercial, industrial, agricultural, open space, and recreational land uses within a community[2].

The general distribution and location and the extent of allowable uses for agricultural lands within a given city or county is typically designated by the land use element in the general plan. In California, the trend is for local planning documents to include goals and policies aimed at balancing the preservation of existing agricultural land with the increasing demands for housing and other types of urbanization. Of particular relevance to the analyses in this chapter, irrigated and/or agricultural activities are typically considered permitted uses under agriculture land use designations. Grazing activities may be permitted uses under multiple land use designations, including but not necessarily limited to agricultural, grassland, and open space.

To facilitate implementation of planned growth patterns, general plans also typically include goals and/or policies addressing the coordination of land use patterns with the development and maintenance of infrastructure facilities and utilities. In most land use designation types, local planning documents and zoning ordinances provide for the installation and operation and maintenance (O&M) of utilities necessary to facilitate and support planned growth patterns.

Exemption From Local Planning Regulations

Article VII, Paragraph 5 of the California Constitution, through the state legislature, vests the CPUC with exclusive jurisdiction over the siting and design of gas and electrical facilities. 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 the field, PG&E is not subject to local land use planning or zoning requirements. Nonetheless, as described above and in Chapter 3 (*Land Use*), PG&E consults with local agencies on land use issues when locating its facilities.

Existing Conditions

The action area includes part or all of nine counties—San Joaquin, Stanislaus, Merced, Fresno, Kings, Kern, Mariposa, Madera, and Tulare—in the San Joaquin Valley, the heart of California's top agricultural producing region (Figure 1-1).

[2] For more information about general plans and local land use planning, see Chapter 3 (*Land Use and Planning*).

While the proportion of different land uses varies by county, agricultural and grazing land is by far the dominant land use in the action area. Table 4-1 shows land use acreages for each county in the action area, for comparison with the acreages of Important Farmland presented in Table 4-2.

Table 4-2. Important Farmland Acreage in Action Area Counties, 2000

	Irrigated Farmland			Nonirrigated Farmland	
County	**Prime**	**Statewide**	**Unique**	**Local**	**Grazing Land**
Fresno	363,758	139,546	93,751	45,112	319,691
Kern (NW, SE)	531,205	109,622	51,076	0	903,243
Kings	142,665	433,245	24,740	6,851	238,301
Madera	102,053	85,086	163,543	24,041	401,568
Mariposa	29	98	145	0	408,308
Merced	286,924	158,536	98,965	46,088	581,501
San Joaquin	423,158	93,846	57,977	56,009	150,332
Stanislaus	266,340	29,100	56,269	34,851	375,147
Tulare	393,036	351,689	11,749	117,741	439,933

Note: Only 57% of the total project area has been mapped by California Department of Conservation's Farmland Mapping and Monitoring Program.

Source: American Farmland Trust 2004.

Fertile soils, a long growing season, and the reliable availability of irrigation water in the San Joaquin Valley provide a favorable combination of conditions that support a wide variety of crops. Orchards that produce a wide range of fruit and nuts and irrigated vineyards occupy a large portion of the area. Numerous ranches and dairy facilities are also located in the valley, especially along its western edge. In total, nearly 300 different agriculture-based commodities are produced in this area.

Agriculture in the San Joaquin Valley is a major contributor to the region's economy. Farm and agricultural services are one of the top employers in the Northern San Joaquin Valley, second only to government jobs. Including food processing, agriculture employs over 30% of the area's workforce (American Farmland Trust 2004).

Agricultural Land Conversion

California is the nation's most populous state (more than 34 million people) and the fastest growing. As California's population increases, agricultural land is being converted to urban land uses, including commercial, industrial, and

Table 4-1. Land Use in Action Area by County (Percentage of Total County Acreage)

	County								
Land Use	**Fresno**	**Kern**	**Kings**	**Madera**	**Mariposa**	**Merced**	**San Joaquin**	**Stanislaus**	**Tulare**
Agricultural and Grazing	86	74	92	79	52	94	77	89	84
High-Density Commercial	0	0	0	0	0	0	1	1	0
High-Density Residential	1	0	1	0	0	0	1	0	1
Industrial	1	1	1	1	0	1	3	1	0
Low-Density Commercial	0	1	1	0	0	1	2	0	0
Low-Density Residential	3	1	1	8	14	0	4	0	0
Medium-Density Residential	3	2	1	4	0	3	7	5	2
Mixed Use	0	0	0	0	0	0	0	0	3
Planned Development	0	0	0	0	0	0	0	0	0
Public Lands and Open Space	5	19	1	6	21	1	3	0	7
Undetermined	0	0	0	0	13	0	0	0	0
Urban Reserve	1	1	1	1	0	1	2	2	1
Water	0	0	0	0	0	0	0	0	0
Grand Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

residential, at a rapid rate (American Farmland Trust 2004). Agricultural land is also being converted for recreational uses such as parks and golf courses. According to the FMMP, net loss of irrigated agricultural land in the state was 42,039 acres between 1998 and 2000, and net loss in the counties in the action area was 21,344 acres (Table 4-3) (California Department of Conservation 2002).

Table 4-3. Net Change in Irrigated Land 1998–2000

County	Net Change in Irrigated Land (Acres)	Rank[a,b]
Kern (NW, SE)	–11,501	2
Tulare	–8,664	5
Fresno	–6,399	6
San Joaquin	–3,711	11
Merced	–1,281	18
Mariposa	14	29
Madera	2,271	38
Stanislaus[c]	3,472	39
Kings	4,455	42
Total for Action Area Counties	**–21,344**	
Total for All Counties in California	–42,039	

Note: Net change includes the impact of urbanization, conversion to Other Land, removal from irrigated use due to idling, as well as conversions into irrigated use. The net figure also includes any soil unit reclassifications or other revisions within irrigated categories.

[a] Figures for *Important* and *Interim* sections of Kern County have been grouped for county ranking.

[b] Rank out of 46 counties; lower rank indicates greater conversion of agricultural lands.

[c] Conversion figures for Stanislaus County do not include the area west of the San Joaquin River, which was added to the survey area in 2000.

Source: American Farmland Trust 2004.

Environmental Consequences and Mitigation Strategies

Methodology for Impact Analysis

The impact analysis in this chapter focused on evaluating the potential of the proposed action and alternatives to result in the conversion of farmland to

nonagricultural uses and to generate conflict with existing Williamson Act contracts in the action area. Impacts were evaluated qualitatively, based on professional judgment in light of the activities, methods, and techniques entailed by PG&E's San Joaquin Valley O&M program, and the additional AMMs that would be enacted under the proposed HCP (see Chapter 2, *Proposed Action and Alternatives*). Socioeconomic effects of agricultural conversion are addressed separately in Chapter 16 (*Socioeconomics*).

Information on impacts related to land use planning in general is presented in Chapter 3. Issues related to the conversion of agricultural lands as an indirect result of changing patterns of land use in the action area are discussed in Chapter 19 (*Growth Inducement and Related Effects*).

Note that because grazing is an important activity in much of the nine-county action area, the analysis presented in this chapter includes grazing as an agricultural land use. The proposed HCP's analysis of acreages of habitat disturbance and loss distinguishes between cultivated agricultural lands (croplands and orchards) and grasslands (including grazed grasslands), because cultivated agricultural lands and non-cultivated grasslands offer very different habitat values.

Significance Criteria

For the purposes of this analysis, an impact was considered to be significant and to require mitigation if it would result in either of the following.

- Conversion of a substantial amount of important farmland (Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Grazing Land, as shown on the maps prepared pursuant to the State of California's FMMP) to nonagricultural use.
- Substantial conflict(s) with existing Williamson Act contracts.

Impacts and Mitigation Measures

Proposed Action

Impact AG1—Potential for the conversion of important farmland to nonagricultural uses due to O&M and minor construction activities. O&M and minor construction activities have varying potential to affect agricultural lands.

O&M tasks such as vegetation management and maintenance and patrol activities would be temporary and short-term and would be restricted to existing PG&E rights-of-way (ROWs) and immediately adjacent areas, and thus would not result in the permanent conversion of farmland to nonagricultural uses. Most other activities associated with O&M of existing facilities and infrastructure would

also occur within existing PG&E–owned properties or ROWs and adjacent areas; therefore, no conversion of farmland would occur as a result of these activities either. In addition, company policy requires that any affected lands not owned by PG&E be restored to landowner specifications following completion of O&M tasks.

The principal potential for permanent conversion of farmland to nonagricultural uses relates to facilities upgrades and expansions, and construction of new facilities. Some new or expanded facilities such as pipelines and underground transmission and distribution lines would be underground once construction is complete and would not result in the permanent conversion of farmland. Aboveground upgrades and expansions, and new aboveground facilities, could require footprints ranging from several hundred square feet to an average of about 5 acres. Any such upgrades and expansions that take place on land designated as agricultural would result in conversion of small increments of farmland to nonagricultural use. Based on PG&E's projections, the total permanent loss of agricultural lands under the proposed action is expected to be a maximum of 2 acres per year over the 30-year permit term, and the total permanent loss of grassland (including grassland that supports grazing use) is estimated at a maximum of 1 acre per year; thus, even making the worst-case assumption that all affected agricultural lands would qualify as important farmland, the maximum amount of important farmland that might be converted to nonagricultural uses due to installation of new facilities, expansion of existing facilities, and acquisition of new ROWs would be very small.

Moreover, as described in Chapter 2 (see *Land Use Planning Practices* in *PG&E's Existing Environmental Programs and Practices*), PG&E will carry forward all of its standard business practices (reflecting the company's obligations under CPUC regulations) in implementing the activities enabled under the proposed action. In siting new facilities, the company routinely consults with local jurisdictions to avoid or minimize conflicts with existing and planned land uses, and may modify the proposed siting or design of new facilities based on such consultation.

In light of the small acreages involved and the business practices PG&E brings forward under the proposed action, **impacts related to conversion of important farmland to nonagricultural uses supporting new or expanded facilities are expected to be less than significant.**

Mitigation Measure—No mitigation is required

Impact AG2—Potential for the conversion of important farmland due to implementation of compensation options. Farmlands that support the production of irrigated crops are unlikely to be identified as conservation lands because of their highly disturbed condition. Thus, in view of the extent of active cultivation in the action area, three of the four FMMP mapping categories in the action area are unlikely to be affected by habitat compensation: Prime Farmland, Unique Farmland, and Farmland of Statewide Importance.

However, the FMMP's Grazing Land category includes unirrigated grasslands in the action area, and some if not all of the action area's grassland likely qualifies as important farmland in view of the importance of grazing to the area's economy (see discussion in *Agricultural Lands* section of *Farmland Mapping and Monitoring Program* under *State Programs and Regulations* above). The proposed HCP identifies high-quality grasslands as the most desirable type of land to be acquired as compensation for habitat disturbance resulting from O&M and minor construction activities. Thus, the *Purchase of Conservation Lands* compensation option[3] has the potential to result in conversion of important farmlands to nonagricultural uses. In accordance with the proposed HCP's Conservation Strategy (see Appendix B of this EIS/EIR), grazing could continue as a management tool on many acquired preserve lands that were previously grazing lands, although grazing practices might be modified and brought into compliance with the proposed HCP's Conservation Strategy and management framework; modifications could include shifting grazing regimes from year-round to seasonal, or changing grazing intensity, duration, or location. Grazing might also be reduced on some preserve lands in order to meet the biological needs of the wildlife in the area, to avoid overgrazing, or to prevent trampling of protected plants.

In addition, under the *Enhancement as Compensation* option, existing ROWs located on important farmland could be identified as suitable sites for enhancement. The process for identifying suitable and appropriate conservation lands would likely eliminate many potential enhancement sites on grazing lands as excessively disturbed and thus inappropriate for compensation use. However, there may be situations in which options for habitat enhancement sites are limited, and the only feasible option is to use a ROW located on grazing lands. If ROW land located on important farmland were identified as an enhancement site, PG&E's existing policies and practices would require coordination with a willing landowner to minimize potential effects on existing grazing activities.

In summary, both the *Purchase of Conservation Lands* option, which would establish new preserves, and the *Enhancement as Compensation* option, which would use existing ROW easement lands, could result in the limited conversion of important farmland to nonagricultural uses.

However, lands would only be acquired from willing sellers, and most lands identified for acquisition and/or enhancement would likely continue to be grazed after acquisition, and thus would not undergo a change in uses. In the unlikely worst-case scenario where grazing was discontinued on compensation lands, the total area of land affected would be very small. Moreover, in contrast to a residential development or other similar project, the proposed action would not result in the loss or conversion of agricultural land to urban or other developed use; under the proposed action, any grasslands 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

[3] For complete descriptions of the proposed HCP's compensation options, see *Compensation* under *Environmental Commitments Enacted by the Proposed HCP* in Chapter 2.

grassland that may be acquired under the proposed action would not be lost or otherwise altered. Consequently, no significant *physical* impact on agricultural land is expected.

In addition, as identified in Chapter 2 and in Impact AG1 above, PG&E will carry forward all of its standard business practices (reflecting the company's obligations under CPUC regulations) in implementing the activities enabled under the proposed action. The company's practice of consulting with local jurisdictions to avoid or minimize conflicts with existing and planned land uses when new facilities are sited would also apply to locating conservation lands, providing a mechanism to address potential changes in use that might be viewed as undesirable by local planning authorities.

In light of these factors, these options' potential impacts related to conversion of agricultural lands are not expected to be significant.

None of the other compensation options identified in the proposed HCP would directly facilitate conversion of important farmland within the action area. Contributions to existing mitigation banks or donations to conservation organizations would support existing or separately planned uses and would therefore not result in any new adverse or beneficial effects on agricultural resources. **These options would have no impact on agricultural resources.**

Mitigation Measure—No mitigation is required.

Impact AG3—Potential to conflict with existing Williamson Act contracts. Although gas and electric facilities are considered a compatible use in agricultural preserves under Section 51238 of the California Government Code, construction of minor new facilities could require cancellation of Williamson Act contracts for small acreages, if new land acquisition is required. In addition, although it is unlikely, it is possible that compensation lands could be identified on lands under Williamson Act contract, such that either the *Purchase of Conservation Lands* option or the *Enhancement as Compensation* option could result in withdrawal of lands from Williamson Act protection. This would also constitute a conflict with Williamson Act contracts. However, the total area likely to be affected under either of these scenarios would be very small. Furthermore, cancellations are unlikely because of the tax benefits to PG&E of maintaining these properties under the Williamson Act; therefore, no substantial conflict is anticipated. **This impact is thus expected to be less than significant.**

Mitigation Measure—No mitigation is required

Alternative 1—HCP with Reduced Take

Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences in the commitments for protection of biological resources. Alternative 1 would enact the same environmental commitments for other resource areas identified in this

EIS/EIR for the proposed action, and compensation ratios for loss or disturbance of habitat would also be the same.

The key difference between the proposed action and Alternative 1 is that Alternative 1 would implement avoidance and minimization measures (AMMs) at a lower level of effect than the proposed action, with the intent of reducing take. Although the level of take would be reduced because of the increased stringency associated with implementation of the AMMs, compensation needs are expected to be similar under both alternatives, because compensation acreages would be based on acreage affected rather than level of take. Consequently, under Alternative 1, impacts on agricultural resources would be similar to those described for the proposed action.

Alternative 2—HCP with Enhanced Compensation

Alternative 2 would enable the same program of O&M and minor construction activities and the same environmental commitments for other resource areas identified in this EIS/EIR for the proposed action. Differences between Alternative 2 and the proposed action center on compensation ratios for habitat disturbed or lost (greater under Alternative 2 than under the proposed action). Under Alternative 2, assuming the same level of habitat disturbance, overall compensation requirements would be higher than under the proposed action, although criteria for identifying suitable compensation lands would remain the same and selection of appropriate compensation lands would be subject to the same agency approval.

As the demand for compensation lands increases, availability of lands that support the appropriate habitat types can be expected to decrease, both within and outside of PG&E ROWs. However, where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options would be still available (i.e., purchase of mitigation credits, donations, and enhancement), and might be more extensively used; reliance on compensation options other than acquisition by purchase or easement might offset some of the difference in compensation needs. Nonetheless, the enhanced compensation requirements under Alternative 2 would result in greater overall compensation requirements and, as a result, could lead to the establishment of a greater number and/or larger acreage of preserves. Consequently, impacts on agricultural resources would likely be slightly greater under Alternative 2 than those described for the proposed action, when viewed from a NEPA perspective. Impacts under CEQA would be the same; that is, less than significant. This is because the physical attributes of agricultural/grazing lands that may be acquired for habitat compensation use under the proposed action would not be lost or otherwise altered by the proposed action, although they would be managed to benefit biological resources as opposed to focused solely on the production of agricultural commodities. In this sense, acquisition and management of agricultural/grazing lands to benefit biological resources is not expected to result in a significant impact on the environment associated with the loss of agricultural land.

Alternative 3—HCP with Reduced Number of Covered Species

Alternative 3 would enable the same program of O&M and minor construction activities as that described for the proposed action, and would enact the same additional environmental commitments for other resource areas identified in this EIS/EIR. The key difference between Alternative 3 and the proposed action relates to the number of species covered under Alternative 3 (reduced by comparison with the proposed action, as described in Chapter 2). Depending on their status at the time, other species might be subject to state, and possibly also federal, requirements for impact assessment and compensation, which would need to be addressed on a case-by-case basis.

Under Alternative 3, reducing the number of covered species could result in the establishment of a smaller number of preserves or preserves that encompass smaller geographic areas by comparison with the proposed action. At the same time, additional, case-by-case assessment of compensation needs might be required for any individual activities identified as having the potential to affect noncovered special-status species. It is difficult to determine the precise effect that this approach would have on agricultural lands since detailed compensation needs cannot be identified at this time. However, because Alternative 3 could require the assessment of at least some compensation needs on a case-by-case basis, it could result in the identification of smaller parcels of land (including ROW areas) for enhancement use, compared to the proposed action. Also, while Alternative 3 could result in smaller contiguous areas for acquisition and/or enhancement use, more numerous acquisitions could also occur under Alternative 3. Depending on availability of appropriate habitat, multiple land acquisitions and/or enhancement areas could potentially be scattered throughout the action area.

As the demand for compensation lands increases, availability of lands that support the appropriate habitat types can be expected to decrease, including areas within PG&E ROWs. Where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options would still be available (e.g., purchase of mitigation credits, donations, and enhancement); reliance on compensation options other than acquisition by purchase or easement could offset some of the difference in compensation needs. However, criteria for identifying suitable compensation lands would remain the same, and selection of appropriate compensation lands would be subject to USFWS and DFG approval. Alternative 3 would thus have some potential to permanently affect agricultural lands (and particularly grazing lands) in the action area, and impacts could be spread over a wider area because more activity-by-activity compensation could be required. Impacts related to agricultural resources would probably be essentially the same or slightly greater under Alternative 3 compared to those described for the proposed action, when viewed from a NEPA perspective. As described for Alternative 2, impacts under CEQA would be the same; that is, less than significant. This is because the physical attributes of agricultural/grazing lands that may be acquired for habitat compensation use under the proposed action would not be lost or otherwise altered by the proposed action, although they would be managed to benefit

biological resources as opposed to focused solely on the production of agricultural commodities. In this sense, acquisition and management of agricultural/grazing lands to benefit biological resources is not expected to result in a significant impact on the environment associated with the loss of agricultural land.

Alternative 4—No Action

Under the No Action Alternative, PG&E would continue its existing program of O&M activities unchanged. No HCP would be implemented, and no other new or additional environmental commitments would be put in place.

Individual actions affecting suitable habitat for listed special-status species would be assessed through case-by-case consultation with USFWS and DFG for level of effect and compensation needs. Because the compensation requirements for habitat disturbance would be assessed on a case-by-case basis, smaller parcels of land would likely be identified for acquisition or enhancement at any given time, but case-by-case assessment could also result in a need for more numerous parcels, potentially distributed over a wider area. This is similar to but more extreme than the case described above for Alternative 3, where most compensation would likely occur under the auspices of an HCP process.

The availability of desirable compensation lands is expected to decrease over time, as lands are used for compensation or other purposes. However, as described for the action alternatives, where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options would likely still be available (e.g., purchase of mitigation credits, donations, and enhancement).

Because of the need for activity-by-activity consultation, the No Action Alternative would have the potential to result in some permanent loss of agricultural resources in the action area, and the overall nature of effects would be similar to that described above for the proposed action. However, the degree of impact is uncertain. Adverse effects on agricultural resources could be slightly reduced under the No Action Alternative compared to the proposed action since suitable compensation lands might be more difficult to acquire on a case-by-case basis, and smaller parcels might be less likely to meet the biological objectives of compensation; accordingly, payment-type compensation options might be used to a greater degree. It is difficult to assess the precise effect that this approach would have on agriculture because locations and other details about specific habitat enhancement sites are unknown at this time, as are the actual compensation acreages that would be required. Alternatively, if payment-type compensation options were not emphasized, the case-by-case approach to compensation determination under the No Action Alternative would result in a greater number of acquisitions/enhancements, some or all of which could be located on agricultural (largely grazing) lands. Consequently, impacts on agricultural resources could be slightly greater under the No Action Alternative than those described for the proposed action when viewed from a NEPA perspective. As described above for the action alternatives, impacts under CEQA

would be the same in this case; that is, less than significant. This is because the physical attributes of agricultural/grazing lands that may be acquired for habitat compensation use under the proposed action would not be lost or otherwise altered by the proposed action, although they would be managed to benefit biological resources as opposed to focused solely on the production of agricultural commodities. In this sense, acquisition and management of agricultural/grazing lands to benefit biological resources is not expected to result in a significant impact on the environment associated with the loss of agricultural land.

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Chapter 5

Biological Resources

Chapter 5
Biological Resources

This chapter analyzes the proposed action's anticipated effects on biological resources. It focuses on the potential for activities enabled by the proposed action to affect special-status species, including but not limited to those specifically covered in the proposed HCP. PG&E's O&M and minor construction activities would also have some potential to affect common species and habitats, but because the common species and habitats most affected are abundant and widely distributed in the San Joaquin Valley, these impacts are not expected to be significant. Impacts on common species and habitats, including agricultural and developed/disturbed lands, are thus discussed in detail only as they have the potential for direct impacts on ecosystem health and indirect impacts on special-status species.

Key sources of information used in the preparation of this chapter include the following.

- The proposed HCP (Appendix B of this EIS/EIR).
- The California Natural Diversity Database (California Department of Fish and Game 2004).
- *Recovery Plan for Upland Species of the San Joaquin Valley, California* (U.S. Fish and Wildlife Service 1998).
- *Amphibian and Reptile Species of Special Concern in California* (Jennings and Hayes 1994).
- *Mammalian Species of Special Concern in California* (Williams 1986).
- *Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands* (Vollmar 2002).

Affected Environment

Regulatory Framework

Federal Regulations

The following sections describe the federal Endangered Species Act, Migratory Bird Treaty Act, and Bald and Golden Eagle Protection Act, which are the principal federal laws relevant to biological resources in the action area. The federal Clean Water Act, which regulates effects on wetlands, is discussed in Chapter 8 (*Water Resources*).

Endangered Species Act

The federal Endangered Species Act (ESA) of 1973 (16 USC Sec. 1531 *et seq*.) protects fish and wildlife species that are listed as threatened or endangered, and their habitats. *Endangered* refers to species, subspecies, or distinct population segments that are in danger of extinction in all or a significant portion of their range. *Threatened* refers to species, subspecies, or distinct population segments that are considered likely to become endangered in the future. The ESA is administered by the U.S. Fish and Wildlife Service (USFWS) for terrestrial and freshwater species and by the National Oceanographic and Atmospheric Administration's National Marine Fisheries Service (NMFS) for marine species and anadromous fishes.

The ESA prohibits "take" of any fish or wildlife species listed by the federal government as endangered or threatened. (*Take* is defined as harassment, harm, pursuit, hunting, shooting, wounding, killing, trapping, capture, or collection, or the attempt to engage in any such conduct.) The ESA also prohibits removing, digging up, cutting, or maliciously damaging or destroying federally listed plants on sites under federal jurisdiction. However, Section 10[a][1][B] of the ESA establishes a process through which a "nonfederal entity" (a business or individual) can apply for a permit allowing take of federally listed species under certain, restricted circumstances. To be permissible under Section 10[a][1][B], take must occur as a corollary of otherwise lawful activities, and may not be the purpose of the activities; this is referred to as *incidental take*. Permits authorizing incidental take are issued by the USFWS and/or NMFS, depending on the species involved. A key requirement for issuance of a permit under Section 10[a][1][B] is preparation of an HCP that fully analyzes the effects of the proposed take and describes the measures that will be taken to avoid, minimize, and compensate for it.

Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) (16 USC Sec. 703–712 *et seq*.) enacted the provisions of treaties between the United States, Great Britain,

Mexico, Japan, and the Soviet Union, and authorizes the U.S. Secretary of the Interior to protect and regulate take of migratory birds. The MBTA is administered by USFWS. It establishes seasons and bag limits for hunted species, and renders taking, possession, import, export, transport, sale, purchase, and barter of migratory birds, their occupied nests, and their eggs illegal except where authorized under the terms of a valid federal permit. Activities for which permits may be issued include: scientific collecting; falconry and raptor propagation; "special purposes," which include rehabilitation, education, migratory game bird propagation, and miscellaneous other activities; control of depredating birds; taxidermy; and waterfowl sale and disposal.

More than 800 species of birds are protected under the MBTA. Specific definitions of *migratory bird* are discussed in each of the international treaties; in general, however, species protected under the MBTA are those that migrate to complete different stages of their life history or to take advantage of different habitat opportunities during different seasons. Examples of migratory bird species include the yellow warbler (*Dendroica petechia*), barn swallow (*Hirundo rustica*), and Canada goose (*Branta canadensis*).

Bald and Golden Eagle Protection Act

The federal Bald and Golden Eagle Protection Act (16 USC Sec. 668 *et seq*.) makes it unlawful to import, export, take, sell, purchase, or barter any bald eagle or golden eagle, or their parts, products, nests, or eggs. *Take* includes pursuing, shooting, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbance. Exceptions may be granted by the USFWS for scientific or exhibition use, or for traditional and cultural use by Native Americans. However, no permits may be issued for import, export, or commercial activities involving eagles.

State Regulations

In addition to CEQA, the principal state laws regulating biological resources are the California Endangered Species Act (CESA), the California Native Plant Protection Act (CNPPA), and the California Fish and Game Code.

California Endangered Species Act

CESA protects wildlife and plants listed as *threatened* and *endangered* by the California Fish and Game Commission, as well as species identified as candidates for such listing. It is administered by DFG. CESA requires state agencies to conserve threatened and endangered species (Sec. 2055) and thus restricts all persons from taking listed species except under certain circumstances. CESA defines *take* as any action or attempt to "hunt, pursue, catch, capture, or kill." Under certain circumstances, DFG may authorize limited take, except for species designated as *fully protected* (see discussion of fully

protected species under *California Fish and Game Code* below). The requirements for an application for an incidental take permit under CESA are described in Section 2081 of the California Fish and Game Code and in final adopted regulations for implementing Sections 2080 and 2081.

California Native Plant Protection Act

The CNPPA of 1977 was enacted to preserve, protect, and enhance endangered and rare plants in California. It specifically prohibits the importation, take, possession, or sale of any native plant designated by the California Fish and Game Commission as rare or endangered, except under specific circumstances identified in the Act. Various activities are exempt from CNPPA, although take as a result of these activities may require other authorization from DFG under the California Fish and Game Code.

California Fish and Game Code

The California Fish and Game Code provides protection from take for a variety of species, separate from and in addition to the protection afforded under CESA. The Code defines *take* as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill."

Species identified in the Code as *fully protected* may not be taken except for scientific research. Fully protected species are listed in various sections of the Code. For instance, fully protected birds in general are protected under Section 3511, nesting birds under Sections 3503.5 and 3513, and eggs and nests of all birds under Section 3503. Birds of prey are addressed under Section 3503.5. All other birds that occur naturally in California and are not resident game birds, migratory game birds, or fully protected birds are considered *non-game birds* and are protected under Section 3800. Section 3515 lists protected fish species and Section 5050 lists protected amphibians and reptiles. Section 4700 identifies fully protected mammals.

The California mountain lion (*Felis* [*Puma*] *concolor*) is identified as a *specially protected species* in Section 4800 of the Code. Under Sections 4800–4809, it is illegal to take, injure, possess, transport, import or sell any mountain lion or any part thereof, except under specific circumstances.

Local Plans and Regulations

Three of the seven "elements" or chapters that the State of California requires local jurisdictions to include in their general plans bear on issues related to biological resources: land use, conservation, and open space.

Of the three, the conservation element is most directly focused on natural resources. Its purpose is to promulgate policies that will help to balance

conflicting demands for natural resources as populations expand. In support of this purpose, some jurisdictions have begun to adopt policies that specifically relate to the requirements of the federal and state Endangered Species Acts and other conservation planning laws. Issues that must be addressed in the conservation element include water, rivers, and harbors; forests; soils; fisheries; wildlife; and minerals. Other topics considered optional but commonly covered include reclamation of lands and waters; water quality and watershed protection; land use in stream channels and other areas important to natural resources conservation; and biological diversity and ecological sustainability needs (Rivasplata and McKenzie 1998).

The purpose of the open space element is to create a blueprint for comprehensive long-range preservation and conservation of open space. Open space lands are used for a variety of purposes; key uses directly relevant to biological resources include *open space for the preservation of natural resources*, such as habitat needed to support plant and animal life, and areas that are important for scientific research in support of conservation. The Governor's Office of Planning and Research (OPR) also identifies a category of *open space used for the managed production of needed resources*; these include forest lands, rangelands, agricultural lands, and waters that support commercial fisheries (Rivasplata and McKenzie 1998).

OPR directs local jurisdictions to consider the preservation of biological resources in the development of their land use policies. Resources specifically identified for consideration in general plan land use elements include the nature and location of "unique water resources" such as marshes, wetlands, and riparian corridors; the distribution, populations, and habitat use of wildlife and fish, including rare and endangered species; and the distribution of rare, threatened, and endangered plants (Office of Planning and Research 2004).

Existing Conditions

The following sections describe existing biological resources in the action area. As discussed in Chapter 1, the action area includes all lands expected to experience direct and indirect effects resulting from activities enabled under the proposed action. Information in these sections was drawn primarily from work performed during the development of the proposed HCP, augmented by information from the published biological literature.

Land Cover Types in the Action Area

Land-cover types (habitat types) in the action area were identified by combining data from several sources:

- the California Department of Conservation's (DOC's) Important Farmland Mapping Program;

- the California Department of Water Resources' (DWR's) urban boundaries mapping;
- DFG's wetland riparian and vernal pool GIS mapping layers;
- the California Department of Forestry and Fire Protection's (CDF's) data on hardwood rangeland forest types; and
- satellite land cover imagery produced by the California GAP Analysis Project at the University of California, Santa Barbara, commonly referred to as the "GAP data" (Davis et al. 1998).

Where the area covered by two or more data sources overlapped, data from the highest quality source were incorporated into the land-cover mapping developed for the proposed HCP. In order to combine data from multiple sources, land cover information was reclassified into a standardized classification based on DFG's Wildlife Habitat Relationships system (WHR), and work by Holland (1986), Sawyer and Keeler-Wolf (1995), and Mayer and Laudenslayer (1988). Additional information on the land cover mapping process is provided in the proposed HCP (included as Appendix B of this EIS/EIR).

The following sections describe the 15 land cover types found in the action area. Plant species nomenclature follows *The Jepson Manual* (Hickman 1993). Percentages of the land cover types were calculated by analyzing the mapped linear miles of gas and electric transmission and distribution facilities that comprise the action area.[1]

Natural Vegetation Types

Blue Oak Woodland

Blue oak woodland covers 1.01% of the action area. This land cover type comprises woodland dominated by blue oak (*Quercus douglasii*), with patches of coast live oak (*Quercus agrifolia*), interior live oak (*Quercus wisliszenii*), and valley oak (*Quercus lobata*). At higher elevations, foothill pine (*Pinus sabiniana*) is common. Shrub species found within blue oak woodland include poison-oak (*Toxicodendron diversilobum*), California coffeeberry (*Rhamnus californica*), California buckeye (*Aesculus californica*), holly-leaf cherry (*Prunus ilicifolia*) and manzanitas (*Arctostaphylos* spp.). The herb layer is mainly annual grasses and forbs.

Blue Oak/Foothill Pine

Blue oak/foothill pine covers 0.53% of the action area. This land cover type is characterized by a mixed, open canopy dominated by blue oak and foothill pine. Associated tree species include interior live oak, California buckeye, and elderberry (*Sambucus mexicana*), with chaparral species such as manzanitas,

[1] These analyses are presented in full in Chapter 3 of the HCP document (Appendix B of this EIS/EIR).

chamise (*Adenostoma fasciculatum*), and buckbrush (*Ceanothus cuneatus*) in the understory. The herb layer is mainly annual grasses and forbs.

Coastal Oak Woodland

Coastal oak woodland covers 0.02% of the action area. Dominant vegetation in this habitat includes coast live oak, Pacific madrone (*Arbutus menziesii*), interior live oak, foothill pine, and California blackberry (*Rubus ursinus*).

Conifer

The conifer land cover-type makes up 0.26% of the action area. *Conifer* is a general land cover-type that includes the WHR habitat types *Sierran mixed conife*r, *closed-cone pine-cypress*, and *Ponderosa pine*.

- **Sierran mixed conifer forest** has a multi-layered canopy that includes five conifers: white fir (*Abies concolor*), Douglas-fir (*Pseudotsuga menziesii*), Ponderosa pine (*Pinus ponderosa*), sugar pine (*Pinus lambertiana*), and incense cedar (*Calocedrus decurrens*); and one hardwood, black oak (*Quercus kelloggii*). Shrubs such as deerbrush (*Ceanothus integerrimus*), manzanitas, bitter cherry (*Prunus emarginata*), gooseberries and currants (*Ribes* spp.), and mountain misery (*Chamaebatia foliolosa*) occur in openings.
- **Closed-cone pine-cypress** generally occurs on low-nutrient or serpentine substrates. Typical species in the action area are Gowan cypress (*Cupressus goveniana*) and knobcone pine (*Pinus attenuata*). The shrub layer is generally well-developed and includes manzanitas, ceanothus, shrubby oaks, buckthorn (*Rhamnus* sp.), and poison-oak.
- **Ponderosa pine woodland** varies from pure stands of Ponderosa pine (*Pinus ponderosa*) to mixed stands with oaks, Pacific madrone (*Arbutus menziesii*) and other conifers. Associated shrubs include manzanitas, mountain misery, ceanothus, yerba santa (*Eriodictyon californicum*), bitter cherry, poison-oak, and Sierra gooseberry (*Ribes roezlii*).

Grassland

Grassland consisting of herbaceous vegetation dominated by grasses and forbs covers 19.71% of the action area. The grassland land-cover type includes a variety of habitats: *annual grassland, perennial grassland, valley sacaton grassland, alkali meadow*, and *vernal pool*. In some areas, particularly in the foothills on the valley margins, it also includes pastures, some of which may be irrigated.

- **Annual grasslands** are dominated by introduced annuals, including wild oats (*Avena* spp.), brome grasses (*Bromus* spp.), barleys (*Hordeum* spp.), and annual fescues (*Vulpia* spp.). Common herbs include introduced annuals such as filarees (*Erodium* spp.) and clovers (*Trifolium* spp.), and native species such as fiddleneck (*Amsinckia* spp.), lupines (*Lupinus* spp.), and owl's-clover (*Castilleja* spp.). These species germinate after the late fall and winter rains and grow, flower, and set seed through spring. Most die in the summer season.

- **Perennial grasslands** are dominated by native grasses such as California oatgrass (*Danthonia californica*), sweet vernal grass (*Anthoxanthum odoratum*), brome grasses, and fescues (*Festuca* spp.). The associated herb cover includes native and non-native forbs and native wildflowers.
- **Valley sacaton grassland** occurs in the San Joaquin Valley, especially on the fine-textured, usually alkaline soils of the Tulare Lake Basin area, where it used to be extensive. The dominant species is alkali sacaton (*Sporobolus airoides*), a tussock-forming native perennial grass. Saltgrass (*Distichlis spicata*) and low barley (*Hordeum depressum*) are common.
- **Alkali meadow** occurs on fine-textured alkaline soils that are usually permanently moist, and is characterized by open to dense perennial grasses and sedges. Typical plants include yerba mansa (*Anemopsis californica*), sedges (*Carex* spp.), saltgrass, rushes (*Juncus* spp.), alkali mallow (*Malvella leprosa*), alkali cordgrass (*Spartina gracilis*), and alkali sacaton.
- **Vernal pools** include northern claypan and northern hardpan vernal pools. Both communities are dominated by native annual species that germinate, grow, and flower as the pools dry up in the spring. Characteristic plants include goldfields (*Lasthenia* spp.), downingia (*Downingia* spp.), meadowfoam (*Limnanthes alba*), navarettia (*Navarretia* spp.), and popcornflower (*Plagiobothrys* spp.).

Montane Hardwood

Montane hardwood covers 0.56% of the action area. This land cover type includes the WHR habitats *montane hardwood*, *montane hardwood conifer*, and *montane riparian*.

- **Montane hardwood** has a clear hardwood layer with a sparse shrub layer, and may include occasional coniferous trees. The dominant tree in the action area is canyon live oak (*Quercus chrysolepis*), with a small component of foothill pine, knobcone pine, and Pacific madrone. This habitat type borders mixed conifer, montane hardwood-conifer, and mixed chaparral habitat types.
- **Montane hardwood conifer** consists of a diverse mixture of hardwood and conifer trees, comprising at least one-third conifers and one-third broadleaved trees. The tree canopy is typically dense and multi-layered; characteristic trees in the action area include black oak, black cottonwood (*Populus balsamifera*), canyon live oak, ponderosa pine, sugar pine, and incense cedar.
- **Montane riparian** habitat occurs as a narrow band of deciduous broadleaved trees along seeps, streams, and rivers. In the action area, characteristic trees include quaking aspen (*Populus tremuloides*), willows (*Salix* spp.), and white alder (*Alnus rhombifolia*).

Open Water

Open water covers 0.43% of the action area. Open water in the action area includes a variety of natural and artificial aquatic habitats that support submerged or floating vegetation: lakes, reservoirs, flood control basins, ponds (including

stock ponds), sloughs, canals, and rivers. Many of the large water bodies support permanent and seasonal wetland and riparian communities along their edges.

Permanent Freshwater Wetland

Permanent freshwater wetland covers 0.07% of the action area. This habitat type includes freshwater emergent wetlands and wet meadows. Dominant vegetation in freshwater wetlands includes cattails (*Typha* spp.), tules and bulrushes (*Scirpus* spp.), sedges, nutsedges (*Cyperus* spp.), arrowhead (*Sagittaria* spp.), Baltic rush (*Juncus balticus*), and common reed (*Phragmites australis*). On sites with more alkaline substrates, saltgrass may be present.

Seasonal Wetland

Seasonal wetlands cover 0.83% of the action area. They are characterized by ponded or saturated soil conditions during the winter and spring. This land cover type includes *seasonal wetland* and *cismontane alkali marsh*.

- **Seasonal wetland** vegetation consists of "wetland generalist" species typical of frequently disturbed sites, such as stream corridors. Common plants include hyssop loosestrife (*Lythrum hyssopifolia*), cocklebur (*Xanthium* spp.), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), and Italian ryegrass (*Lolium multiflorum*).
- **Cismontane alkali marsh** vegetation consists of specialized plants that grow in wet areas with high salt contents. Common plants include yerba mansa, saltgrass, rushes, pickleweed (*Salicornia virginica*), cattails, alkali heath (*Frankenia salina*).

Upland Scrub

Upland scrub covers 0.48% of the action area. Upland shrub habitat includes a wide variety of shrub/scrub cover types; common constituents are alkali desert scrub and three types of chaparral (mixed, chamise-redshank, and montane). Other shrub types are also present in some areas.

- **Alkali desert scrub** is similar to the WHR land cover types Valley/Coast Range Saltbush Scrub and Valley Sink Scrub", and includes both xerophytic and halophytic shrub-dominated communities. These habitat types are dominated by shrubs in the chenopod family, especially all-scale (*Atriplex polycarpa*) and other *Atriplex* species. In addition to all-scale, characteristic shrubs include arrowscale (*Atriplex phyllostegia*), goldenbush (*Isocoma acradenia* var. *bracteosa*), bladderpod (*Isomeris arborea*), and alkali heath (*Frankenia salina*).
- **Valley sink scrub** is an open shrub-dominated community on highly alkaline soils, usually heavy, sticky clay. Alkali playas (or "balds") are common. The groundwater table is usually high, and the soil surface is often covered with a salty crust. Characteristic shrubs include iodine bush (*Allenrolfea occidentalis*) and bush seepweed (*Suaeda moquinii*), and typical forbs are saltgrass, nitrophila (*Nitrophila occidentalis*), pickleweed (*Salicornia subterminalis*), and alkali sacaton.

Three types of chaparral are distinguished in the plan area. All are characterized by dense stands of evergreen shrubs, but species composition varies greatly with elevation, location, aspect, climate, and substrate. Fire is regular in these communities, and influences structure and species composition. Herbaceous plants include annual and perennial grasses and forbs that occupy small openings in the shrub canopy.

- **Mixed chaparral** is typically dense and diverse. Dominant species include shrubby oaks (*Quercus* spp.), manzanitas, and several species of ceanothus, in mixed or patchy stands. Commonly associated shrubs include chamise, toyon (*Heteromeles arbutifolia*), yerba-santa, mountain-mahogany (*Cercocarpa betuloides*), buckeye, silk-tassel (*Garrya* spp.), fremontia (*Fremontia californicum*), and chaparral-pea (*Pickeringia montana*).
- **Chamise-redshank chaparral** is characterized by a dense monolayer dominated by chamise and redshank (*Adenostoma sparsifolium*). Associated shrubs are similar to those in mixed chaparral.
- **Montane chaparral** is characterized by evergreen shrubs with some admixture of broadleaved species. Typical shrubs include mountain whitethorn (*Ceanothus cordulatus*), manzanitas, bitter cherry, huckleberry oak, mountain-mahogany, and toyon.

Valley Oak Woodland

Valley oak woodland covers 0.38% of the action area. This habitat type is strongly dominated by valley oak, but may also contain blue oak, California sycamore (*Platanus racemosa*), black walnut (*Juglans californica* var. *hindsii*), and box elder (*Acer negundo*). The canopy layer is typically open, forming a savanna structure rather than woodland. Associated understory shrubs include elderberry, poison-oak, toyon, and California blackberry. The herb layer is often dominated by creeping wildrye grass (*Leymus triticoides*), and includes a variety of annual and perennial grasses and forbs.

Woody Riparian

Woody riparian habitat covers 0.09% of the action area. This land cover type includes WHR's valley-foothill riparian and desert riparian habitat types, along with *great valley cottonwood riparian forest* and *great valley mixed riparian forest*. Dominant trees and shrubs include Fremont cottonwood (*Populus fremontii* ssp. *fremontii*), valley oak, sycamore, box elder, willows, blackberries (*Rubus* spp.), buttonbush (*Cephalanthus occidentalis*), and California grape (*Vitis californica*).

Agricultural and Developed Types

Agricultural Lands

Agricultural lands cover 36.18% of the action area. This land cover type includes all areas where the native vegetation has been cleared for agriculture. Common types of agricultural lands in the action area are evergreen and deciduous orchards, vineyards, irrigated row and field crops~~,~~ including irrigated

hayfields, dryland and irrigated ~~pasture~~grain crops, rice paddies, and fallow fields.

Urban

Approximately 38.79% of the action area consists of urban areas. This land cover type was mapped to include all types of urban development for residential, commercial, industrial, and recreational uses. Developed areas also include sites that support structures, paved surfaces, horticultural plantings, and lawns.

Other Developed and Disturbed Lands

About 1.41% of the action area falls into the "other disturbed and developed lands" category. This land cover type includes what the WHR classification refers to as *barren* land cover—lands that support perennial weeds dominated by nonnative species, and lands with urban infrastructure.

Special-Status Species

Special-status species include plants and animals that are legally protected under ESA, CESA, or other regulations, as well as species considered sufficiently rare by the scientific community to qualify for such listing. Following are key categories of special-status species.

- **Currently listed** as threatened or endangered under ESA or CESA.
- **Proposed for listing** as threatened or endangered under ESA or CESA.
- **Candidates for possible future listing** as threatened or endangered under ESA or CESA.
- Considered by the California Native Plant Society (CNPS) to be **"rare, threatened or endangered in California"** (CNPS List 1B).
- **Fully protected** under the California Fish and Game Code.

Special-status species also include some species in the following categories.

- California species of special concern (i.e., species included on DFG's *Special Animals List* 2003).
- Species identified by DFG and the Point Reyes Bird Observatory (PRBO) as being of special concern in California.
- Species known by experts to be very rare, declining rapidly, and/or with important habitat that may be affected.

The proposed HCP covers 65 special-status species (Table 2-6). It includes special-status species meeting all of the following criteria.[2]

- Currently listed as threatened or endangered under ESA or CESA, fully protected species in California, or species expected to be listed within the next 30 years.
- Known or likely to occur in the action area.
- May be adversely affected by O&M or minor construction activities conducted by PG&E.
- Sufficiently well documented that impacts can be adequately evaluated and conservation measures to mitigate impacts to regulatory standards can be developed, ***or*** important habitat for the species occurs in the plan area even if limited data are available.

Special-Status Plants

Forty-two special-status plant species met the above criteria and were included in the proposed HCP. Table 5-1 contains a summary of legal status, distribution, and habitat for each of these special-status species.

In addition to the species covered in the proposed HCP, another 88 special-status plant species are known to occur or have the potential to occur in the action area. These species are referred to as non-covered special-status species in this EIS/EIR. Non-covered special-status plant species were identified for inclusion in EIS/EIR analyses based on work done during the preparation of the proposed HCP; in addition, because the original screening of special-status species for coverage in the HCP was conducted in 2001, the current (2004) CNDDB was consulted to determine whether additional species should be analyzed in this EIS/EIR. The resulting list includes all special-status plant species that are known or likely to occur in the action area, and have the potential to be affected by O&M or minor construction activities or HCP implementation, but did not meet the criteria identified above for HCP coverage. Table 5-2 contains a summary of their legal status, distribution, and habitat requirements.

Special-Status Wildlife

Twenty-three special-status wildlife species are included in the proposed HCP. Table 5-3 contains a summary of their legal status, distribution, and habitat requirements.

[2] Additional information on the process by which species were identified for inclusion in the proposed HCP is provided in the HCP document (Appendix B of this EIS/EIR).

Table 5-1. Overview of Special-Status Plants Covered by Proposed Habitat Conservation Plan

Species	Status Fed/State/CNPS	Description and Habitat	Distribution	Primary Threats
Large-flowered fiddleneck (*Amsinckia grandiflora*)	E/E/1B	Erect, coarsely hairy annual herb in the borage family (Boraginaceae). The large, orange-red flowers are borne on stalks curved like the neck of a fiddle and bloom April–May. Grows in cismontane woodland and valley and foothill grassland at elevations of 902–1,001 feet. Found on organic-rich neutral to slightly basic soils with a loamy or clayey structure.	Endemic to California; known from only two native occurrences in Alameda and San Joaquin Counties. Additional populations have been introduced into the species' former range in Contra Costa and San Joaquin Counties. Within the action area, there are 2 native occurrences and 1 introduced population in San Joaquin County.	Competition from nonnative annual grasses; grazing; possibly also alteration of natural fire frequency.
Lesser saltscale (*Atriplex minuscula*)	–/–/1B	Ascending to erect annual in the goosefoot family (Chenopodiaceae), grows 15 inches with spreading, brittle reddish, peeling branches. Opposite leaves ovate to cordate in shape; white-scaly below, green above and blooms May-October. Grows in alkali sinks and on alkaline sandy soils in chenopod scrub and valley and foothill grasslands, often on scald margins, at elevations of 49–656 feet.	Endemic to California; most populations found in San Joaquin Valley at elevations less than 656 feet. Of 18 occurrences in Sutter, Stanislaus, Fresno, Kern, Madera, Merced, King, and Tulare Counties, 17 are within the action area.	Habitat loss from agricultural conversion, highway construction, golf course construction, pipeline installation, and flooding (waterfowl management).
Bakersfield smallscale (*Atriplex tularensis*)	–/E/1B	Erect, few-branched annual in the goosefoot family (Chenopodiaceae), with a scaly surface on the stems, smooth ovate leaves, and small dense clusters of greenish flowers that bloom June–October. Grows in chenopod scrub at elevations of 295–656 feet.	Endemic to Kern County; known from only 3 occurrences. All are within the action area; 2 are known to be extirpated, and the third may also be extirpated. Historically occurred on the borders of alkali sinks and on alkaline plains in the vicinity of Weed Patch, southern Kern County (south of Bakersfield along Highway 99).	Land conversion; lowering of the water table; possibly also hybridization with bracted saltbush (*Atriplex serenana*).
Big tarplant (*Blepharizonia plumose* ssp. *plumosa*)	–/–/1B	Annual herb in the sunflower family (Asteraceae); grows 12–71 inches high and blooms July–October. Grows on clay to clay loam soils in valley and foothill grasslands at elevations of 98–1,657 feet.	Endemic to California; known from 36 occurrences in Alameda, Contra Costa, San Joaquin, Stanislaus, and Solano Counties. Within the action area, there are 15 native occurrences in San Joaquin County and 1 occurrence in Stanislaus County.	Competition from nonnative plants; fire suppression activities; proposed drainage construction; cattle grazing; erosion; road maintenance.
Mariposa pussypaws (*Calyptridium pulchellum*)	T/–/1B	Small annual herb in the purslane family (Portulacaceae); blooms April–August. Grows in chaparral and cismontane woodland plant communities with granitic sandy or gravelly soils at elevations of 1,312–4,003 feet.	Known from 7 occurrences distributed over a 750 square–mile area in Fresno, Madera, and Mariposa Counties; probably was never more widely distributed than it is today. Six of the known occurrences are within the action area and are recent and extant.	Loss of habitat to development, grazing, and vehicles.

Species	Status Fed/State/CNPS	Description and Habitat	Distribution	Primary Threats
Tree-anemone (*Carpenteria californica*)	–/T/1B	Erect to spreading evergreen shrub in the mock orange family (Philadelphaceae); blooms May–July. Grows on well-drained granitic soils; most abundant in north-facing ravines and drainages in chaparral and cismontane woodland communities at elevations of 1,115–4,396 feet.	Endemic to the central and southern Sierra Nevada foothills between the Kings and San Joaquin Rivers in Fresno County. Of 11 occurrences listed in the California Natural Diversity Database, 1 historic occurrence and 5 recent/extant ones are within the action area.	Extant populations threatened by proposed road construction; off-highway vehicle use; logging; hydroelectric operations; residential development; and fire suppression. Populations have been lost due to landfill and road construction activities.
Succulent owl's-clover (*Castilleja campestris* ssp. *succulenta*)	T/E/1B	Hemiparasitic annual herb in the figwort family (Scrophulariaceae). Occurs in drying, often acidic, vernal pools with heavy clay soils in valley grassland or woodland habitats at elevations of 164–2,461 feet.	Endemic to lower foothills and valleys in a 66-mile stretch of eastern San Joaquin Valley. Range extends through northern Fresno, western Madera, eastern Merced, southeastern San Joaquin, and Stanislaus Counties. All 63 known occurrences are within the action area; 51 are recent and 12 are historic.	Loss of vernal pool habitat from agricultural conversion; disking of pools; competition from nonnative plants; overgrazing; off-highway vehicle use; inappropriate grazing practices; urbanization.
California jewelflower (*Caulanthus californicus*)	E/E/1B	Annual herb in the mustard family (Brassicaceae). Grows on sandy soils in pinyon and juniper woodlands, chenopod scrub, and valley and foothill grasslands at elevations of 230–328 feet.	Endemic to California. Historically occurred in Fresno, Kings, Kern, Santa Barbara, San Luis Obispo, Tulare, and Ventura Counties. Today known only from Santa Barbara, San Luis Obispo, and Fresno Counties. Of 58 known occurrences, 24 are within the action area; 4 are extant, 12 may be extirpated, and 8 are known to be extirpated. All 4 extant occurrences are in Kern and Fresno Counties.	Agriculture; urbanization; energy development; grazing; nonnative plants.
Hoover's spurge (*Chamaesyce hooveri*)	T/–/1B	Small, prostrate annual herb in the spurge family. Has milky sap. Forms mats from a few inches to a few feet across. Restricted to large, deep vernal pools on old alluvial terraces and basin rims with claypan soils at the base of the Sierra Nevada foothills.	Endemic to a 240-mile stretch along the eastern margin of the Central Valley. Historical distribution poorly documented, but species is believed to have been more common in the past. Most extant populations occur in Tulare County north of Visalia; 1 population each occurs in Stanislaus and Merced Counties. Of 30 known occurrences, 8 (7 recent and 1 historic) are within the action area.	Habitat loss and degradation from urbanization; agricultural land conversion; livestock grazing; off-highway vehicle use; flood control construction; highway construction; altered hydrology; landfill projects; competition from weedy nonnative plants.
Slough thistle (*Cirsium crassicaule*)	–/–/1B	Annual or biennial species of the sunflower family (Asteraceae); grows 3–10 feet tall and blooms May–August. Grows in chenopod scrub, marshes and swamps (sloughs), and riparian scrub at elevations of 10–328 feet.	Endemic to Kern, King, and San Joaquin Counties. Of 19 known occurrences (17 presumed extant and 2 possibly extirpated), 17 are within the action area, 15 in Kern County, 1 extant in San Joaquin County, and 1 possibly extirpated in King County.	Conversion of habitat to agricultural use; nonnative plants; grazing; loss of water sources.

Species	Status Fed/State/CNPS	Description and Habitat	Distribution	Primary Threats
Mariposa clarkia (*Clarkia biloba* ssp. *australis*)	–/–/1B	Erect annual herb in the evening primrose family (Onagraceae); blooms May–July. Grows in chaparral and woodlands, or in ecotone between foothill woodland and riparian habitat. Found on soil derived from metamorphic rock, and on other types of loose soil. Generally occurs at elevations of 984–3,100 feet.	Endemic to Mariposa County; may also occur in Tuolumne County. Recorded occurrences are along or near the South Fork Merced River and along State Routes 140 and 49. Of 14 known occurrences, 13 are within the action area; all are presumed extant.	Road maintenance and roadside spraying; power line maintenance; slope failure; mining; public recreation; fire control activities; nonnative plants.
Merced clarkia (*Clarkia lingulata*)	–/E/1B	Annual herb in the evening primrose family (Onagraceae); produces bright pink flowers in May–June. Grows at elevations of 1,312–1,493 feet, on steep north-facing slopes in chaparral and cismontane woodland plant communities with sandy loam soils derived from phyllite parent material.	Endemic to California. Known only from 2 locations in Mariposa County, both within the action area, and both considered extant.	Road maintenance; herbicide spraying; slumping of slopes; fire; grazing. Also, as of 1998, encroachment by yellow star-thistle (*Centaurea solstitialis*).
Springville clarkia (*Clarkia springvillensis*)	T/E/1B	Annual herb in the evening primrose family (Onagraceae); blooms May–July. Grows along roadsides and in grassy openings in blue oak woodland, chaparral, cismontane woodland, and valley and foothill grassland plant communities with granitic soils at elevations of 1,099–4,003 feet.	Endemic to California. Restricted to area near Springville in Tulare County. Of 15 extant populations, 11 are in the action area.	Nonnative plants; overgrazing; vehicles; road maintenance; logging; residential development.
Vasek's clarkia (*Clarkia tembloriensis* ssp. *calientensis*)	–/–/1B	Annual herb in the evening primrose family (Onagraceae); blooms in April. Grows on north- and northwest-facing slopes in valley and foothill grassland plant communities at elevations of 902–1,640 feet.	Endemic to California. Known from only 3 locations in Kern County near Caliente Creek, east of Bakersfield; all are within the action area, and all are extant.	Grazing; encroachment by invasive grasses.
Hispid bird's-beak (*Cordylanthus mollis* ssp. *hispidus*)	–/–/1B	Hemiparasitic annual herb in the figwort family (Scrophulariaceae); grows 4–16 inches tall and blooms June–September. Occurs in playas, alkaline meadows, and saline marshes and flats.	Historically occurred in central and southern Central Valley, including Alameda, Merced, Placer, Kern, and Solano Counties. Extirpated from most of the San Joaquin Valley; some 25 occurrences remain, of which 23 extant occurrences (22 in Merced County and 1 in Kern County) and 1 believed extirpated are within the action area.	Conversion of habitat to agricultural use; residential development; hydraulic modifications; off-highway vehicle use; erosion; grazing.

Species	Status Fed/State/CNPS	Description and Habitat	Distribution	Primary Threats
Palmate-bracted bird's-beak (*Cordylanthus palmatus*)	E/E/1B	Annual herb in the figwort family (Scrophulariaceae); blooms May–October. Grows on seasonally flooded saline-alkali soils of lowland plains and basins, in chenopod scrub and valley and foothill grasslands at elevations below 500 feet. Restricted to soils within a narrow range of pH, salinity, and moisture content.	Endemic to California. Historically occurred throughout the San Joaquin Valley (Fresno and Madera Counties), the Livermore Valley (Alameda County), and the Sacramento Valley (Colusa and Yolo Counties). Of 11 occurrences in the action area, 8 are extant, 1 is possibly extirpated, and 2 are known extirpated.	Agriculture; urbanization; vehicles; altered hydrology; grazing; bicycle use; industrial development.
Kern mallow (*Eremalche kernensis*)	E/–/1B	Small annual herb in the mallow family (Malvaceae). Grows on alkaline sandy loam or clay soils in chenopod scrub and valley and foothill grassland at elevations of 230–3,281 feet. Occupies areas where shrub cover is less than 25%.	Endemic to California. Known distribution is restricted to a single metapopulation comprising 15 occurrences in an area of about 40 square miles at the eastern base of the Temblor Range, near McKittrick and Buttonwillow (western Kern County). All known occurrences are within the action area; 13 are extant, 2 are extirpated.	Agriculture; sheep grazing; activities along transmission line corridor; oil and gas development.
Congdon's woolly sunflower (*Eriophyllum congdonii*)	–/Rare/1B	Yellow-flowered annual herb in the sunflower family (Asteraceae); blooms May–June. Occurs in chaparral, cismontane woodland, and lower montane conifer forest on dry ridges of metamorphic rock, scree, and talus at elevations of 1,640–6,234 feet.	Endemic to California; restricted to Merced River Canyon, Mariposa County. Of 14 known occurrences, 5 are in the action area; 2 are recent, 3 are historic, and all are presumed extant.	Competition from weedy nonnative plants; trail restoration; mining; timber harvesting; road maintenance.
Delta button-celery (*Eryngium racemosum*)	–/E/1B	Annual/perennial herb in the carrot family (Apiaceae); blooms June–August. Occupies vernally mesic clay depressions in riparian scrub, or subalkaline swales, at elevations of 10–98 feet. Periodic flooding maintains the species' habitat through sustenance of seasonal wetlands; scouring reduces competition from other species.	Endemic to California. Historically occurred in Calaveras, Merced, Stanislaus, and San Joaquin Counties. Of 26 known occurrences, 6 may be extirpated, including all the occurrences in San Joaquin County and most in Stanislaus County. Most extant occurrences are found in Merced County along the San Joaquin River. Some 25 occurrences are within the action area (19 extant and 6 possibly extirpated); of the remaining extant occurrences, 17 are in Merced County, 1 in Stanislaus County, and 1 along the Merced-Stanislaus County boundary.	Flood control activities and related alterations in hydraulics/hydrology; conversion of lowlands to agricultural uses. Riparian restoration or waterfowl enhancement projects could threaten the species if habitat areas are artificially flooded during some life cycle stages.
Striped adobe lily (*Fritillaria striata*)	–/T/1B	Perennial herb in the lily family (Liliaceae); blooms February–April. Grows on clay soils in cismontane woodland and valley and foothill grassland plant communities at elevations of 443–4,774 feet.	Endemic to California. Known distribution is in the southern Sierra Nevada foothills of eastern Tulare and Kern Counties. Of 20 known occurrences, 19 (17 extant and 2 extirpated) are within the action area.	Agriculture; competition from nonnative plants; urbanization. Although heavy grazing has adversely affected some populations, light grazing and avoidance during the flowering period appears to benefit the species by reducing competition from nonnative plants.

Species	Status Fed/State/CNPS	Description and Habitat	Distribution	Primary Threats
Boggs Lake hedge-hyssop (*Gratiola heterosepala*)	–/E/1B	Semiaquatic annual plant. Typically grows on margins of shallow lakes and large vernal pools. Less commonly found on loam and loamy sand soils. In smaller vernal pools, inhabits barren, muddy areas on extremely shallow soils. Elevations of known occurrences range from 26 feet in Solano County to more than 5,171 feet in Modoc County.	Endemic to northern California and southern Oregon. Distribution of populations is patchy even in areas of suitable habitat. In California, a total of 86 known occurrences are documented from Lassen County south to Madera County, with concentrations on the Modoc Plateau and in the Sacramento Valley. Action area supports 10 recent occurrences and 1 historic occurrence.	Loss and degradation of vernal pool habitat from agricultural and urban development, overgrazing, and off-highway vehicle traffic; hydrologic alteration; disturbance by disking and grading. Several occurrences on ranchland in the action area are threatened by cattle grazing and trampling.
Pale-yellow layia (*Layia heterotricha*)	–/–/1B	Annual herb in the sunflower family (Asteraceae); grows 5–35 inches tall and blooms March–June. Occurs in cismontane woodland, pinyon and juniper woodland, and valley and foothill grassland communities on alkaline or clay soils at elevations of 984–5,249 feet.	Endemic to California. Historically distributed throughout the southern Tehachapi Mountains, western San Joaquin Valley, southern Coast Ranges, and northern Western Transverse Ranges, in portions of Fresno, Kings, Kern, Monterey, Santa Barbara, San Benito, San Luis Obispo, and Ventura Counties. Of 30 recorded populations, 9 ranging in size from 5 to 1,000 plants have been surveyed recently; of these, 5 extant occurrences are within the action area.	Agricultural conversion; overgrazing.
Comanche Point layia (*Layia leucopappa*)	–/–/1B	Straw-colored annual herb in the sunflower family (Asteraceae); blooms March–April. Occurs in chenopod scrub and valley and foothill grassland communities on open slopes with heavy clay soils at elevations of 328–1,148 feet.	Endemic to California. Known from only 8 recorded populations in the Comanche Point area, Tehachapi Mountains (Kern County). All are within the action area and are presumed extant.	Agricultural conversion; development; overgrazing.
Legenere (*Legenere limosa*)	–/–/1B	Small annual herb in the bellflower family (Campanulaceae); blooms April–June. Occurs in vernal pools and wet areas at elevations of 3–2,887 feet.	Endemic to California, including Lake, Napa, Placer, Sacramento, Shasta, San Mateo, Solano, and Tehama Counties; historically also occurred in Sonoma and Stanislaus Counties. Of more than 50 recorded populations, only 2 (1 extant, 1 extirpated) are within in the action area, both in San Joaquin County.	Agricultural conversion; overgrazing.
Panoche peppergrass (*Lepidium jaredii* ssp. *album*)	–/–/1B	Tall annual herb in the mustard family (Brassicaceae); blooms February–June. Grows on alkali bottoms, slopes, washes, and alluvial fans with clay and gypsum-rich soils, in valley and foothill grasslands at elevations of 607–902 feet.	Occurs in Fresno, San Benito, and San Luis Obispo Counties. Of 13 known occurrences, 8 (3 extant and 5 extirpated) are located within the action area, in the Panoche Hills (western Fresno County).	Gravel mining; grazing.

Species	Status Fed/State/CNPS	Description and Habitat	Distribution	Primary Threats
Congdon's lewisia (*Lewisia congdonii*)	–/Rare/1B	Perennial herb in the purslane family (Portulaceae); blooms April–June. Grows in chaparral, cismontane woodland, lower montane coniferous forest, and upper montane coniferous forest communities on dry talus slopes and in rock crevices at elevations of 1,640–9,186 feet.	Endemic to California; known only from the Merced River Canyon (Mariposa County) and Kings River Canyon (Fresno County). Of 8 known occurrences, 3 are within the action area and are presumed extant.	Herbicide spraying; road widening; collecting; landslides.
Mason's lilaeopsis (*Lilaeopsis masonii*)	–/Rare/1B	Small (0.6–3 inches) turf-forming perennial herb in the carrot family (Apiaceae). Semiaquatic. Spreads by rhizomes, producing narrow jointed leaves. Blooms April–November. Grows in marshes, brackish and freshwater swamps, and riparian scrub at elevations of 0–33 feet, on saturated clay soils that are regularly inundated.	Endemic to California. Known range extends from the Napa River in Napa County east to the channels and sloughs of the Sacramento–San Joaquin Delta from Contra Costa County to Solano, Sacramento, Yolo, and San Joaquin Counties. Of 148 total occurrences, the action area supports 37 that are extant.	Erosion; channel stabilization; development; flood control projects; recreation; agriculture; shading resulting from marsh succession; competition with nonnative water hyacinth (*Eichhornia crassipes*). In addition, saltwater intrusion and changes in water quality resulting from decreased flows in the Delta reduce habitat suitability.
Mariposa lupine (*Lupinus citrinus* var. *deflexus*)	–/T/1B	Annual herb in the pea family (Fabaceae); blooms April–May. Grows in chaparral and cismontane woodland communities on granitic substrate with sandy soil at elevations of 1,312–2,001 feet.	Endemic to California. Known from only 6 occurrences on the west slope of the Sierra Nevada, south of the town of Mariposa (Mariposa County). Total area occupied is less than 125 acres; lack of historical records of the species outside its current range suggests that it has always been rare. All 6 occurrences are within the action area and are extant.	Grazing; factors associated with development (e.g., irrigation runoff and herbicides).
Showy madia (*Madia radiata*)	–/–/1B	Annual herb in the sunflower family (Asteraceae). Species is glandular and grows 4–35 inches; blooms March–May. Grows on grassy slopes of cismontane woodlands and grasslands with adobe clay soils at elevations of 82–3,691 feet.	Endemic to California; occurs in western San Joaquin Valley (San Joaquin, Stanislaus, Fresno, Kings, and Kern Counties), eastern San Francisco Bay Area, and southern Coast Ranges. Of 32 known occurrences, 12 are within the action area.	Grazing; competition with invasive nonnative plants. Could also be threatened by road maintenance activities and conversion of habitat to off-highway vehicle use.
Hall's bush mallow (*Malacothamnus hallii*) Note: Hall's bush mallow is recognized only by CNPS. *The Jepson Manual* (Hickman 1993) includes this taxon in the treatment of *Malacothamnus fasciculatus*.	–/–/1B	Evergreen shrub in the mallow family (Malvaceae); grows 39–197 inches tall and blooms May–September. Found in chaparral plant communities at elevations of 33–1,804 feet. Some populations grow on serpentine soils.	Endemic to California (Contra Costa, Merced, Santa Clara, and Stanislaus Counties). Of 17 known occurrences, 4 extant occurrences are within the action area.	Grazing; rooting by feral pigs; proposed reservoir at Los Banos Creek in Merced County.

Species	Status Fed/State/CNPS	Description and Habitat	Distribution	Primary Threats
San Joaquin woollythreads (*Monolopia* [*Lembertia*] *congdonii*)	E/–/1B	Annual herb in the sunflower family (Asteraceae). Produces several white, woolly, many-branched trailing stems up to 10 inches long; blooms March–May. Grows in chenopod scrub, valley and foothill grasslands, and alluvial fans with a sparse cover of saltbush, commonly in sandy soils, at elevations of 197–2,625 feet.	Endemic to southern San Joaquin Valley and surrounding hills. Historic range extended from southern Fresno and Tulare Counties (excluding the Tulare Lake bed) to Bakersfield and Cuyama Valley. Now occurs primarily near Carrizo Plain, Kettleman Hills, and Kettleman Plain. Of 87 known occurrences, 68 (46 extant, 22 possibly extirpated) are within the action area.	More than 60% of historically known populations have been eliminated by conversion of habitat to agricultural uses. Threats to remaining unprotected populations include heavy grazing (especially by sheep); oil field development; energy development; possibly also air pollution.
Pincushion navarretia (*Navarretia myersii* ssp. *myersii*)	–/–/1B	Small white-flowered annual herb in the phlox family (Polemoniaceae); blooms in May. Occurs in vernal pools at elevations of 66–1,083 feet.	Endemic to California (central Sierra Nevada foothills and central Great Valley). Known from only 12 occurrences in Amador, Lake, Merced, and Sacramento Counties. Action area supports 3 extant occurrences.	Potential loss of habitat due to development.
Colusa grass (*Neostapfia colusana*)	T/E/1B	Annual in the grass family (Poaceae); grows 4–12 inches tall and flowers May–July. Occurs in large or deep vernal pools on clay substrates at elevations of 16–656 feet.	Endemic to Sacramento and San Joaquin Valleys. Historical distribution included Merced, Stanislaus, Solano, and Colusa Counties. Populations are currently known only from Merced, Stanislaus, and Solano Counties. Of 59 occurrences, 51 (41 extant, 4 possibly extirpated, and 6 extirpated) are with the action area.	Conversion of vernal pools to agricultural and developed lands; heavy grazing by cattle; competition from introduced weedy species.
Bakersfield cactus (*Opuntia basilaris* var. *treleasei*)	E/E/1B	Spiny-stemmed succulent shrub in the cactus family (Cactaceae); produces large, showy magenta flowers in May. Grows in chenopod scrub, cismontane woodland, and valley or foothill grassland communities on sandy or gravelly soils at elevations of 394–1,739 feet.	Endemic to southern San Joaquin Valley. Once formed extensive colonies around Bakersfield, extending up the Kern River Canyon to the northeast, through the Caliente Creek drainage to the southeast, and to the Tejon Hills. Now restricted to a limited area of central Kern County near Bakersfield. All 44 known occurrences are within the action area; 33 are extant, 1 is possibly extirpated, and 10 are known extirpated.	Energy development; agricultural conversion; grazing; sand mining; vehicles.
San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*)	T/E/1B	Small, grayish-green, sticky, aromatic, tufted annual in the grass family (Poaceae); blooms April–September. Grows in vernal pools at elevations of 98–2,477 feet.	Restricted to the San Joaquin Valley. Formerly common along the eastern margin of the Valley in Stanislaus, Merced, Fresno, Madera, and Tulare Counties; now mostly restricted to eastern Merced County, with additional occurrences in Madera, Tulare, and Merced Counties. All 48 known occurrences are within the action area; 28 are extant, 3 are possibly extirpated, and 17 are extirpated.	Almost half of the species' historical occurrences have been destroyed by conversion of grassland to agricultural uses. Additional threats include loss and degradation of habitat as a result of disking; hydrologic modification; urbanization; late spring grazing; and competition from nonnative weeds.

Species	Status Fed/State/CNPS	Description and Habitat	Distribution	Primary Threats
Hairy Orcutt grass (*Orcuttia pilosa*)	E/E/1B	Small tufted annual in the grass family (Poaceae); flowers May–September, typically producing several short stems, each with a dense inflorescence. Grows in vernal pools in rolling grasslands on remnant alluvial fans and stream terraces along eastern edge of Central Valley.	Endemic to east margin of Central Valley. Historically occurred from Tehama County south to Merced and Madera Counties. Currently, one-third of known populations are found in Tehama County, with other occurrences in Butte and Glenn Counties. Of 34 historically known populations, 24 remain; of these, only half are considered stable. In the action area, occurrences are known only in Madera and Stanislaus Counties.	Principal reason for species' decline has been loss of vernal pool habitat to agriculture and urbanization. Current threats include urbanization; agricultural activities and land conversion; off-highway vehicle use; highway expansion projects; competition from nonnative plants; possibly also grazing and trampling by livestock, depending on stocking level and timing and duration of grazing.
Hartweg's golden sunburst (*Pseudobahia bahiifolia*)	E/E/1B	Small annual; blooms March–April. Grows on grassy slopes in valley and foothill grasslands and at the edges of blue-oak woodland, usually on clay or shallow, well-drained, fine-textured, and gravelly soils on the north- or northeast-facing slopes of mima mounds, which are often associated with vernal pool complexes. Highest densities are usually on the upper slopes of mima mounds where grass cover is lowest.	Endemic to Central Valley. Historically, range may have extended from Yuba County south to Fresno County. Distribution is now concentrated in the Friant region (Fresno and Madera Counties) and the La Grange region (Stanislaus County). Of 20 known occurrences, 19 are within the action area, 15 of which are presumed extant. Most extant occurrences contain fewer than 200 plants.	Habitat loss caused by agricultural and urban development, levee construction, and pumice mining; overgrazing by cattle; competition with nonnative invasive plants; road construction, and off-highway vehicle use.
San Joaquin adobe sunburst (*Pseudobahia peirsonii*)	T/E/1B	Slender, woolly annual in the sunflower family (Asteraceae). Develops branching stems 4–24 inches tall; blooms March–April. Grows on heavy adobe clay soils in cismontane woodland and valley and foothill grassland communities at elevations of 295–2,625 feet.	Endemic to eastern San Joaquin Valley. Historically scattered from northern Kern County to Tulare and Fresno Counties. Now concentrated east of Fresno (Fresno County), west of Lake Success (Tulare County), and northeast of Bakersfield (Kern County). All 39 known occurrences are within the action area; 32 are extant, 2 are possibly extirpated, and 5 are extirpated.	Agriculture; grazing; development; road construction and maintenance; flood control activities.
Keck's checkerbloom (*Sidalcea keckii*)	E/–/1B	Annual herb in the mallow family (Malvaceae); blooms April–May, producing deep pink flowers. Grows in cismontane woodland and valley and foothill grassland communities with clay soils and serpentinite parent material at elevations of 394–1,395 feet.	Endemic to Tulare and Fresno Counties. All 3 known occurrences are within the action area; 1 is recent and 2 are historic.	Agricultural conversion; proposed development; possibly also grazing.

Species	Status Fed/State/CNPS	Description and Habitat	Distribution	Primary Threats
Oil neststraw (*Stylocline citroleum*)	–/–/1B	Annual herb in the sunflower family (Asteraceae); blooms March–April, producing a small, spherical woolly head. Habitat includes chenopod scrub, valley and foothill grasslands, and possibly coastal scrub; grows on clay soils at elevations of 164–1,312 feet.	Endemic to California. Historical distribution limited to Kern and San Diego Counties; now known only from the flats at Taft, the Kern River Canyon, and the Elk Hills (Kern County). Of 9 known occurrences, 8 extant occurrences are in the action area.	Urbanization; possibly also energy development, flooding, and fire.
Greene's tuctoria (*Tuctoria greenei*)	E/Rare/1B	Small tufted annual in the grass family (Poaceae); blooms May–September. Grows in vernal pools at elevations of 98–3,510 feet.	Endemic to the Central Valley. Historical range included parts of Shasta, Tehama, and Butte Counties and extended south through Fresno, Madera, San Joaquin, Stanislaus, and Tulare Counties. The 40 known occurrences are in Shasta, southern Tehama, Butte, Glenn, and eastern Merced Counties. Of these, 23 (7 extant, 7 possibly extirpated, and 9 extirpated) are within the action area.	Agricultural conversion; competition from weedy nonnative plants; overgrazing; residential development.
Kings gold (*Twisselmannia californica*)	–/–/1B	Annual herb in the mustard family (Brassicaceae); blooms March. Grows in chenopod scrub at an elevation of 213 feet.	One occurrence in Kings County.	

T = Threatened
E = Endangered
Rare = Listed as rare under the California Native Plant Protection Act. This category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.
1B = CNPS List 1B (Plants rare, threatened, or endangered in California and elsewhere)
4 = CNPS List 4 species (Plants of limited distribution)
– = No listing

Sources: Cypher and Sandoval 1997; Kaye et al. 1990; Hickman 1993; 62 Federal Register 58, March 26, 1997; U.S. Fish and Wildlife Service 1997; California Department of Fish and Game 1998; Al-Shehbaz 1999; Gregory et al. 2001; California Department of Fish and Game 2000a, 2000b; California Native Plant Society 2001; California Natural Diversity Database 2002; U.S. Fish and Wildlife Service 2002a through i.

Table 5-2. Overview of Action Area's Special-Status Plants Not Covered by Proposed Habitat Conservation Plan

Species	Status[a] Fed/State/CNPS	Habitat Requirements	Distribution	Blooming Period	Potential to be Impacted by the Proposed Action
Henderson's bent grass *Agrostis hendersoni*	SC/–/3	Moist places in valley and foothill grassland, vernal pools, below 1,000 feet.	Scattered locations in Central Valley and adjacent foothills. Butte, Calaveras, Merced, Placer, Shasta, and Tehama Counties.	Apr–May	Minimal; no known occurrences within 200 meters of PG&E infrastructure.
Mount Pinos onion *Allium howellii* var. *clokeyi*	–/–/1B	Great Basin scrub, pinyon-juniper woodland, between 4,200 and 6,000 feet.	Endemic to the Mount Pinos region of the northern western transverse ranges, Ventura County	Apr–Jun	Low. Species' geographic distribution and elevation range is largely outside the action area. CNDDB records only one occurrence in action area, dated 1955.
Sharsmith's onion *Allium sharsmithae*	–/–/1B	Rocky serpentine slopes in chaparral or cypress woodland, between 1,300 and 3,900 feet.	Diablo Range; San Francisco Bay region; Alameda, Santa Clara, and Stanislaus Counties.	Mar–May	Minimal; no known occurrences within 200 meters of PG&E infrastructure.
Yosemite onion *Allium yosemitense*	–/R/1B	Rocky, metamorphic substrates of broad-leaved upland forest, chaparral, cismontane woodland, lower montane coniferous forest, between 2,600 and 7,200 feet.	Central Sierra Nevada, including portions of Mariposa and Tuolumne Counties.	May–Jul	Minimal; no known occurrences within 200 meters of PG&E infrastructure. Proposed for HCP coverage but eliminated during HCP screening analysis based on location of known occurrences.
Suisun Marsh aster *Aster lentus*	SC/–/1B	Brackish and freshwater marsh, below 500 feet.	Sacramento–San Joaquin Delta, Suisun Marsh, Suisun Bay. Contra Costa, Napa, Sacramento, San Joaquin, and Solano Counties.	Aug–Nov	Low; impacts on species would be buffered by regulations protecting wetlands. Species would also be protected by requirements of PG&E's existing biological resources program.
Alkali milk-vetch *Astragalus tener* var. *tener*	–/–/1B	Grassy flats and vernal pool margins, on alkali soils, below 200 feet.	Merced, Solano, and Yolo Counties; historically more widespread.	Mar–Jun	Minimal; no known occurrences within 200 meters of PG&E infrastructure.
Heartscale *Atriplex cordulata*	SC/–/1B	Alkali grassland, alkali meadow, alkali scrub, below 660 feet.	Western Central Valley and valleys of adjacent foothills.	May–Oct	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Crownscale *Atriplex coronata* var. *coronata*	–/–/4	Chenopod scrub, valley and foothill grassland, vernal pools, on fine alkaline soils below 660 feet.	Southern Sacramento Valley, San Joaquin valley, eastern south coast inner range, Alameda, Contra Costa, Fresno, Kings, Kern, Glenn, Merced, Monterey, San Joaquin, San Luis Obispo, Solano, and Stanislaus Counties.	Apr–Oct	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Brittlescale *Atriplex depressa*	–/–/1B	Alkali grassland, alkali meadow, alkali scrub, chenopod scrub, playas, valley and foothill grasslands on alkaline or clay soils below 660 feet.	Sacramento Valley and valleys of adjacent foothills on west side of San Joaquin Valley.	May–Oct	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.

Species	Status[a] Fed/State/CNPS	Habitat Requirements	Distribution	Blooming Period	Potential to be Impacted by the Proposed Action
Earlimart orache *Atriplex erecticaulis*	–/–/1B	Valley and foothill grassland, 130 to 330 feet.	San Joaquin Valley in Kings, Kern, and Tulare Counties.	Aug–Sept	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
San Joaquin spearscale *Atriplex joaquiniana*	SC/–/1B	Alkali grassland, alkali scrub, alkali meadows, saltbush scrub, below 1,000 feet.	West edge of Central Valley from Glenn County to Tulare County.	Apr–Sept	Moderate to low; no known occurrences within 200 meters of PG&E infrastructure but species' habitat is common. However, species' habitat would be protected by HCP compensation for lesser saltscale and Bakersfield smallscale. Species would also be protected by requirements of PG&E's existing biological resources program.
Vernal pool saltscale (persistent-fruited saltscale) *Atriplex persistens*	–/–/1B	Dry beds of vernal pools, on alkaline soils, 33 to 380 feet.	Central Valley, from Glenn, Merced, Solano, Stanislaus*, and Tulare Counties.	Jul–Oct	Low; effects would be buffered by regulations protecting wetlands, and by HCP's measures for vernal pool protection. Species would also be protected by requirements of PG&E's existing biological resources program.
Subtle orache *Atriplex subtilis*	–/–/1B	Alkali scalds and alkali grasslands, often near vernal pools.	Central Valley, especially San Joaquin Valley: Butte, Fresno, Kings, Kern, Madera, Merced, and Tulare Counties.	Aug–Oct	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Lost Hills crownscale *Atriplex vallicola*	SC/–/1B	Alkali sink, alkaline vernal pool, saltbush scrub.	Lost Hills, vicinity of McKittrick in Kern County, scattered locations in Fresno, Kings, Kern, and Merced Counties.	Apr–Aug	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Kaweah brodiaea *Brodiaea insignis*	SC/E/1B	Cismontane woodland, valley and foothill grassland, on granitic or clay substrate.	Southern Sierra Nevada foothills, Kaweah and Tule River drainages, Tulare County.	Apr–Jun	Minimal; no known occurrences within 200 meters of PG&E infrastructure.
Alkali mariposa lily *Calochortus striatus*	SC/–/1B	Chaparral, chenopod scrub, Mohavean desert scrub, in alkaline meadows and ephemeral washes, 300 to 5,200 feet.	Western Mojave Desert, Kern, Los Angeles, San Bernardino, and Tulare Counties.	Apr–Jun	Minimal; no known occurrences within 200 meters of PG&E infrastructure.
Hoover's calycadenia (Hoover's rosinweed) *Calycadenia hooveri*	SC/–/1B	Cismontane woodland, valley and foothill grassland, on barren, rocky, exposed soil, 200 to 1,000 feet.	Northern and central Sierra Nevada foothills, Calaveras, Madera, Merced, Mariposa, and Stanislaus Counties.	Jul–Sep	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.

Species	Status[a] Fed/State/CNPS	Habitat Requirements	Distribution	Blooming Period	Potential to be Impacted by the Proposed Action
San Benito evening-primrose *Camissionia benitensis*	T/–/1B	Chaparral, cismontane woodland, on serpentinite, alluvium, clay, or gravelly substrates.	Inner south Coast Ranges, lower Clear Creek drainage, Fresno and San Benito Counties.	May–Jun	Minimal; no known occurrences within 200 meters of PG&E infrastructure.
Kern River evening-primrose *Camissonia integrifolia*	–/–/4	Chaparral, sagebrush scrub.	Southern Sierra Nevada foothills, Kern County.	May	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Chaparral harebell *Campanula exigua*	–/–/1B	Rocky areas in chaparral, usually on serpentinite.	San Francisco Bay region, northern inner south Coast Ranges; Alameda, Contra Costa, San Benito, Santa Clara, and Stanislaus Counties.	May–Jun	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Sharsmith's harebell *Campanula sharsmithiae*	–/–/1B	Barren, rocky serpentine areas in chaparral, at 1,300 to 3,000 feet.	Southern San Francisco Bay region, northern inner south coast range, Mount Hamilton area; Santa Clara and Stanislaus Counties.	May–Jun	Minimal; no known occurrences within 200 meters of PG&E infrastructure. Proposed for HCP coverage but eliminated during HCP screening analysis based on location of known occurrences.
Lemmon's jewelflower *Caulanthus coulteri* var. *lemmonii*	–/–/1B	Valley and foothill grassland, pinyon and juniper woodland, at 260 to 4,000 feet.	San Joaquin Valley.	Mar–May	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
San Benito spineflower *Chorizanthe douglasii*	–/–/1B	Chaparral, cismontane woodland, lower montane conifer forest.	Primarily known from Monterey, San Benito, and San Luis Obispo Counties.		Minimal; no known occurrences within 200 meters of PG&E infrastructure. Proposed for HCP coverage but eliminated during HCP screening analysis based on location of known occurrences.
Mount Hamilton thistle *Cirsium fontinale* var. *campylon*	SC/–/1B	Freshwater seeps and streams on serpentine outcrops; chaparral, cismontane woodland, valley and foothill grassland, at 1,000 to 2,500 feet.	Alameda, Santa Clara, and Stanislaus Counties.	Apr–Oct	Low. Species is highly localized, and the likelihood that O&M or minor construction activities would overlap with occupied habitat is evaluated as small. Species would be protected by requirements of PG&E's existing biological resources program, and species' habitat would benefit from regulatory protection and HCP measures for wetlands.
Kern Canyon clarkia *Clarkia xantiana* ssp. *parviflora*	–/–/1B	Cismontane woodland.	Southern Sierra Nevada foothills, Kern River drainage, Kern County.	May–Jun	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.

Species	Status[a] Fed/State/CNPS	Habitat Requirements	Distribution	Blooming Period	Potential to be Impacted by the Proposed Action
Beaked clarkia *Clarkia rostrata*	SC/–/1B	Annual grassland and blue oak-foothill pine woodland, on dry slopes, 200 to 1,500 feet.	Central Sierra Nevada foothills, San Joaquin Valley, Hell Hollow, and Merced River drainage. Merced, Mariposa, and Stanislaus Counties.	Apr–May	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Flaming trumpet *Collomia rawsoniana*	SC/–/1B	Lower montane coniferous forest, riparian forest.	Central Sierra Nevada foothills, Madera and Mariposa Counties.	Jul–Aug	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Mount Hamilton coreopsis *Coreopsis hamiltonii*	SC/–/1B	Steep shale talus slopes in cismontane woodland.	Eastern San Francisco Bay region, Santa Clara and Stanislaus Counties.	Mar–May	Minimal; no known occurrences within 200 meters of PG&E infrastructure. Proposed for HCP coverage but eliminated during HCP screening analysis based on location of known occurrences.
Mariposa cryptantha *Cryptantha mariposae*	–/–/1B	Chaparral on serpentine substrate.	Mariposa, Tuolumne, and Calaveras Counties.	Apr-May	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Hall's tarplant *Deinandra halliana Hemizonia clementina*	–/–/1B	Chenopod scrub, cismontane woodland, valley and foothill grassland/clay; elevation 980 to 3,100 feet.	Fresno, Monterey, San Benito, San Luis Obispo.	Apr–May	Minimal; no known occurrences within 200 meters of PG&E infrastructure.
Hospital Canyon larkspur *Delphinium californicum* ssp. *interius*	SC/–/1B	Openings in chaparral, mesic cismontane woodland, on moist slopes and ravines, 750 to 3,600 feet.	Inner South Coast Ranges, eastern San Francisco Bay, Alameda, Contra Costa, Merced, San Benito, Santa Clara, San Joaquin, and San Luis Obispo Counties.	Apr–Jun	Minimal; no known occurrences within 200 meters of PG&E infrastructure.
Kern County larkspur *Delphinium purpusii*	–/–/1B	Rocky areas in chaparral, cismontane woodland, pinyon-juniper woodland. Commonly on carbonate substrates.	Kern and Tulare Counties.	Apr–May	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Recurved larkspur *Delphinium recurvatum*	SC/–/1B	Subalkaline soils in annual grassland, saltbush scrub, cismontane woodland, vernal pools, 100 to 2,000 feet.	San Joaquin Valley and Central Valley of the South Coast Ranges, Contra Costa County to Kern County.	Mar–May	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Dwarf downingia *Downingia pusilla*	–/–/2	Vernal pools and mesic valley and foothill grasslands, to 1,500 feet.	California's Central Valley and South America.	Mar–May	Low; effects on vernal pool populations at least would be buffered by regulations protecting wetlands, and by HCP's measures for vernal pool protection. Species would also be protected by requirements of PG&E's existing biological resources program.

Species	Status[a] Fed/State/CNPS	Habitat Requirements	Distribution	Blooming Period	Potential to be Impacted by the Proposed Action
Four-angled spikerush *Eleocharis quadrangulata*	–/–/2	Freshwater marsh, lake and pond margins, 100 to 1,650 feet.	Scattered California occurrences, Butte, Merced, Shasta, and Tehama Counties.	May–Sep	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Moss *Entosthodon kochii*	–/–/1B	Cismontane woodland (soil), at 1,600 to 3,200 feet.	Known from Mariposa County along the Merced River.	N/A	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Keil's daisy *Erigeron inornatus* var. *keilii*	–/–/1B	Lower montane conifer forest, meadows.	Kern and Tulare Counties	Jun–Sep	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Kings River buckwheat *Eriogonum nudum* var. *regirivum*	–/–/1B	Cismontane woodland on carbonate substrate.	Fresno County.	Aug–Nov	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Round-leaved filaree *Erodium macrophyllum*	–/–/2	Open sites, dry grasslands and shrublands below 4,000 feet.	Sacramento Valley, northern San Joaquin Valley, Central Western California, South Coast, and northern Channel Islands (Santa Cruz Island).	Mar–May	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Tejon poppy *Eschscholzia lemmonii*	–/–/1B	Valley and foothill grasslands.	Kern County.		Minimal; no known occurrences within 200 meters of PG&E infrastructure. Proposed for HCP coverage but eliminated during HCP screening analysis based on location of known occurrences.
Diamond-petaled poppy *Eschscholzia rhombipetala*	–/–/1B	Grassland or chenopod scrub; on clay soils, where grass cover is sparse enough to allow growth of low annuals.	Interior foothills of south Coast Ranges from Contra Costa County to Stanislaus Counties, Carrizo Plain in San Luis Obispo County.	Mar–Apr	Minimal; no known occurrences within 200 meters of PG&E infrastructure. Proposed for HCP coverage but eliminated during HCP screening analysis based on location of known occurrences.
Spiny-sepaled button-celery *Eryngium spinosepalum*	SC/–/1B	Valley and foothill grasslands, vernal pools, at 330 to 840 feet.	Eastern San Joaquin Valley and Sierra Nevada foothills; Calaveras, Fresno, Madera, Stanislaus, Tulare, and Tuolumne Counties	Apr–May	Minimal; no known occurrences within 200 meters of PG&E infrastructure. Proposed for HCP coverage but eliminated during HCP screening analysis based on location of known occurrences.
Talus fritillary *Fritillaria falcata*	SC/–/1B	Chaparral, oak woodland, conifer forest on serpentine talus.	Southern inner Coast Ranges; Alameda, Monterey, San Benito, Santa Clara, and Stanislaus Counties.	Mar–May	Minimal; no known occurrences within 200 meters of PG&E infrastructure. Proposed for HCP coverage but eliminated during HCP screening analysis based on location of known occurrences.

Species	Status[a] Fed/State/CNPS	Habitat Requirements	Distribution	Blooming Period	Potential to be Impacted by the Proposed Action
Onyx Peak bedstraw *Galium angustifolium* ssp. *onycense*	–/–/1B	Rocky areas in cismontane woodland and pinyon-juniper woodland, on granitic substrate.	Onyx Peak area in Kern County.	Apr–Jul	Low. Species is highly localized, and the likelihood that O&M or minor construction activities would overlap with occupied habitat is evaluated as small. Species would also be protected by requirements of PG&E's existing biological resources program.
Napa western flax *Hesperolinon serpentinum*	–/–/1B	Chaparral on serpentinite substrate.	Alameda, Lake, Napa, and Stanislaus Counties.	May–Jul	Minimal; no known occurrences within 200 meters of PG&E infrastructure.
Shevock's hairy golden-aster *Heterotheca shevockii*	–/–/1B	Chaparral, cismontane woodland on serpentinite substrate.	Kern County.	Aug–Nov	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Rose-mallow (California hibiscus) *Hibiscus lasiocarpus*	–/–/2	Wet banks, freshwater marshes, generally below 135 feet.	Central and southern Sacramento Valley, deltaic Central Valley, Butte, Contra Costa, Colusa, Glenn, Sacramento, San Joaquin, Solano, Sutter, and Yolo Counties.	Jun–Sep	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Parry's horkelia *Horkelia parryi*	SC/–/1B	Chaparral or cismontane woodland openings (especially on Ione Formation), on dry slopes below 3,500 feet.	Amador, Calaveras, El Dorado, and Mariposa Counties.	Apr–Jun	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Munz's iris *Iris munzii*	–/–/1B	Cismontane woodland.	Tulare County.	Mar–Apr	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Knotted rush *Juncus nodosus*	–/–/4	Moist meadows and lake margins.	Inyo County; possibly Tulare County.	Jul–Sep	Low; effects would be buffered by regulations protecting wetlands. Species would also be protected by requirements of PG&E's existing biological resources program.
Coulter's goldfields *Lasthenia glabrata* ssp. *coulteri*	SC/–/1B	Grasslands, vernal pools, alkali sinks, and playas; on alkaline soils; below 4,600 feet.	Scattered locations in southern California from San Luis Obispo County to San Diego County. Outer southern Coast Ranges, south coast, northern Channel Islands, Peninsular Ranges, western Mojave desert.	Feb–Jun	Minimal; no known occurrences within 200 meters of PG&E infrastructure. Proposed for HCP coverage but eliminated during HCP screening analysis based on location of known occurrences.
Delta tule pea *Lathyrus jepsonii* var. *jepsonii*	SC/–/1B	Coastal and estuarine marshes, below 1,000 feet.	Central Valley, especially the San Francisco Bay region, Alameda, Contra Costa, Fresno, Marin, Napa, Sacramento, San Benito, Santa Clara*, San Joaquin, and Solano Counties.	May–Sep	Low; effects would be buffered by regulations protecting wetlands. Species would also be protected by requirements of PG&E's existing biological resources program.

Species	Status[a] Fed/State/CNPS	Habitat Requirements	Distribution	Blooming Period	Potential to be Impacted by the Proposed Action
Rayless layia *Layia discoidea*	SC/–/1B	Chaparral, cismontane woodland, lower montane conifer forest, on serpentinite, alluvial terraces, and talus substrate.	Fresno and San Benito Counties	May	Minimal; no known occurrences within 200 meters of PG&E infrastructure. Proposed for HCP coverage but eliminated during HCP screening analysis based on location of known occurrences.
Munz's tidy-tips *Layia munzii*	–/–/1B	Chenopod scrub, grasslands, flats and hillsides in alkaline clay soils, 170 to 2,500 feet.	Western San Joaquin Valley and interior foothills valleys from Fresno County to San Luis Obispo County.	Mar–Apr	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Jared's pepper-grass *Lepidium jaredii* ssp. *jaredii*	–/–/1B	Valley and foothill grassland (alkaline flats), 1,100 to 3,300 feet.	Kern, San Luis Obispo Counties.	Mar–May	Minimal; no known occurrences within 200 meters of PG&E infrastructure.
Madera leptosiphon *Leptosiphon serrulatus*	–/–/1B	Cismontane woodland, lower montane conifer forest.	Fresno, Kern, Madera, Mariposa, and Tulare Counties.	Apr–May	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Delta mudwort *Limosella subulata*	–/–/2	Muddy or sandy intertidal flats and marshes, streambanks in riparian scrub generally at sea level.	Deltaic Central Valley, Contra Costa, Sacramento, San Joaquin, and Solano Counties; Oregon.	May–Aug	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Sagebrush loeflingia *Loeflingia squarrosa* var. *artemisiarum*	–/–/1B	Great Basin scrub and Sonoran Desert scrub on sandy flats and dunes, 2,200 to 3,900 feet.	Inyo, Kern, Los Angeles, and Riverside Counties.	Apr–May	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Mt. Hamilton lomatium *Lomatium observatorium*	–/–/1B	Cismontane woodland, 4,000 to 4,360 feet.	Primarily Mt. Hamilton area, Santa Clara and Stanislaus Counties.	Mar–May	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Red-flowered lotus *Lotus rubriflorus*	SC/–/1B	Cismontane woodland, valley and foothill grassland, on sterile red soils and volcanic mudflow deposits.	Inner north Coast Ranges and San Francisco Bay area; Colusa, Stanislaus, and Tehama Counties.	Apr–Jun	Minimal; no known occurrences within 200 meters of PG&E infrastructure.
Orange lupine *Lupinus citrinus* var. *citrinus*	SC/–/1B	Chaparral, cismontane woodland, lower montane coniferous forest on granitic substrate.	Fresno and Madera Counties.	Apr–Jul	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Shaggyhair lupine *Lupinus spectabilis*	SC/–/1B	Chaparral, cismontane woodland on serpentinite substrate.	Mariposa and Tulare Counties.	Apr–May	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Indian Valley bush mallow *Malacothamnus aboriginum*	–/–/1B	Rocky areas in chaparral and oak woodland, often in burned areas.	Inner South Coast Ranges; Fresno, Monterey, and San Benito Counties.	Apr–Oct	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Moss (copper moss) *Mielichhoferia elongata*	–/–/2	Cismontane woodland (metamorphic rock, usually vernally mesic), 1,600 to 4,200 feet.	Fresno, Mariposa, Santa Cruz, Trinity, and Tulare Counties and other localities.	N/A	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Slender-stemmed monkeyflower *Mimulus filicaulis*	SC/–/1B	Cismontane woodland, lower and upper montane coniferous forest, meadows, vernally mesic, loamy soils.	Mariposa and Tuolumne Counties.	Apr–Aug	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.

Species	Status[a] Fed/State/CNPS	Habitat Requirements	Distribution	Blooming Period	Potential to be Impacted by the Proposed Action
Slender-stalked monkeyflower *Mimulus gracilipes*	–/–/1B	Chaparral, on soils derived from decomposed granite, often in burns and disturbed areas.	Fresno, Mariposa and Tuolumne Counties.	Apr–Jun	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Kaweah monkeyflower *Mimulus norrisii*	–/–/1B	Rocky areas in chaparral, cismontane woodland.	Fresno and Tulare Counties.	Mar–May	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Calico monkeyflower *Mimulus pictus*	–/–/1B	Broad-leaved upland forest and cismontane woodland, in bare ground around gooseberry bushes or around granitic rock outcrops, 300 to 4,200 feet.	Southern Sierra Nevada foothills and Tehachapi Mountains of Kern and Tulare Counties.	Apr–May	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Kelso Creek monkeyflower *Mimulus shevockii*	SC/–/1B	Joshua tree woodland, pinyon-juniper woodland, on sandy, granitic substrate.	Kern County.	Mar-May	Minimal; no known occurrences within 200 meters of PG&E infrastructure. Proposed for HCP coverage but eliminated during HCP screening analysis based on location of known occurrences.
Prostrate navarretia *Navarretia prostrata*	–/–/1B	Mesic sites in alkaline valley and foothill grassland, coastal scrub, vernal pools	Los Angeles, Merced, Monterey, Orange, Riverside, San Bernardino, and San Diego Counties.	Apr–Jul	Minimal; no known occurrences within 200 meters of PG&E infrastructure. Proposed for HCP coverage but eliminated during HCP screening analysis based on location of known occurrences.
Shining navarretia *Navarretia nigelliformis* ssp. *radians*	–/–/1B	Cismontane woodland, valley and foothill grassland, vernal pools.	Fresno, Merced, Monterey, San Benito, San Luis Obispo.	May–Jun	Vernal pool occurrences would be protected by HCP's vernal pool measures.
Piute Mountains navarretia *Navarretia setiloba*	SC/–/1B	Oak woodland, pinyon-juniper woodland, grassland, clay soil, 5,000 to 7,000 feet.	Kern and Tulare Counties.	Apr–Jun	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Merced phacelia *Phacelia ciliata* var. *opaca*	SC/–/1B	Adobe or clay soils of valley floor, open hills, alkali flats, or grasslands.	Merced County.	Feb–May	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Mount Diablo phacelia *Phacelia phacelioides*	SC/–/1B	Chaparral and oak woodland, adjacent to trails, on rock outcrops and talus slopes, at 2,000 to 3,000 feet.	South Coast Ranges from Contra Costa County to San Benito County	Apr-May	Minimal; no known occurrences within 200 meters of PG&E infrastructure. Proposed for HCP coverage but eliminated during HCP screening analysis based on location of known occurrences.

Species	Status[a] Fed/State/CNPS	Habitat Requirements	Distribution	Blooming Period	Potential to be Impacted by the Proposed Action
Charlotte's phacelia *Phacelia nashiana*	SC/–/1B	Joshua tree woodland, Mohavean Desert scrub, pinyon-juniper woodland on sandy or rocky areas on steep slopes or flats, on granitic soils, 2,000 to 7,000 feet.	Inyo, Kern, and Tulare Counties.	Mar–Jun	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Mount Diablo phacelia *Phacelia phacelioides*	SC/–/1B	Chaparral, oak woodland, adjacent to trails, on rock outcrops and talus slopes, at 2,000 to 3,000 feet.	Southern Coast Ranges from Contra Costa County to San Benito County.	Apr–May	Minimal; no known occurrences within 200 meters of PG&E infrastructure.
Slender-leaved pondweed *Potamogeton filiformis*	–/–/2	Freshwater marsh, shallow emergent wetlands.	Lassen, Merced, Mono, Placer, Santa Clara*, and Sierra Counties, Arizona, Nevada, Oregon, Washington.	May–Jul	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Moss *Pterygoneurum californicum*	–/–/1B	Playas, valley and foothill grasslands, on alkali soils at 30 to 300 feet.	Historic location in Kern County most likely extirpated; habitat still exists in Kern County.	N/A	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Parish's alkali-grass *Puccinellia parishii*	–/–/1B	Alkaline springs and seeps, at 2,300 to 6,000 feet.	Widely disjunctive localities in California, Arizona, New Mexico.	Apr–May	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Aromatic canyon gooseberry *Ribes menziesii* var. *ixoderme*	–/–/4	Chaparral, cismontane woodland	Fresno, Kern, and Tulare Counties.	Apr	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Sanford's arrowhead *Sagittaria sanfordii*	–/–/1B	Freshwater marshes, sloughs, canals, and other slow-moving water habitats, below 1,000 feet.	Scattered locations in Central Valley and Coast Ranges.	May–Aug	Low; effects would be buffered by regulations protecting wetlands. Species would also be protected by requirements of PG&E's existing biological resources program.
Moss *Schizymenium shevockii*	–/–/1B	Mesic cismontane woodland on metamorphic rocksubstrate, at 2,500 to 4,500 feet.	Known from only three occurrences in Fresno County.	N/A	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Marsh skullcap *Scutellaria galericulata*	–/–/2	Wet sites, mesic meadows, streambanks; coniferous forest between 330 to 6,900 feet.	Northern high Sierra Nevada, Modoc plateau, El Dorado, Lassen, Modoc, Nevada, Placer, Plumas, Shasta, San Joaquin, and Siskiyou Counties; Oregon.	Jun–Sep	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.
Rayless ragwort *Senecio aphanactis*	–/–/2	Open sandy or rocky areas in oak woodland or coastal scrub, on alkaline soils.	Scattered locations in central western California and southwestern California, from Alameda County to San Diego County	Jan–Apr	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.

Species	Status[a] Fed/State/CNPS	Habitat Requirements	Distribution	Blooming Period	Potential to be Impacted by the Proposed Action
Arburua Ranch jewel-flower *Streptanthus insignis* ssp. *lyonii*	–/–/1B	Coastal scrub, sometimes on serpentinite substrate.	Merced County.	Mar–May	Minimal; no known occurrences within 200 meters of PG&E infrastructure.
Mason's neststraw *Stylocline masonii*	–/–/1B	Chenopod scrub, pinyon-juniper woodland, in sandy washes, 300 to 3,900 feet.	Scattered locations from Monterey County to Los Angeles County.	Mar–Apr	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Moss *Tortula californica*	–/–/1B	Chenopod scrub, valley and foothill grassland, sandy soil, 30 to 300 feet.	Known from Kern and Riverside Counties.	N/A	Minimal; species' range includes part of action area but CNDDB shows no known occupied habitat in action area.
Wright's trichocoronis *Trichocoronis wrightii* var. *wrightii*	–/–/2	Floodplains and other moist places, on alkaline soils, below 1,500 feet.	Scattered locations in the Central Valley and on the south coast of Texas.	May–Sep	Potential impacts analyzed in this EIS/EIR; see Impact BIO5.

[a] Status explanations:

Federal
T = Listed as threatened under the federal Endangered Species Act.
SC = Species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.
– = No listing.

State
E = Listed as endangered under the California Endangered Species Act.
R = Listed as rare under the California Native Plant Protection Act. This category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.
SSC = Species of special concern in California.
– = No listing.

CNPS (California Native Plant Society)
1A = List 1A species: presumed extinct in California.
1B = List 1B species: rare, threatened, or endangered in California and elsewhere.
2 = List 2 species: rare, threatened, or endangered in California but more common elsewhere.
3 = List 3 species: plants about which more information is needed to determine their status.
4 = List 4 species: plants of limited distribution.
– = No listing.
* = Known populations believed extirpated from that county.
? = Population location within county uncertain.
N/A = Not applicable

Table 5-3. Overview of Special-Status Wildlife Species Covered by Proposed Habitat Conservation Plan

Species	Status Fed/CA	Habitat Requirements	Distribution	Reasons for Decline
Vernal pool fairy shrimp (*Branchinecta lynchi*)	T/–	Inhabits ephemeral pools (vernal pools) in grassland or basalt flow depressions. Pools typically have grass or mud bottoms. Also occurs in other wetlands with habitat characteristics similar to those of vernal pools, including alkaline rain-pools, rock outcrop pools, and some constructed sites. Occupied habitats range from 0.56-m^2 puddles to pools exceeding 10 hectares. Pools must stay inundated long enough (3 weeks under optimal conditions) for the species to complete its life cycle, but species does not use riverine, marine, or other permanent waters.	From Shasta County in the north throughout the Central Valley to Tulare County and west to the central Coast Ranges. Disjunct populations occur in San Luis Obispo, Santa Barbara, and Riverside Counties. Most known locations are in the Sacramento and San Joaquin Valleys and along the east margin of the central Coast Ranges.	Conversion of vernal pool habitat to agricultural uses and urban development; water supply and flood control activities; destruction and modification of pools from filling, grading, disking, leveling, and other activities; modification of surrounding uplands that alters vernal pool hydrology.
Midvalley fairy shrimp (*Branchinecta mesovallensis*)	SC/–	Found in ephemeral aquatic habitats that contain standing water in the winter and spring; primarily found in vernal pools but sometimes also in vernal swales and other ephemeral wetlands such as roadside puddles and pools. Most occupied vernal pools are small (<200 m^2) and shallow (10 centimeters on average) with grassy bottoms. Life cycle can be completed in as little as 8 days, especially when late-season rains are followed by warm weather.	Endemic to Central Valley; 58 occurrences are known Sacramento, Yolo, Solano, Contra Costa, San Joaquin, Madera, Merced, and Fresno Counties. Also found in the Sierra Nevada foothills from Yuba County south to Kern County, and along the east flank of the Coast Ranges from the Sacramento Valley south to Santa Clara County.	Urban development; flood control activities; expansion of agricultural uses; development activities that alter local hydrology.
Vernal pool tadpole shrimp (*Lepidurus packardi*)	E/–	Found in grass-bottomed swales on old alluvial soils underlain by hardpan; and in mud-bottomed pools with highly turbid water. Occupied habitats range in size from 5 m^2 to 36 hectares. Pools must dry out and reinundate for cysts to hatch. Adult populations generally persist until the habitat dries up.	Endemic to Central Valley. Most populations occur in the Sacramento Valley. Also reported from the Sacramento River Delta to the east side of San Francisco Bay, and from scattered localities in the San Joaquin Valley from San Joaquin County to Merced County.	Conversion of vernal pool habitat to agricultural uses and urban development; water supply and flood control activities; direct destruction and modification of pools from filling, grading, disking, leveling, and other activities; modification of surrounding uplands that alters vernal pool hydrology.
Valley elderberry longhorn beetle (VELB) (*Desmocerus californicus dimorphus*)	T/–	Hosted by elderberry shrubs (*Sambucus* spp.) in riparian forests and adjacent uplands that may also include cottonwoods (*Populus* spp.), willows (*Salix* spp.), ashes (*Fraxinus* spp.), oaks (*Quercus* spp.), and walnuts (*Juglans* spp.). Found in many different plant communities where elderberries grow but is most common in riparian woodlands and savannas, possibly because of the greater concentration of elderberries in these areas.	Throughout the Central Valley and foothills from the northern border of Shasta County to southern Kern County, and from the watershed of the Central Valley in the west to approximately 3,000 feet above sea level in the Sierra Nevada foothills.	Conversion of riparian and nonriparian habitats to agricultural uses and urban development
California tiger salamander (*Ambystoma californiense*)	T, SSC	Restricted to grasslands and low foothill regions that provide breeding habitat, including temporary ponds or pools, slower portions of streams, and some permanent waters. Unlikely to use permanent waters unless fish predators are absent. Requires dry-season refugia such as ground squirrel burrows within 1 mile of breeding sites.	Endemic to areas below 1,400 feet in the San Joaquin and Sacramento River valleys and bordering foothills. Also found in coastal valleys of central California. In the Central Valley, range extends from southern Sacramento County south to Tulare County.	Agriculture; urban development; introduction of nonnative predators such as fish, bullfrogs, and crayfish; loss of dry season refuge habitat due to land use changes; poisoning of ground squirrels.
Limestone salamander (*Hydromantes brunus*)	SC/T, FP	Requires moss-covered talus piles and cliff crevices for refugia. Extensive rock cover is a characteristic of all	Limited to scattered locations along the Merced River and its tributaries between	Lack of suitable habitat; fragility of suitable habitat; mining; road construction; alteration of natural

Species	Status Fed/CA	Habitat Requirements	Distribution	Reasons for Decline
		occupied sites; surrounding habitat typically consists of oak/buckeye woodland with a thick shrub understory. Species is often found on steep north- to east-facing slopes, which provide shade. Optimal habitat is moist but not wet; species is found more often on the slopes of ravines and canyons than on valley floors.	Briceburg and McClure Reservoir in Mariposa County.	hydrology.
California red-legged frog (*Rana aurora draytonii*)	T/SSC	Requires cool-water habitat (pools, streams, and ponds) with emergent and submergent vegetation. Most abundant in habitats with pools at least 2.5 feet deep, dense stands of overhanging willows (*Salix* spp.), and a fringe of tules (*Scirpus* spp.) or cattails (*Typha* spp.) Can inhabit either ephemeral or permanent streams and ponds, but populations probably cannot be maintained in ephemeral streams in which all surface water disappears during the dry season. Adults may take refuge during dry periods in rodent holes, leaf litter in riparian habitats, or large cracks in the bottom of dried ponds. Adults typically remain near streams or ponds, but some individuals have been observed to move more than 2 miles through upland habitat, typically during wet weather and/or at night.	Known from isolated locations in the Sierra Nevada, northern Coast Ranges, and northern Transverse Ranges; relatively common in the San Francisco Bay area and along the central coast. Believed to be extirpated from the floor of the Central Valley.	Large-scale commercial harvesting; competition with nonnative aquatic predators such as bullfrogs (*Rana catesbeiana*), crayfish (*Procambarus clarki*), and various fishes; conversion of land to agricultural and commercial uses; reservoir construction; off-highway vehicle use; livestock grazing.
Blunt-nosed leopard lizard (*Gambelia sila*)	E/E, FP	Found in undeveloped areas. Inhabits sparsely vegetated plains, alkali flats, grasslands, low foothills, canyon floors, and large washes; typically uses areas with sandy soils and scattered vegetation and is absent from thickly vegetated habitats. In the San Joaquin Valley, species is usually found in nonnative grassland, valley sink scrub, valley needlegrass grassland, alkali playa, and valley saltbush scrub habitats. Uses ground squirrel and kangaroo rat burrows for shelter and thermoregulation.	Endemic to San Joaquin Valley. Scattered occurrences at elevations below 2,600 feet, from Sierra Nevada foothills west to the Coast Ranges; on the Carrizo Plain; and in the Cuyama Valley west of the San Joaquin Valley.	Habitat disturbance, destruction, and fragmentation as a result of cultivation, petroleum and mineral extraction, off-highway vehicle use, and construction of transportation, communication, and irrigation infrastructure. Also threatened by pesticide use.
Giant garter snake (*Thamnophis gigas*)	T/T	Found in emergent wetlands, including marshes, sloughs, ponds, and small lakes; and in low-gradient waterways such as small streams, irrigation and drainage canals, and rice fields. Requires permanent water during the active season (early spring through mid-fall) to maintain populations of food organisms. Also requires herbaceous emergent vegetation for cover and foraging, along with open areas and grassy banks for basking. Uses small mammal burrows and crevices in upland habitat for winter hibernation sites and refuge from floodwaters. All three habitat components (cover and foraging habitat, basking areas, and protected hibernation sites) are needed for the species to persist in an area.	Endemic to Central Valley. Historically found from Butte County south to Kern County. Since the 1940s, the species has been extirpated from the southern end of its range; now found from near Gridley (Butte County) to Mendota Wildlife Area (Fresno County).	Habitat loss from urban and agricultural development and flood control activities; upstream watershed modifications; water storage and diversion projects; interruptions in water supply; poor water quality and water pollution; predation by mammals, birds, and introduced game fishes such as largemouth bass (*Micropterus salmoides*) and catfish (*Ictalurus* spp.); vehicle traffic; agriculture; channel maintenance (e.g., canal bank earthwork, mowing, herbicide use).
Swainson's hawk	SC/T	Primarily consumes insects and small rodents, foraging	Nests in the lower Sacramento and San	Conversion of native grassland and woodland

Species	Status Fed/CA	Habitat Requirements	Distribution	Reasons for Decline
(*Buteo swainsoni*)		in large, open plains and grasslands. Hay, grain, and most row crops also provide suitable foraging habitat during at least part of the breeding season. Vineyards and orchards are unsuitable because prey is scarce or unavailable due to vegetation density. Usually nests in large trees, preferring native species. Most nest sites are found in riparian habitats, but species may also use mature roadside trees, isolated individual trees in agricultural fields, small groves of oaks, and trees around farm houses.	Joaquin Valleys, the Klamath Basin, and Butte Valley. Highest nesting densities occur near Davis and Woodland, Yolo County	communities to agricultural and urban uses; pesticide contamination; mortality from shooting; disturbance at nesting sites.
White-tailed kite (*Elanus leucurus*)	SC/FP	Found in low-elevation grassland, savannah, oak woodland, wetland, agricultural, and riparian habitats. Preys mostly on voles (*Microtus* spp.) and other small mammals, foraging in undisturbed open grasslands, meadows, farmlands, and emergent wetlands. Requires large shrubs or trees for nesting and communal roosting; vegetation structure and prey populations appear to be more important than plant associations in determining habitat suitability. Nest trees range from small, isolated shrubs and trees to trees in relatively large stands.	Lowland areas west of Sierra Nevada from the head of the Sacramento Valley south, including coastal valleys and foothills to western San Diego County at the Mexico border.	Degradation and loss of breeding and foraging habitat; conversion of natural or agricultural lands to urban and commercial development; loss of vegetation needed by prey species because of farming techniques; increased competition for nest sites; drought; increased disturbance at nest sites.
Golden eagle (*Aquila chrysaetos*)	PR/SSC, FP	Typically found in rolling foothills, mountain areas, sage-juniper flats, and desert. Prefers territory with a favorable nest site, a dependable food supply (medium-sized to large mammals and birds), and broad expanses of open country for foraging. Hilly or mountainous country where takeoff and soaring are supported by updrafts is generally preferred to flat habitats; deeply cut canyons rising to open mountain slopes and crags is ideal habitat. Uses secluded cliffs with overhanging ledges, and large trees near forest edges or in small stands near open fields, for nesting and cover.	Found throughout much of California year-round; breeds in much of the state except for the center of the Central Valley.	Land use changes and encroaching urbanization; shooting; unintentional human disturbance in nesting and hunting areas; pesticides and pollutants; electrocution; collisions with wires and wind turbines.
Bald eagle (*Haliaeetus leucocephalus*)	T, PR/E, FP	Breeds in coastal areas and at rivers, lakes, and reservoirs with forested or cliff shorelines. Winters in aquatic areas offering open water for foraging. Nests in trees in mature and old growth forests that have some habitat edge and are within 1.25 miles of water offering suitable foraging. Tends to select nest trees that are more than about 0.3 mile from human development and disturbance. Uses snags or other hunting perches adjacent to large bodies of water or rivers to hunt for fish.	Nests in Siskiyou, Modoc, Trinity, Shasta, Lassen, Plumas, Butte, Tehama, Lake, and Mendocino Counties and in the Lake Tahoe Basin. Reintroduced into central coast. Winter range includes the rest of California, except the southeastern deserts, very high altitudes in the Sierra Nevada, and east of the Sierra Nevada south of Mono County	Shooting; habitat destruction; electrocution from collisions with power lines; human disturbance; poisoning by DDT and other pesticides.
Western burrowing owl (*Athene cunicularia hypugea*)	SC/SSC	Requires habitat with three key attributes: open, well-drained terrain; short, sparse vegetation; and underground burrows or burrow facsimiles. Occupies grasslands; deserts; sagebrush scrub; agricultural areas,	Lowlands throughout California, including the Central Valley, northeastern plateau, southeastern deserts, and coastal areas. Rare along south coast.	Habitat destruction, including conversion of grassland to agriculture and urban development; elimination of burrowing rodents through control programs.

Species	Status Fed/CA	Habitat Requirements	Distribution	Reasons for Decline
		including pastures and untilled margins of cropland; earthen levees and berms; coastal uplands; and urban vacant lots as well as the margins of airports, golf courses, and roads. Relies on burrows excavated by fossorial mammals such as ground squirrels (*Spermophilus* spp.), badgers (*Taxidea taxus*), skunks (*Mephitis* spp.), and coyotes (*Canis latrans*) for nesting and cover (Karalus and Eckert 1987). Can also use cavities in rock outcrops and artificial habitat such as concrete, asphalt, and piles of rubble for nesting sites.		
Bank swallow (*Riparia riparia*)	SC/T	Nests in friable alluvial soils of vertical banks, cliffs, and bluffs along ocean coasts, rivers, streams, lakes, and reservoirs. Banks must be steep and tall enough to provide some protection from terrestrial predators. Typically nests in colonies; colonies range from 10 to more than 2,000 nests. During migration, species can be found in a variety of open and water-associated habitats.	Range in California has been reduced by 50% since 1900. Now found primarily along the upper Sacramento River; additional populations along the central coast north to San Francisco Bay, and in the Honey Lake and Lower Klamath Lake areas.	Habitat loss and degradation from flood and erosion control projects; erosion and bank undercutting during breeding season, as a result of wave wash from boats, high winds, storms, and reservoir releases; loss and modification of wetlands, grasslands, and other open habitats.
Tricolored blackbird (*Agelaius tricolor*)	SC/SSC	Forages year-round in annual grasslands; wet and dry vernal pools and other seasonal wetlands; agricultural fields; cattle feedlots; and dairies. May also forage in riparian scrub habitats and along marsh borders. Weed-free row crops and intensively managed vineyards and orchards do not serve as regular foraging sites. Most foraging occurs within 3 miles of nesting colony sites, but commute distances up to 8 miles have been reported. Breeding requires sites that offer access to water; a protected nesting substrate (flooded, thorny, or spiny vegetation); and a suitable foraging area with adequate insect prey within a few miles.	Breeding colonies occur in all Central Valley counties, primarily in central California; additional populations found in coastal and inland southern California locations and scattered sites in Oregon, western Nevada, and western coastal Baja California.	Habitat loss; destruction of nests; predation.
Buena Vista Lake shrew (*Sorex ornatus relictus*)	E/SSC	Found in moist vegetative communities with a mature overstory, a dense riparian understory, and 90–95% ground cover; requires abundant, diverse insect population for food.	Known from the Kern Preserve and Kern National Wildlife Refuge.	Conversion of riparian and wetland habitats to croplands; water diversions.
Riparian brush rabbit (*Sylvilagus bachmani riparius*)	E/E	Occupies riparian forest with a dense understory shrub layer. Closed-canopy forests are generally deficient in shrub understory to support the species. Common plants in suitable habitat include California wild rose (*Rosa californica*), California blackberry (*Rubus ursinus*), wild grape (*Vitis californica*), coyote brush (*Baccharis pilularis*), and various grasses.	Known from isolated populations along the lower San Joaquin and Stanislaus Rivers in the northern San Joaquin Valley; localities include Caswell Memorial State Park and the Paradise Cut area (San Joaquin County).	Habitat loss; wildfire; disease; predation; clearing of riparian vegetation; rodenticide use; flooding.
Riparian (San Joaquin Valley) woodrat (*Neotoma fuscipes riparia*)	E/SSC	Most abundant where shrub cover is dense; least abundant in open areas. In riparian areas, highest densities of woodrats and their nests commonly occur in	Historical distribution along the San Joaquin, Stanislaus, and Tuolumne Rivers, and Caswell State Park in San Joaquin,	Loss and fragmentation of habitat from cultivation and construction of large dams and canals; cattle grazing; inbreeding; catastrophic events such as fire,

Species	Status Fed/CA	Habitat Requirements	Distribution	Reasons for Decline
		willow thickets with an oak overstory. More likely to be present where there are deciduous valley oaks and few live oaks.	Stanislaus, and Merced Counties; presently limited to San Joaquin County at Caswell State Park and a possible second population near Vernalis.	flooding, and drought.
Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*)	E/E	Occupies arid-land communities on alluvial fans and saline floodplain soils; occurs in higher densities where shrub cover is sparse to moderate. Burrow systems are most often located in open areas; commonly found in slightly elevated mounds, road berms, canal embankments, railroad beds, and at bases of shrubs and fences where windblown soils accumulate. For permanent occupancy, species requires terrain not subject to flooding. Soils with finer texture and higher salinity are more commonly associated with higher-density populations than are less saline soils.	Limited to scattered clusters west of the towns of Tipton, Pixley, and Earlimart (Tulare County); around Pixley National Wildlife Refuge, Allensworth Ecological Reserve, and Allensworth State Historical Park; around Delano and Lamont (Kern County); and at the Coles Levee Ecosystem Preserve and other scattered units in southern Kern County.	Loss of habitat from agricultural conversion, including cultivation of alkaline soils in saltbush, valley sink scrub, and relict dune communities; rodenticide use.
Giant kangaroo rat (*Dipodomys ingens*)	E/E	Prefers annual grassland communities with few or no shrubs, gentle slopes, and well-drained, sandy loam soils, typically in areas with scant rainfall that are free from winter flooding. Can also be found in shrub communities on a variety of soil types on slopes up to 22%. May colonize agricultural areas that have been fallow for at least a year, but does not use actively cultivated areas. A few burrow systems have been found in remnant patches of habitat along canals, roads, or other rights-of-way.	Known from the Panoche region (western Fresno and eastern San Benito Counties); the Kettleman Hills (Kings County); the Lokern and Elk Hills areas and various other uplands near Taft, Maricopa, and McKittrick (western Kern County); the Carrizo Plain Natural Area and San Juan Creek Valley (San Luis Obispo County); and the Cuyama Valley (Santa Barbara and San Luis Obispo Counties).	Urban and industrial development; mineral and petroleum extraction; construction of linear transportation and utility infrastructure; lack of grazing or fire to control vegetation density on conservation lands.
San Joaquin (Nelson's) antelope squirrel (*Ammospermophilus nelsoni*)	SC/T	Inhabits dry grasslands with sandy loam soils and widely spaced alkali scrub vegetation. Omnivorous; will feed on green vegetation, fungi, insects, and/or seeds, depending on availability.	Primarily found on the Carrizo and Elkhorn Plains (eastern San Luis Obispo County) and around Lokern and Elk Hills (western Kern County); smaller populations use marginal habitat in the foothills at the western edge of the San Joaquin Valley.	Habitat loss and fragmentation due to conversion of habitat to agricultural use; petroleum exploration and production; overgrazing by livestock.
San Joaquin kit fox (*Vulpes macrotis mutica*)	E/T	Because agriculture has replaced much of the Central Valley's native habitat, species appears to have adapted to marginal areas such as grazed, nonirrigated grasslands; peripheral lands adjacent to tilled and fallow fields; irrigated row crops, orchards, and vineyards; petroleum fields; and urban areas. Usually prefers areas with loose-textured soils suitable for den excavation, but is found on virtually every soil type. Where soils make digging difficult, may enlarge or modify burrows built by other animals, particularly California ground squirrels. May also use structures such as culverts, abandoned pipelines, and well casings as den sites.	Historical range unknown but believed to have extended from Contra Costa and San Joaquin Counties south to Kern County. Now uses areas of suitable habitat on the floor of the San Joaquin Valley and in the surrounding foothills of the Coast Ranges, Sierra Nevada, and Tehachapi Mountains from Kern County north to Contra Costa, Alameda, and San Joaquin Counties.	Habitat loss and fragmentation as a result of agricultural, industrial, and urban development; continued predation and competition from coyotes and other predators; decreases in prey populations due to catastrophic events such as extended drought or rain; accidents and disease (becoming increasingly important as species is subjected to more contact with humans, their pets, and livestock).

Species	Status Fed/CA	Habitat Requirements	Distribution	Reasons for Decline

Status explanations:

Federal

E = listed as endangered under the federal Endangered Species Act.
T = listed as threatened under the federal Endangered Species Act.
PT = proposed for federal listing as threatened under the federal Endangered Species Act.
PR = federally protected under the Bald and Golden Eagle Protection Act.
C = species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded.
SC = species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.
– = no listing.

State

E = listed as endangered under the California Endangered Species Act.
T = listed as threatened under the California Endangered Species Act.
FP = fully protected under the California Fish and Game Code.
SSC = species of special concern in California.
– = no listing.

Sources: Storer 1925; Neff 1937; Grinnell and Miller 1944; Wright and Wright 1949; Stebbins 1954; Orians 1961; Anderson 1968; Montanucci 1965, 1967, 1970; Feaver 1971; Stebbins 1972; Hansen and Brode 1980; Tordoff 1980; U.S. Fish and Wildlife Service 1980; Williams 1980; Bruce et al. 1982; Tollestrup 1982; Kauffman et al. 1983; U.S. Fish and Wildlife Service 1983; Brode and Bury 1984; Estep 1984; Kauffman and Krueger 1984; Schlorff and Bloom 1984; Evens and Page 1986; Jennings and Hayes 1985; U.S. Fish and Wildlife Service 1985; Bohn and Buckhouse 1986; Hansen 1986; Hayes and Jennings 1986; Orloff et al. 1986; Williams 1986; California Department of Fish and Game 1988; Ehrlich et al. 1988; Hayes and Jennings 1988; Jennings 1988; Pogsdon and Lindstedt 1988; Zeiner et al. 1988; Estep 1989; Frayer et al. 1989; Eng et al. 1990; Jennings and Hayes 1990; Johnsgard 1990; Wilen and Frayer 1990; Zeiner et al. 1990a, 1990b; Barr 1991; Beedy et al. 1991; Evens et al. 1991; California Department of Fish and Game 1992a, 1992b; Williams 1992; Germano and Williams 1993; Haug et al. 1993; Williams and Germano 1993; Anthony et al. 1994; Barry and Shaffer 1994; Eddleman et al. 1994; Fisher et al. 1994; Hansen and Tordoff 1994; Jennings and Hayes 1994; California Department of Fish and Game 1995; Hamilton et al. 1995; Hunt et al. 1995; Cook 1996; Helm 1996; Loredo et al. 1996; Baicich and Harrison 1997; Beedy and Hamilton 1997; Watson 1997; Hunt et al. 1998; U.S. Fish and Wildlife Service 1998; Beedy and Hamilton 1999; Eriksen and Belk 1999; Cook 1999; Garrison 1999; U.S. Fish and Wildlife Service 1999a; U.S. Fish and Wildlife Service 1999b; Belk and Fugate 2000; Buehler 2000; California Department of Fish and Game 2000b; Garrison 2000; Hamilton 2000; Center for Biological Diversity and VernalPools.org 2001; Fellers et al. 2001; Rogers 2001; U. S. Fish and Wildlife Service 2002; Center for Biological Diversity et al. 2003; Stebbins 2003; Alvarez in press; Bradbury et al. in preparation; 58 FR 54053; 59 FR 48136–48153; 64 FR 128 36454–36464; 65 FR 8881, 57242–57264; 66 FR 14626; 67 FR 10101; 68 FR 13498–13520, 28648–28670; 69 FR 3592–3598; Dunk 1995.

In addition to the species covered in the proposed HCP, another 31 special-status wildlife species are known to occur or have the potential to occur in the action area. These species are referred to as *noncovered special-status species* in this EIS/EIR. Noncovered special-status wildlife species were identified for inclusion in this EIS/EIR based on work done during the preparation of the proposed HCP; in addition, as described above for special-status plants, the current (2004) CNDDB was consulted to determine whether additional species should be added to those originally identified through the HCP process. The resulting list includes all special-status wildlife species that are known or likely to occur in the action area and have the potential to be impacted by O&M or minor construction activities or HCP implementation, but did not meet the criteria listed above for HCP coverage. Table 5-4 contains a summary of their legal status, distribution, and habitat requirements.

Environmental Consequences and Mitigation Strategies

Methodology for Impact Analysis

Impacts on biological resources were analyzed through a combination of quantitative and qualitative techniques, incorporating professional judgment in light of the nature of the proposed activities and current conservation practices.

Analysis focused primarily on the potential for activities enabled by the proposed action to affect special-status species, including but not limited to those specifically covered in the proposed HCP. Analysis addressed direct effects such as direct disturbance, injury, and mortality, as well as indirect effects through loss and degradation of habitat and other factors. Because the action area is so extensive and supports such a diversity of special-status plants and wildlife, this approach incorporated analysis of potential effects on sensitive habitats such as wetlands and riparian areas that are sometimes evaluated separately. Analyses did not address loss or disturbance of cultivated agricultural ~~fields~~ lands (croplands, orchards, vineyards, fallow fields, etc.; see *Land Cover Types in Action Area* above) or other developed or disturbed lands, because the level of disruption associated with O&M and minor construction activities is expected to be commensurate with ongoing disturbances resulting from established uses on these types of parcels.[3],[4] Note that because grazing is an important activity in much of the action area, analyses in Chapters 3 (*Land Use and Planning*) and 4

[3] Potential for the proposed action to result in conversion of agricultural lands to nonagricultural uses is addressed separately in Chapter 4 (*Agricultural Resources*).

[4] Note that some types of agricultural lands included in the agricultural lands land-cover type provide limited habitat value for a few of the HCP-covered species, as discussed in HCP Table 3-10 and HCP Appendix C. Potential direct and indirect take as a result of O&M activities on agricultural lands was addressed in the HCP and is incorporated into the impact analyses presented in this chapter.

(*Agricultural Resources*) of this EIS/EIR include grazing as an agricultural land use. Analysis of effects on biological resources reflected the HCP approach, which distinguishes between cultivated agricultural lands and grasslands (including grazed grasslands and irrigated pasture) because cultivated agricultural lands and grasslands offer very different habitat values.

Effects on HCP-covered species were evaluated on the basis of acreage estimates in the HCP, which analyzed the area potentially affected by O&M and minor construction during the 30-year permit term, and the resulting potential for effects on covered species. These analyses are presented in full in Chapter 3 of the proposed HCP, presented as Appendix B of this EIS/EIR. For brevity, they are not reproduced here.

For noncovered special-status wildlife species, additional calculations using the HCP methodology were performed to identify the acreage of habitat for noncovered special-status plants in the action area as a whole, and within 200 meters (650 feet) of PG&E infrastructure. The 200-meter limit was identified as part of PG&E's programmatic assessment of potential effects conducted during development of the proposed HCP. This distance represents the maximum width of the disturbance area for O&M activities; most disturbance areas are confined to the facility ROWs, which typically range from 10 to 150 feet wide on either side of the facility centerline. Because of the uncertainty associated with how much area outside the ROW would be disturbed in any given activity, PG&E conservatively assumed that a maximum of 25% of the habitat within 200 meters of infrastructure could be disturbed over the 30 year permit term. EIS/EIR impact analyses compared this disturbance estimate to the total acreage of ~~occupied~~ suitable habitat for each species known to exist in the action area. The resulting percentage was used to support a qualitative assessment of the likelihood for adverse impacts at the population level.

Additional calculations based on the HCP methodology were also performed for noncovered special-status plant species. This involved identifying the noncovered special-status plant species with documented occupied habitat within 150 meters of PG&E infrastructure, based on accuracy classes 1 through 4 in the 2004 CNDDB. As with the covered species and noncovered wildlife, analysis assumed that up to 25% of the occupied habitat within this corridor could be disturbed over the permit term. This 25% value was then compared to the total area of known occupied habitat for each species within the action area, based on CNDDB accuracy classes 1 through 4. CNDDB records in accuracy classes 5 and above were not included in the analysis because the uncertainty of location for these accuracy classes is greater than 300 meters (substanstantially greater than the width of PG&E's O&M work corridors, thus precluding meaningful analysis). In addition, accuracy classes 5 and above typically consist of older data that may no longer be current.

Consistent with the methodology used in the HCP effects analysis, effects on vernal pool habitat were evaluated for the 30-year lifespan of the HCP and associated permits, with effects on other types of habitat addressed on an annual basis. Disturbances to natural vegetation in general were categorized on the basis of their potential to cause habitat loss affecting special-status species. Effects on

Table 5-4. Overview of Action Area's Special-Status Wildlife Not Covered by Proposed Habitat Conservation Plan

Species	Status	Habitat Requirements	Distribution
	Federal/State		
Merced Canyon shoulderband (=Allyn Smith's banded snail) *(Helminthoglypta allynsmithi)*	SC/–	Rocky slopes at approximately 1,500 feet elevation.	Rock slides in canyon of Merced River, from 3 to 6 miles below El Portal, Mariposa County.
California linderiella *(Linderiella occidentalis)*	SC/–	Vernal pools.	Central Valley, central and south Coast Ranges from Mendocino County to Santa Barbara County.
Ciervo aegialian scarab (beetle) *(Aegialia concinna)*	SC/–	Sand dunes and sandy substrates.	Four locations known from Contra Costa, San Benito, Fresno, and San Joaquin Counties.
Dry Creek cliff strider bug *(Oravelia pege)*	SC/–	Under rocks and in cracks at base of sheer, rocky cliff.	Only known from Dry Creek, Fresno County.
Hopping's blister beetle *(Lytta hoppingi)*	SC/–	Generally occurs in foothill habitats in the western San Joaquin Valley; feeds on flowers from March through June.	Southern and western San Joaquin Valley.
Moestan blister beetle *(Lytta moesta)*	SC/–	Feeds on flowers in the summer and fall, mostly composites.	Most records from San Joaquin Valley (Kern, Tulare, San Joaquin, and Stanislaus Counties); a few specimens collected from Santa Cruz County.
Molestan blister beetle *(Lytta molesta)*	SC/–	Feeds on flowers in the summer and fall, mostly composites.	San Joaquin Valley from Contra Costa County south to Tulare and Kern Counties.
Morrison's blister beetle *(Lytta morrisoni)*	SC/–	Feeds on flowers in the summer and fall, mostly composites.	San Joaquin Valley; records from Fresno and San Benito Counties.
Western spadefoot *(Spea hammondii)*	SC/SSC	Shallow streams with riffles and seasonal wetlands, such as vernal pools in annual grasslands and oak woodlands.	Sierra Nevada foothills, Central Valley, Coast Ranges, coastal counties in southern California.
Foothill yellow-legged frog *(Rana boylii)*	SC/SSC	Creeks or rivers in woodland, forest, mixed chaparral, and wet meadow habitats with rock and gravel substrate and low overhanging vegetation along the edge; usually found near riffles with rocks and sunny banks nearby.	Klamath, Cascade, north Coast, south Coast, Transverse, and Sierra Nevada Ranges up to approximately 6,000 feet.
Western pond turtle *(Clemmys marmorata)*	SC/SSC	Woodlands, grasslands, and open forests; occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation.	Northwestern subspecies occurs from Oregon border of Del Norte and Siskiyou Counties south along the coast to San Francisco Bay, inland through Sacramento Valley, and on the western slope of Sierra Nevada; southwestern subspecies occurs along the central coast of California east to the Sierra Nevada and along the southern California coast inland to the Mojave and Sonora Deserts; the subspecies' range overlaps through the Delta and Central Valley to Tulare County.
California horned lizard *(Phrynosoma coronatum frontale)*	SC/SSC	Grasslands, brushlands, woodlands, and open coniferous forest with sandy or loose soil; requires abundant ant colonies for foraging.	Sacramento Valley, including foothills, south to southern California; Coast Ranges south of Sonoma County; below 4,000 feet in northern California.

Species	Status	Habitat Requirements	Distribution
	Federal/State		
Silvery legless lizard *(Anniella pulchra pulchra)*	SC/SSC	Habitats with loose soil for burrowing or thick duff or leaf litter; often forages in leaf litter at plant bases; may be found on beaches and sandy washes and in woodland, chaparral, and riparian areas.	Along the Coast, Transverse, and Peninsular Ranges from Contra Costa County to San Diego County with spotty occurrences in the San Joaquin Valley.
Two-striped garter snake *(Thamnophis hammondii)*	–/SSC	Perennial and intermittent streams having rocky beds bordered by willow thickets or other dense vegetation; also inhabits large sandy riverbeds—such as the Santa Clara river—if a strip of riparian vegetation is present, and stock ponds if riparian vegetation and fish and amphibian prey are present.	Known range extends through the South Coast and Peninsular ranges west of the San Joaquin valley from the Salinas Valley and the southeastern slopes of the Diablo range, south to the Mexican border.
San Joaquin whipsnake *(Masticophis flagellum ruddocki)*	SC/SSC	Open, dry vegetative habitats with little or no tree cover (e.g., valley grassland and saltbush scrub), often in association with mammal burrows.	From Colusa County in the Sacramento Valley southward to the Grapevine in the San Joaquin Valley and westward into the inner coast ranges; known range of elevation from 60 to 3,000 feet. An isolated population occurs at Sutter Buttes
Snowy egret *(Egretta thula)* (rookery)	–/–	Nests in marshes, trees, or shrubs near freshwater and calm-water intertidal habitats.	Nesting colonies occur near Redwood City, San Rafael, Pittsburg, Los Banos, Bishop, and the south end of the Salton Sea; also nests in Santa Barbara and San Diego Counties along the Colorado River and on the northeastern plateau.
Great blue heron *(Ardea herodias)* (rookery)	–/–	Widely distributed in freshwater and calm-water intertidal habitats.	Nests in suitable habitat throughout California except at higher elevations in Sierra Nevada and Cascade mountain ranges.
Northern harrier *(Circus cyaneus)*	–/SSC	Grasslands, meadows, marshes, and seasonal and agricultural wetlands.	Occurs throughout lowland California; has been recorded in fall at high elevations.
Cooper's hawk *(Accipiter cooperii)*	–/SSC	Nests in a wide variety of habitat types, from riparian woodlands and digger pine–oak woodlands through mixed conifer forests.	Throughout California except high altitudes in the Sierra Nevada; winters in the Central Valley, southeastern desert regions, and plains east of the Cascade Range.
Yellow rail *(Coturnicops noveboracensis)*	–/SSC	Freshwater marshes, brackish marshes, coastal salt marshes, and grassy meadows.	Historical records of nests in Mono County east of the Sierra Nevada and formerly Marin County on the coast; winter records also on the coast from Humboldt County to Orange County.
Western snowy plover (inland population) *(Charadrius alexandrinus nivosus)*	–/SSC	Barren to sparsely vegetated ground at alkaline or saline lakes, reservoirs, ponds and riverine sand bars; also along sewage, salt-evaporation, and agricultural wastewater ponds.	Nests at inland lakes throughout northeastern, central, and southern California, including Mono Lake and Salton Sea.
Long-eared owl *(Asio otus)*	–/SSC	Nests in abandoned crow, hawk, or magpie nests, usually in dense riparian stands of willows, cottonwoods, live oaks, or conifers.	Permanent resident east of the Cascade Range from Placer County north to the Oregon border, east of the Sierra Nevada from Alpine County to Inyo County; scattered breeding populations along the coast and in southeastern California; winters throughout the Central Valley and southeastern California.
California horned lark *(Eremophila alpestris actia)*	–/SSC	Common to abundant resident in a variety of open habitats, usually where large trees and shrubs are absent (e.g., grasslands and deserts to dwarf shrub habitats) above tree line.	Found throughout much of the state, less common in mountainous areas of the North Coast and in coniferous or chaparral habitats.

Species	Status Federal/State	Habitat Requirements	Distribution
Le Conte's thrasher *(Toxostoma lecontei)*	–/SSC	Desert scrub habitats, open washes, and Joshua tree habitat.	Resident of the deserts of southern California from Inyo County south to the Mexican border.
Gray vireo *(Vireo vicinior)* (nesting)	–/SSC	Breeds in arid, shrub-covered slopes with moderate cover and small trees, including oaks, pinyon pine, and juniper.	Summer resident throughout the mountains of the southeastern deserts from 2,000 to 6,500 feet, including the northeastern slopes of the San Bernardino Mountains, the San Jacinto Mountains, and the southern slopes of the Laguna Mountains.
Pale Townsend's (=western) big-eared bat *(Corynorhinus townsendii pallescens)*	SC/SSC	Mesic habitats; gleans insects from brush or trees and feeds along habitat edges.	Klamath Mountains, Cascades, Sierra Nevada, Central Valley, Transverse and Peninsular Ranges, Great Basin, and the Mojave and Sonora Deserts.
San Joaquin pocket mouse *(Perognathus inornatus)*	SC/–	Favors grasslands and scrub habitats with fine-textured soils.	Occurs throughout the San Joaquin Valley and in the Salinas Valley.
Short-nosed kangaroo rat *(Dipodomys nitratoides brevinasus)*	SC/SSC	Arid grassland and desert scrub communities on flat or gently sloping terrain with friable soils.	Western side of the San Joaquin Valley from Merced County to Kern County; isolated populations also in San Benito, San Luis Obispo, and Santa Barbara Counties.
Merced kangaroo rat *(Dipodomys heermanni dixoni)*	SC/–	Annual grassland and oak savanna.	Eastern portions of Merced and Stanislaus Counties.
Tulare grasshopper mouse *(Onychomys torridus tularensis)*	SC/SSC	Grasslands, chaparral, sagebrush and bitterbrush scrub, alkali desert scrub.	Madera, Kings, Kern, San Benito, Fresno and eastern San Luis Obispo Counties.
American badger *(Taxidea taxus)*	–/SSC	Preferred habitat includes grasslands, savannas, and mountain meadows near timberline; Requires sufficient food, friable soils, and relatively open uncultivated ground.	Throughout California, except for the humid coastal forests of northwestern California in Del Norte County and the northwestern portion of Humboldt County.

Status explanations:

Federal

E = Listed as endangered under the federal Endangered Species Act.
T = Listed as threatened under the federal Endangered Species Act.
PT = Proposed for federal listing as threatened under the federal Endangered Species Act.
C = Species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list.
SC = Species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.
– = No listing.

State

E = Listed as endangered under the California Endangered Species Act.
T = Listed as threatened under the California Endangered Species Act.
FP = Fully protected under the California Fish and Game Code.
SSC = Species of special concern in California.
– = No listing.

noncovered special-status wildlife were analyzed qualitatively, based on the extent of suitable habitat in the action area vis-à-vis the species' known ranges.

Significance Criteria

For the purposes of this analysis, an impact was considered to be significant and to require mitigation[5] if it would result in any of the following.

- A substantial adverse effect, either directly or through habitat modification or degradation, on any species identified as a candidate, sensitive, or special-status species in federal, state, or local plans, policies, or regulations, by USFWS or DFG, or by CNPS.
- A substantial adverse effect on federally protected wetlands as defined by CWA Section 404, including but not limited to marshes and vernal pools.
- A substantial adverse affect on sensitive wildlife habitats, especially riparian and wetland communities, due to fragmentation or isolation of such habitats.
- A substantial adverse effect on fish or wildlife resources as a result of obstructing or diverting natural flow in a river, stream, or lake; altering or removing materials from the bed, channel, or bank of a river, stream, or lake; or placing debris, waste, or other material where it can pass into a river, stream or lake.
- Substantial interference with the movement of any native resident or migratory wildlife species, with established native resident or migratory wildlife corridors, or with the use of native wildlife nursery sites.
- Substantial long-term degradation or loss of a sensitive plant community because of substantial alteration of landforms or other site conditions.
- Effects on common species or habitats that would contribute substantially to any of the effects identified above for special-status species.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Conflict with the provisions of an adopted habitat conservation plan (HCP), natural communities conservation plan (NCCP), or other approved local, regional, or state habitat conservation plan.

[5] This EIS/EIR document uses the term "mitigation" consistent with Section 15126.4[a][1][A] of the State of California's CEQA Guidelines, which requires that an EIR "distinguish between measures which are proposed by project proponents to be included in the project, and other measures proposed by the lead … agency … and not included in the project." The proposed HCP's Conservation Strategy (see HCP Chapter 4), (including the requirement to preserve suitable habitat to offset potential species effects of O&M–related habitat disturbance and loss), is included in the project (i.e. is part of the Proposed Action), and is referred to as "compensation" in this EIS/EIR. The lead agencies have proposed "other measures" only for potential project impacts to the paleontological resources identified in Chapter 10 of this EIS/EIR. This document also uses mitigation in the general sense, referring to the process of avoiding, reducing, or compensating for impacts (for example, in discussing the use of mitigation sites or use of existing mitigation banks).

Impacts and Mitigation Measures

Proposed Action

Impacts on Natural Vegetation

Impact BIO1—Potential disturbance or loss of natural vegetation. Table 5-5 summarizes anticipated impacts on natural vegetation communities, by County. Impacts on vernal pools are presented separately in Table 5-6. Note that because more than 90% of PG&E's existing facilities are located in agricultural lands, urban areas, or grasslands—which are the three most areally extensive land cover types in the action area—almost all impacts affect these land-cover types. This is expected to continue to be the case in the foreseeable future. Note also that although comparatively little disturbance occurs in and adjacent to stream corridors, O&M and minor construction activities enabled under the proposed action could entail as many as 5–15 "wet crossings" per year, temporarily affecting approximately 0.1 to 0.5 acre each. Over the 30-year permit term, this could translate to a total between a minimum of about 15 acres and a worst-case maximum of about 225 acres of vegetation impacted. Because the specific locations where individual activities would be carried out cannot be predicted at this time, the acreage of various vegetation types potentially affected are not known. However, in general, "wet crossing" activities are most likely to affect woody riparian, freshwater wetland, and open water habitats; some could also affect grassland and agricultural fields and possibly also other habitat types.[6]

As described in Chapter 2, PG&E currently has a biological resources protection program in place (see under *PG&E's Existing Environmental Programs and Practices*), which is intended to avoid and minimize disturbance to sensitive biological resources. Like all of the company's existing environmental commitments and practices, the biological resources program would be brought forward in implementing the activities enabled under the proposed action. As part of this program, the company enforces individual accountability for the protection of biological resources, and requires monitoring and reporting of biological impacts for some types of projects. In addition, general BMPs to protect biological resources apply to company activities, consistent with the CPUC directive to provide reliable energy to the public in a way that avoids or substantially lessens the related environmental impacts; these include minimizing ground disturbance, keeping vehicles on existing roads, maintaining clean worksites, and implementing weed control measures as appropriate. The company's environmental awareness training familiarizes project managers and construction leads with site conditions that may indicate biological sensitivity. Where appropriate, PG&E's biologists review proposed new minor construction and some O&M activities for their potential to affect sensitive habitats, and identify additional protection measures where these are needed for a specific site

[6] Additional analysis of effects of stream and lake crossings is provided in Impact BIO7 below, and in Impact ~~WR6~~ WR7 in Chapter 8 (*Water Resources*). More detailed calculation of impacts on various habitat types as a result of O&M and minor construction activities is provided in Table 5-5.

Table 5-5. Estimated Annual Habitat Disturbance by Habitat Type and County

Land Cover	Disturbance Type	County									
		Fresno	Kern	Kings	Madera	Mariposa	Merced	San Joaquin	Stanislaus	Tulare	Total
Agricultural Fields	Permanent Loss	<1	1	<1	<1	0	<1	<1	<1	<1	2
	Temporary Loss	–	–	–	–	–	–	–	–	–	–
	Other Disturbance	170	335	103	125	<1	157	211	65	64	1,231
Blue Oak Woodland	Permanent Loss	<1	<1	<1	<1	<1	<1	<1	<1	<1	1
	Temporary Loss	15	2	1	4	4	3	2	1	3	34
	Other Disturbance	76	8	3	60	50	16	10	10	21	253
Blue Oak/Foothill Pine	Permanent Loss	<1	0	<1	<1	<1	<1	<1	<1	0	1
	Temporary Loss	6	0	1	5	3	1	1	<1	0	17
	Other Disturbance	30	0	2	53	40	3	2	7	0	137
Coastal Oak Woodland	Permanent Loss	0	<1	<1	0	0	<1	0	<1	0	<1
	Temporary Loss	0	<1	<1	0	0	<1	0	<1	0	<1
	Other Disturbance	0	<1	<1	0	0	1	0	<1	0	1
Conifer	Permanent Loss	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Temporary Loss	<1	1	<1	<1	2	<1	<1	<1	<1	4
	Other Disturbance	1	1	1	2	18	1	2	1	1	30
Grassland	Permanent Loss	<1	<1	<1	<1	<1	<1	<1	<1	<1	1
	Temporary Loss	14	30	9	7	2	13	18	10	2	105
	Other Disturbance	70	175	48	49	13	77	94	48	15	588
Montane Hardwood	Permanent Loss	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Temporary Loss	3	<1	<1	3	5	<1	<1	<1	<1	14
	Other Disturbance	9	<1	<1	53	104	7	3	3	2	181
Open Water	Permanent Loss	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Temporary Loss	<1	<1	<1	<1	<1	<1	1	<1	<1	2
	Other Disturbance	1	1	<1	1	<1	3	4	1	<1	12
Other Developed and Disturbed Lands	Permanent Loss	–	–	–	–	–	–	–	–	–	–
	Temporary Loss	–	–	–	–	–	–	–	–	–	–

Table 5-5. Continued

Land Cover	Disturbance Type	County									
		Fresno	Kern	Kings	Madera	Mariposa	Merced	San Joaquin	Stanislaus	Tulare	Total
	Other Disturbance	4	2	1	3	0	13	9	6	1	40
Permanent Freshwater Wetland	Permanent Loss	<1	<1	<1	<1	0	<1	<1	<1	<1	<1
	Temporary Loss	<1	<1	<1	<1	0	<1	<1	<1	<1	<1
	Other Disturbance	<1	1	<1	<1	0	1	<1	<1	<1	2
Seasonal Wetland (excluding vernal pools)	Permanent Loss	<1	<1	<1	<1	0	<1	<1	<1	<1	<1
	Temporary Loss	<1	<1	<1	<1	0	<1	<1	<1	<1	<1
	Other Disturbance	1	<1	<1	<1	0	1	<1	<1	<1	2
Upland Scrub	Permanent Loss	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Temporary Loss	<1	1	1	<1	1	<1	<1	<1	<1	3
	Other Disturbance	2	6	1	2	6	1	<1	<1	<1	17
Urban[5]	Permanent Loss	–	–	–	–	–	–	–	–	–	–
	Temporary Loss	–	–	–	–	–	–	–	–	–	–
	Other Disturbance	153	188	25	60	3	71	192	44	11	747
Valley Oak Woodland	Permanent Loss	<1	<1	0	0	0	0	<1	<1	0	<1
	Temporary Loss	<1	15	0	0	0	0	<1	<1	0	15
	Other Disturbance	<1	93	0	0	0	0	<1	<1	0	93
Woody Riparian	Permanent Loss	<1	<1	<1	<1	0	<1	<1	<1	<1	<1
	Temporary Loss	1	<1	<1	<1	0	<1	1	<1	<1	2
	Other Disturbance	6	<1	1	1	0	2	4	3	<1	17
Total Permanent Loss		<1	1	<1	<1	<1	<1	1	<1	<1	4
Total Temporary Loss		40	49	12	20	18	18	22	12	5	196
Total Other Disturbance		523	810	186	409	235	353	533	187	116	3,352
Permanent Loss of Natural Vegetation		**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**1**
Temporary Loss of Natural Vegetation		**40**	**49**	**12**	**20**	**18**	**18**	**22**	**12**	**5**	**196**

Table 5-6. Estimated Annual Disturbance of Vernal Pool Habitat by System and County[a,b]

System	County									
	Fresno	Kern	Kings	Madera	Mariposa	Merced	San Joaquin	Stanislaus	Tulare	Total
Gas Transmission										
Permanent Loss[c]	<0.001	0	0	0.009	0	0.007	0.007	0.003	0	0.027
Temporary Loss	<0.001	0	0	0.004	0	0.003	0.004	0.001	0	0.013
Other Disturbance	<0.001	0	0	0.018	0	0.013	0.015	0.006	0	0.052
Gas Distribution										
Permanent Loss[c]	0.011	0.006	<0.001	0.001	0	0.003	0.009	0.007	0	0.038
Temporary Loss	0.003	0.002	<0.001	0.010	0	0.028	0.084	0.069	0	0.348
Other Disturbance	0.008	0.004	<0.001	0.001	0	0.002	0.006	0.005	0	0.027
Electric Transmission										
Permanent Loss[c]	<0.001	<0.001	<0.001	0.001	<0.001	0.001	0.001	<0.001	<0.001	0.004
Temporary Loss	0.021	0.001	0.026	0.047	0.002	0.083	0.058	0.019	0.013	0.270
Other Disturbance	0.089	0.005	0.113	0.203	0.008	0.357	0.250	0.083	0.057	1.164
Electric Distribution										
Permanent Loss[c]	0.003	<0.001	0.002	0.006	<0.001	0.016	0.004	0.001	0.003	0.036
Temporary Loss	0.014	0.001	0.011	0.031	0.001	0.077	0.021	0.007	0.016	0.178
Other Disturbance	0.149	0.011	0.112	0.333	0.016	0.825	0.224	0.072	0.172	1.914
Total										
Permanent Loss[c]	0.014	0.006	0.003	0.017	<0.001	0.026	0.021	0.0120	0.003	0.104
Temporary Loss	0.038	0.004	0.037	0.083	0.003	0.164	0.085	0.030	0.029	0.473

Notes:

[a] Acreages are for vernal pool areas within worksites (including access corridors) but not their surrounding watersheds.

[b] Values may not sum exactly to totals because of rounding error; values were not rounded off during intermediate steps in calculations.

[c] O&M activities potentially excavating areas not previously excavated were considered to permanently alter vernal pools. Consequently, disturbance associated with activities G8, G14, G15, G16, E12, E13, and E14 was considered to cause permanent loss of vernal pools (i.e., for these activities disturbance temporarily altering other land-cover types was considered to permanently alter vernal pools).

and/or activity. As discussed in Chapter 2, the proposed HCP would extend the company's existing program of protective measures to additional species and activities (see Tables 2-7, 2-9, 2-11, 2-12, and 2-13 for specifics).

PG&E's existing biological resources program and new/expanded measures required under the proposed HCP would substantially avoid and minimize effects on natural vegetation. However, some temporary disturbance and permanent loss of habitat is still expected to occur, as summarized in Tables 5-5 and 5-6.[7] Based on analysis presented in Chapter 3 of the HCP (see EIS/EIR Appendix B), routine O&M activities and minor construction are expected to result in the permanent loss of up to 1 acre and temporary (recoverable) disturbance of as much as 196 acres of natural vegetation annually over the 30-year life of the proposed action.[8] [9] The sensitive land-cover type subject to the greatest temporary effect is expected to be grassland, with a net disturbance of up to 105 acres per year. ~~This could represent a significant impact.~~ This could represent a significant impact, even taking into account that not all suitable grassland would actually be occupied by covered species.

Accordingly, PG&E has committed through the HCP to fund the acquisition and maintenance of natural vegetated habitat to conserve and promote the recovery of sensitive species within the action area. The acreage of conservation land required to compensate for effects on special-status species habitat will be identified based on a combination of documented and projected habitat losses, as described under *Environmental Commitments Enacted by the Proposed HCP* in Chapter 2. Permanent losses of suitable habitat[10] other than wetlands will be

[7] Note that the temporary disturbance and permanent loss of "Urban" and "Other Developed and Disturbed" (ODD) land-cover types, and the temporary disturbance of the "Agricultural" land-cover type are not itemized in these tables. Most covered wildlife and plant species are unlikely to occur in these land-cover types, because of the highly disturbed nature and the marginal habitat value they offer. Species impacts related to disturbance of such cover types are extremely unlikely to occur, or the size of the species impact would not reach the scale where species take would occur. Therefore, compensation for disturbance or loss of "Urban" and "ODD" or the disturbance of "Agricultural" land-cover is generally not merited. Valley elderberry longhorn beetle, California tiger salamander, giant garter snake, Swainson's hawk, white-tailed kite, tricolored blackbird, western burrowing owl, and/or San Joaquin kit fox may use "Urban", "ODD" or Agricultural land-cover types in some situations (see HCP Chapters 3 and 5 and HCP Appendix C). In such situations, the pre-activity surveys required for activities disturbing more than 0.1 acre would identify the presence of habitat suitable for these and other covered species should it occur in these land-cover types; thus, potential impacts will be assessed in advance and compensation may be required. Impacts are thus expected to be less than significant as a result of disturbance or loss of "Urban" or "ODD", or the disturbance of Agricultural land-cover types.

[8] As discussed on page 3-2 of the final HCP, *temporary effects* refers to effects that are expected to be recoverable within a period of 1–3 years, based on their extent and severity, the habitat type affected, and condition of the habitat prior to disturbance.

[9] The proposed HCP also identifies "other disturbances" that do not result in habitat loss; these are not included here because they have no effect on short- or long-term habitat availability. Noise effects are discussed separately in Chapter 12 (*Noise and Vibration*).

[10] As discussed in Chapter 2, *suitable habitat* refers to habitat suitable for one or more of the species covered in the HCP.

compensated at a 3:1 ratio (3 acres created, restored, or conserved for every acre lost), and temporary losses of suitable habitat will be compensated at a ratio of 0.5:1, through several mechanisms, including establishment of conservation easements on existing PG&E lands, purchase of high-quality natural lands (particularly those that support particular species), purchase of credits from existing mitigation banks, and purchase of conservation easements from willing sellers (see Chapter 2 for additional strategies and information). Permanent and temporary loss of wetlands, including vernal pools, will be compensated at a 3:1 ratio using existing mitigation banks.

Compensation will be proposed in 5-year increments. As activities occur over the 5-year period subsequent to advanced compensation, PG&E will track actual impact acreages, and any compensation surpluses will be addressed by adjusting the compensation requirement during the subsequent 5-year compensation period. Toward the end of each 5-year period, the amount of available advance compensation will decline. If it appears that the amount of compensation required will exceed the amount remaining in that 5-year increment, PG&E will either purchase the next 5-year increment early, or purchase sufficient compensation so that project compensation stays ahead of impacts. By providing compensation in 5-year increments and purchasing additional compensation lands early if it appears that they will run out of excess compensation, PG&E will stay ahead of project impacts.

As discussed in Chapter 2, there is some uncertainty with respect to actual effects for very limited distribution wildlife and very rare plants. The HCP is written to avoid, minimize, and mitigate effects to all covered species, but pre-activity surveys for the rarest wildlife species (i.e., riparian brush rabbit, Buena Vista lake shrew, riparian woodrat, and limestone salamander) will ultimately determine if there is the potential for an effect and if a particular activity needs to be mitigated; in these instances, ~~mitigation~~ habitat compensation must occur in advance of the impact. Potential effects for the very rare plant species will need to be similarly determined. In instances where the rarest of plants could be affected, substantial efforts will be made to avoid and minimize effects, and if this is not possible, the effects will be mitigated as soon as possible within 2 years of the effect.

In summary, in light of the existing environmental programs and practices PG&E will carry forward in implementing activities enabled under the proposed action, and the protection, conservation, and compensation measures provided by the proposed HCP, **impacts on natural vegetation are expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact BIO2—Potential disturbance or loss of vernal pool habitat. Vernal pools are of particular concern as habitat because of their potential to support

special-status invertebrates, including the three covered shrimp species.[11] Based on analysis in the HCP, routine O&M and minor construction activities are expected to temporarily disturb 0.473 acre and permanently remove 0.104 acre of vernal pool habitat annually over the 30-year life of the proposed action. Disturbance and loss of vernal pool habitat could occur as a result of several factors, including alteration of topography due to ground-disturbing activities; water quality degradation through increased erosion and sediment delivery; settling of construction-related dust; and herbicide use. Various O&M activities also have the potential to spread invasive weeds that could reduce habitat quality within vernal pools. ~~At their worst, i~~Impacts on vernal pool habitat ~~could~~ have the potential to be significant.

To address these concerns, PG&E will continue all existing biological resources measures, including herbicide BMPs, and the proposed HCP would establish additional avoidance and minimization measures (AMMs), as described in Chapter 2. These include defining exclusion zones prior to O&M activities, where feasible; and avoiding work during periods when vernal pool habitat is wet. The HCP also includes AMMs and BMPs that would help to avoid indirect impacts on vernal pools by controlling erosion and sedimentation, and the spread of invasive weeds. The proposed program of AMMs would avoid or substantially reduce potential affects of O&M and minor construction activities on water and habitat quality in vernal pools. In addition, PG&E will provide habitat compensation for effects of O&M and minor construction activities, as described in Chapter 2 and above in Impact BIO1. With the AMMs and compensation identified in the proposed HCP, **impacts on vernal pool habitat in the action area are expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impacts on Covered Special-Status Species

Impact BIO3—Potential disturbance or loss of covered special-status plant species and their habitat. Routine O&M and minor construction activities enabled under the proposed action have the potential to result in direct and indirect effects on plants within the action area (area of effect), including the 42 HCP-covered species. Direct and indirect effects could occur in a variety of ways, discussed in the following paragraphs.

Direct effects could occur through several mechanisms: trampling, crushing, and/or burial during O&M or minor construction activities; burning; and inadvertent damage or mortality due to herbicide use. ~~At worst, i~~These impacts ~~could~~ have the potential to be significant. However, as discussed above and in Chapter 2, PG&E will continue existing biological resources BMPs, including those for herbicide use, and the proposed HCP provides a comprehensive

[11] As discussed in the proposed HCP (Appendix B of this EIS/EIR), only about 30% of the action area's vernal pool habitat is estimated to be occupied by the covered shrimp species. However, PG&E plans to assume that all vernal pool habitat is occupied, and will implement AMMs and compensation accordingly.

conservation program to avoid and minimize impacts on covered plant species and provide long-term protection of covered species by protecting biological communities in the HCP area. It includes general measures as well as specific measures for individual covered species (see Tables 2-9 and 2-13 for details). **With PG&E's existing biological resources protection program and ~~this~~ the new ~~program~~ protection and conservation measures that would be provided by the proposed HCP, direct effects on covered special-status species are expected to be less than significant.**

Indirect effects are most likely to result from disturbance or degradation of habitat as a result of O&M or minor construction activities. No permanent removal of occupied habitat is expected to occur, but between 4 and ~~30~~ 25 acres of habitat occupied by one or more of the 42 HCP-covered plant species may be disturbed by O&M activities over the 30-year permit term, as discussed on pages 3-16 ff. of the final HCP; see also HCP Appendix G. Disturbance would be temporary (i.e., recoverable over time, likely within 1–3 years), but could affect the local success of covered plant species. Some 15 of the covered species are not expected to be affected by O&M activities (see HCP effects analyses in Chapter 3 of Appendix B). An additional three of the covered species—*Castilleja campestris* ssp. *succulenta*, *Lilaeopsis masonii*, and *Opuntia basilaris* var. *treleasei*—are expected to undergo temporary adverse effects. For these three species combined, it is estimated that 4–8 acres of occupied habitat would be temporarily affected over the permit term. Occupied habitat for most of the remaining 24 covered plant species could also be temporarily affected although it is difficult to predict the precise extent of disturbance, because the specific location and nature of all activities that would take place over the 30-year lifespan of the proposed action is uncertain at this time, as discussed in Chapter 2 of this EIS/EIR, and in Chapter 4 of the final HCP. In summary, for all of the HCP-covered plant species, the extent of temporary habitat disturbance would be limited, but significant effects could nonetheless occur.

Accordingly, as described in Chapter 2, the proposed HCP would also provide a mechanism to compensate for habitat loss through a variety of strategies, including establishment of conservation easements on existing PG&E lands, purchase of high-quality natural lands, purchase of credits from existing mitigation banks, and purchase of conservation easements from willing sellers (see Chapter 2 for additional information and strategies). Priority would be placed on high-quality habitat with attributes that maximize its potential to be successfully managed for habitat conservation (see related discussions in Chapter 3, *Land Use and Planning*). In addition, ~~a~~ the HCP's comprehensive monitoring and adaptive management program (described in HCP Chapter 6) would assess, evaluate, and adapt management prescriptions to ensure that the HCP's defined resource management objectives continue to be met. Consequently, **indirect impacts related to habitat degradation as a result of O&M and minor construction activities are expected to be less than significant with the proposed HCP in place.**

Habitat used by the HCP-covered plant species could also be degraded as an indirect result of activities that cause erosion or facilitate the spread of invasive nonnative plant species. ~~At worst,~~These impacts ~~could~~ have the potential to be

significant, but are already substantially addressed by PG&E's existing program of erosion and noxious weed control measures (see *Biological Resources Program* and *Water Quality Protection Program* under *PG&E's Existing Environmental Programs and Practice*s section of Chapter 2). Additional protection would be provided in AMMs specified in the proposed HCP (see Table 2-9). **Indirect impacts related to the effects of erosion and invasive nonnative species on habitat quality are thus expected to be less than significant with PG&E's existing biological and water resources programs and the proposed HCP in place.**

In summary, in light of the existing environmental programs and practices PG&E will routinely implement under the proposed action, and the additional protection, conservation, and compensation measures provided by the proposed HCP, **direct and indirect impacts on the 42 covered special-status plant species would be less than significant.**

Mitigation Measure—No mitigation is required.

Impact BIO4—Potential disturbance or loss of covered special-status wildlife species and their habitat. The impact analyses for each of the 23 covered wildlife species are presented in full in Chapter 3 of the final HCP (see Appendix B of this EIS/EIR). For brevity, those individual species impact-analyses are not reproduced here.

Routine O&M and minor construction activities have the potential to result in direct disturbance, injury, or mortality of wildlife in the action area, including the 23 special-status species covered by the proposed HCP. Additional indirect effects could result from temporary and permanent loss or degradation of habitat, which in turn could reduce local population size and/or lower reproductive success. ~~At worst, b~~Both direct and indirect impacts ~~could~~ have the potential to be significant.

The proposed HCP covers 23 special-status wildlife species (Table 5-3). As identified above, approximately 196 acres of habitat with the potential to support one or more of the covered species would be subject to temporary disturbance (i.e., disturbance that is recoverable over time, likely within 1–3 years ~~without human intervention~~) each year over the 30-year permit term. The habitat type subject to the greatest disruption is expected to be grassland, with a net disturbance of up to 105 acres per year. In addition, up to 1 acre of habitat could be permanently lost each year over the permit term.

Impacts on wildlife are already substantially addressed by PG&E's existing biological resources program (see *PG&E's Existing Environmental Programs and Practice*s section of Chapter 2). As discussed in Impacts BIO1 through BIO3 above, and in Chapter 2, the proposed HCP would expand on PG&E's ~~current practices~~ existing environmental programs and practices by establishing a conservation program specifically designed to avoid and minimize impacts on the 23 HCP-covered species; and to provide long-term protection of covered species by protecting biological communities in the action area. It includes a variety of AMMs specific to each covered wildlife species (see Tables 2-9, 2-11, and 2-12

for details). The intent of the AMM program is to ensure consistent implementation of protective measures when activities are conducted in sensitive areas; as such, it includes protections aimed at reducing direct take as well as measures to protect habitats used by covered wildlife species. In addition, to offset any habitat impacts that cannot be avoided, PG&E has committed through the HCP to provide compensation for habitat loss and disturbance.

As discussed in Chapter 2 of this EIS/EIR and on pages 4-15 ff. of the final HCP, compensation requirements will be identified based on actual documented habitat losses for activities that require preactivity surveys (those that typically disturb an area of 0.1 acre or more, listed in Table 2-11 on page 2-43 of this EIS/EIR). For smaller-disturbance activities that do not require preactivity surveys, compensation requirements will be based on estimates of habitat loss.

Where it is necessary to estimate habitat loss over the permit term, estimates will be based on the area typically disturbed by each activity (given in HCP Table 3-1) and the number of times that activity is expected to occur over the permit term. For example, if pole equipment repair/replacement typically affects 0.032 acre per activity, and is expected to occur 200 times over the next 5-year compensation increment, the total disturbance anticipated as a result of this particular activity would be 6.4 acres. To estimate the portion of this total 5-year disturbed area offering habitat suitable for a particular species (the basis for compensation requirements for that species as a result of pole equipment repair/replacement over the next 5 years), the area disturbed will be multiplied by the proportion of habitat considered suitable for that species by biologists conducting surveys in the same portion of the San Joaquin Valley prior to other activities. For example, if 50% of habitat in the region was identified as suitable for San Joaquin kit fox during preactivity surveys, pole repair/replacement would be estimated to disturb 50% times 6.4 acres = 3.2 acres of kit fox habitat over the next 5-year increment.

To identify the amount of kit fox compensation needed, habitat effects will be broken down into temporary disturbance (compensated a ratio of 0.5:1) and permanent loss (compensated at 3:1). Acreages of temporary loss will then be multiplied by 0.5 and acreages of permanent loss will be multiplied by 3, and the products will be summed to provide the net compensation acreage for each species within each habitat type, in each of the action area counties.[12]

The same methodology was used in the HCP to arrive at an estimate of anticipated habitat disturbance and loss and compensation acreage needs annually and by 5-year increments over the 30-year permit term. This is presented in HCP Tables 4-11 and 4-12. To summarize, a total of approximately 43 acres of habitat compensation is expected to be required each year including all affected habitat types in all nine action area counties (see HCP Table 4-11).

[12] The maximum compensation acreage for a species will be used as the required compensation for that land cover type, as discussed on page 4-17 of the final HCP. This assumes that all compensation acreage for the most widespread species within the habitat type also provides habitat for all of the other species requiring compensation for disturbance to that habitat type in that region of the San Joaquin Valley.

This corresponds to a 5-year total of approximately 212 acres (again, see HCP Table 4-11).

~~Finally, a~~ A comprehensive monitoring and adaptive management program would assess, evaluate, and adapt management prescriptions to ensure that the HCP's defined resource management objectives continue to be met.

In summary, in light of the existing environmental programs and practices PG&E will routinely implement under the proposed action, and the additional protection, conservation, and compensation measures provided by the proposed HCP, **direct and indirect impacts on the 23 covered special-status wildlife species would be less than significant.**

Mitigation Measure—No mitigation is required.

Impacts on Non-Covered Special-Status Species

Impact BIO5—Potential loss of non-covered special-status plant species and their habitat. In addition to the special-status plants covered in the proposed HCP (Table 5-1), the action area may support as many as 88 additional plant species that are not now federally or state-listed and are not expected to be listed within the proposed 30-year HCP term but nonetheless qualify for some form of special status. These species are listed in Table 5-2. Although these species are not subject to the protections afforded to listed species under the federal and state ESAs, CEQA requires that potential effects on them be analyzed, and if significant, mitigated.

A number of the species listed in Table 5-2 have ranges that include all or part of the action area, and suitable habitat for them is present, but they have not been reported as occurring in the action area (California Department of Fish and Game 2004). These include crownscale, Kern Canyon clarkia, Kern River evening-primrose, flaming trumpet, four-angled spikerush, Keil's daisy, Kings River buckwheat, sagebrush loeflingia, Mount Hamilton lomatium, Kaweah monkeyflower, calico monkeyflower, Piute Mountains navarretia, Merced phacelia, Charlotte's phacelia, slender-leaved pondweed, Parish's alkali-grass, Mason's neststraw, and several species of mosses. Because these species are not known to occur in the action area, preliminary EIS/EIR analysis evaluated them as very unlikely to experience significant impacts as a result of O&M or minor construction activities enabled under the proposed action, and they are not analyzed further. These species are indicated on Table 5-2.

Some of the species listed in Table 5-7 were considered for HCP coverage during development of the proposed HCP, but were ultimately eliminated because HCP screening conducted by PG&E, USFWS, and DFG concluded that they were very unlikely to be significantly affected by O&M and minor construction even with no HCP in place, because they are not known to occur within 200 meters (650 feet) of existing PG&E infrastructure, although suitable habitat may be present. These species were reconsidered for inclusion in the EIS/EIR analyses, but were ultimately excluded because preliminary EIS/EIR evaluation reached a similar

conclusion that the likelihood of significant impacts was minimal. In addition, PG&E will continue its current biological resources program for the activities enabled under the proposed action. This will provide protection in the unlikely event of an unrecorded occurrence in closer proximity to an existing ROW, and will also require the company to assess whether any of these species is present in the area potentially affected by proposed new minor construction activities and to implement appropriate protective measures if so (see *Biological Resources Program* under *PG&E's Existing Environmental Programs and Practices in Chapter 2* for details). These species are also indicated on Table 5-2.

A further 14 of the species listed in Table 5-2 were not considered for HCP coverage because they were evaluated as less sensitive and/or less likely to become listed during the lifespan of the proposed action, but also fall into the category of species that are known to occur in the action area, but do not occur within 200 meters (650 feet) of existing PG&E infrastructure (California Department of Fish and Game 2004). They include Henderson's bent grass, Sharsmith's onion, alkali milk-vetch, San Joaquin spearscale, Kaweah brodiaea, alkali mariposa lily, San Benito evening-primrose, Hall's tarplant, Hospital Canyon larkspur, Napa western flax, Jared's pepper-grass, red-flowered lotus, and Arburua Ranch jewelflower. Like the other species that occur in the action area but do not occur in close proximity to PG&E infrastructure, they are unlikely to be significantly affected by activities enabled under the proposed action, and were also eliminated from detailed analysis, as indicated on Table 5-2.

Several additional species were eliminated from detailed analysis based on various "outside" mitigating factors, as summarized in Table 5-2. For instance, although the CNDDB shows one occurrence of Mt. Pinos onion in the action area, the species' geographic range is largely outside the action area, and Mt. Pinos onion is typically found at elevations of 4,200 to 6,000 feet. This species is thus unlikely to be affected by activities enabled under the proposed action. Other species would be protected by various laws or regulations in addition to the general protection afforded by PG&E's biological resources program. Some would also benefit by measures implemented under the HCP. For example, effects on Suisun Marsh aster, Mount Hamilton thistle, knotted rush, Delta tule pea, Sanford's arrowhead, and some occurrences of dwarf downingia would be buffered by federal and state regulations protecting water and habitat quality and controlling invasive activities in wetlands, while the HCP measures for vernal pool protection would help to avoid or reduce effects on vernal pool saltscale, some occurrences of dwarf downingia, and some occurrences of shining navarretia; these species are also unlikely to be substantially affected by activities under the proposed action. Species such as Mount Hamilton thistle and Onyx Peak bedstraw, whose distribution is very limited, are also considered unlikely to be affected because the probability of work sites' overlapping their occurrences is low. They would also be protected by PG&E's requirement that company activities avoid disturbance to small, localized populations of special-status species.

Detailed analysis focused on the 29 species listed in Table 5-7.

Table 5-7. Summary of Habitat Acreage Impacted and Potential HCP Benefits—Noncovered Special-Status Plants

Species	Potentially Occupied Habitat in Action Area	Potentially Occupied Habitat within 200 m of PG&E Infrastructure	Maximum Estimated Disturbance Over Permit Term	Potential Benefits from New HCP Measures
Heartscale *Atriplex cordulata*	6,793 acres	1252 acres	313 acres (5%)	Species would receive some benefit from HCP measures and compensation for lesser saltscale and Bakersfield smallscale.
Brittlescale *Atriplex depressa*	837 acres	40 acres	10 acres (1%)	Species would receive some benefit from HCP measures and compensation for lesser saltscale and Bakersfield smallscale.
Earlimart orache *Atriplex erecticaulis*	775 acres	544 acres	136 acres (18%)	Species could benefit from protection of grassland habitat.
Subtle orache *Atriplex subtilis*	2,106 acres	94 acres	24 acres (1%)	Species would receive some benefit from HCP's vernal pool measures and measures and compensation for lesser saltscale and Bakersfield smallscale. Species could also benefit from protection of grassland habitat.
Lost Hills crownscale *Atriplex vallicola*	3,177 acres	698 acres	175 acres (5%)	Species would receive some benefit from HCP measures and compensation for vernal pools, lesser saltscale, and Bakersfield smallscale.
Hoover's calycadenia (Hoover's rosinweed) *Calycadenia hooveri*	180 acres	8 acres	2 acres (1%)	
Chaparral harebell *Campanula exigua*	163 acres	14 acres	3 acres (2%)	
Lemmon's jewelflower *Caulanthus coulteri* var. *lemmonii*	844 acres	147 acres	37 acres (4%)	Species would receive some benefit from HCP measures and compensation for California jewelflower. Species could also benefit from protection of grassland habitat.
Beaked clarkia *Clarkia rostrata*	659 acres	93 acres	23 acres (4%)	Species would receive some benefit from HCP measures and compensation for other *Clarkia* species.
Mariposa cryptantha *Cryptantha mariposae*	715 acres	204 acres	51 acres (7%)	
Kern County larkspur *Delphinium purpusii*	145 acres	74 acres	18 acres (13%)	
Recurved larkspur *Delphinium recurvatum*	4,052 acres	878 acres	219 acres (5%)	
Round-leaved filaree *Erodium macrophyllum*	1,341 acres	252 acres	63 acres (5%)	
Shevock's hairy golden-aster *Heterotheca shevockii*	25 acres	15 acres	4 acres (15%)	

Species	Potentially Occupied Habitat in Action Area	Potentially Occupied Habitat within 200 m of PG&E Infrastructure	Maximum Estimated Disturbance Over Permit Term	Potential Benefits from New HCP Measures
Rose-mallow (California hibiscus) *Hibiscus lasiocarpus*	1,718 acres	801 acres	200 acres (12%)	
Parry's horkelia *Horkelia parryi*	59 acres	4 acres	1 acre (2%)	
Munz's iris *Iris munzii*	294 acres	86 acres	22 acres (7%)	
Munz's tidy-tips *Layia munzii*	347 acres	158 acres	40 acres (11%)	
Madera leptosiphon *Leptosiphon serrulatus*	116 acres	110 acres	27 acres (24%)	
Delta mudwort *Limosella subulata*	164 acres	75 acres	19 acres (12%)	
Orange lupine *Lupinus citrinus* var. *citrinus*	130 acres	44acres	11 acres (8%)	
Shaggyhair lupine *Lupinus spectabilis*	376 acres	61 acres	15 acres (4%)	
Indian Valley bush mallow *Malacothamnus aboriginum*	41 acres	21 acres	5 acres (13%)	
Slender-stemmed monkeyflower *Mimulus filicaulis*	12 acres	5 acres	1 acre (11%)	
Slender-stalked monkeyflower *Mimulus gracilipes*	60 acres	40 acres	10 acres (17%)	
Aromatic canyon gooseberry *Ribes menziesii* var. *ixoderme*	177 acres	66 acres	17 acres (9%)	
Marsh skullcap *Scutellaria galericulata*	5 acres	4 acres	1 acre (21%)	
Rayless ragwort *Senecio aphanactis*	21,088	2,637 acres	659 acres (3%)	
Wright's trichocoronis *Trichocoronis wrightii* var. *wrightii*	4 acres	1 acre	0.3 acre (8%)	

As discussed in the proposed HCP (see Appendix B of this EIS/EIR), disturbance related to O&M activities is expected to be fully recoverable over time (typically within 1–3 years). As identified in *Methodology* above, and based on PG&E's experience with O&M in the action area to date, analysis assumed that a maximum of 25% of a species' potentially occupied habitat within 200 meters of PG&E infrastructure could be disturbed over the 30-year permit term. This is considered a conservative (worst-case) assumption overall; in most cases, impacts of O&M activities are confined to a much narrower corridor. In addition, while the level of disturbance (percentage of existing habitat affected within the disturbed area) could be somewhat greater in grassland areas, it would likely be much less in chaparral, woodland, and forest habitat, where equipment and foot traffic would be constrained by denser vegetation. Moreover, because O&M activities are ongoing, species that cannot tolerate the types of disturbance associated with O&M are unlikely to be present in the areas most likely to be disturbed, although they may be present in adjacent portions of the broader impact corridor.

Chaparral, woodland, and/or forest species, for which the 25% maximum disturbance estimate is probably overly conservative, include Kern County larkspur, Shevock's hairy golden-aster, Munz's iris, orange lupine, Indian Valley bush mallow, and aromatic canyon gooseberry. Even assuming a maximum of 25% disturbance of known habitat, the highest level of disturbance for any of these species would be about 15% of the action area's potentially occupied habitat (Shevock's golden-aster), but as discussed above, actual disturbance levels would likely be much lower.

For another ten of the species listed in Table 5-7, even the conservative worst-case assumption would represent disturbance of less than 5% of potentially occupied habitat in the action area: brittlescale (which would benefit from HCP measures and compensation for other *Atriplex* species); subtle orache (which would benefit from HCP measures and compensation for vernal pools and for other *Atriplex* species, and possibly also from protection of grassland habitat); Lost Hills crownscale (which would benefit from HCP vernal pool measures and measures for other *Atriplex* species); Hoover's calycadenia; chaparral harebell; Lemmon's jewelflower (which would receive some benefit from HCP measures and compensation for California jewelflower, and possibly also from protection of grassland habitat); beaked clarkia (which would receive some benefit from HCP measures and compensation for other *Clarkia* species); Parry's horkelia; shaggyhair lupine; and rayless ragwort.

Maximum disturbance could be slightly greater (5–10% of action area's potentially occupied habitat) for another eight of the species listed in Table 5-7: heartscale (which would benefit from HCP measures and compensation for other *Atriplex* species); Mariposa cryptantha; recurved larkspur; round-leaved filaree; rose-mallow; shaggyhair lupine; rayless ragwort; and Wright's trichocoronis.

An additional eight species could experience a higher level of disturbance (10–24%): Earlimart orache (which would also benefit from protection of grassland habitat); rose-mallow; Munz's tidy-tips; Madera leptosiphon; Delta mudwort; slender-stemmed monkeyflower; slender-stalked monkeyflower; and marsh

skullcap (which would benefit from HCP wetland measures as well as federal and state regulations protecting wetlands).

However, for all of the species listed in Table 5-7, impacts would be substantially addressed by requirements of PG&E's existing biological resources program, which will carry forward for the activities enabled under the proposed action. In addition, as summarized above and in Table 5-7, a number of these species would benefit from HCP measures for the protection of covered species with similar habitat requirements. Consequently, in light of the small area of impact anticipated, the continuing protection afforded by PG&E's existing biological resources program, and the additional benefits to some noncovered species through the proposed HCP, **population-level impacts of O&M activities enabled under the proposed action are expected to be less than significant.**

New minor construction enabled under the proposed action would result in small permanent losses of habitat (estimated at an averaged maximum of 1 acre per year over the 30-year permit term). It is difficult to predict precise per-species losses of habitat for noncovered special-status plants as a result of new minor construction, because the number, location, and size of new facilities that would be constructed cannot be identified with certainty at this time, although most are likely to be located in proximity to existing PG&E infrastructure and/or to existing or new development. However, the loss of habitat—*in toto* and for any given species—would be small overall. Moreover, as identified above, PG&E will carry its existing biological resources program forward under the proposed action. As part of this program, as discussed in Chapter 2, PG&E's biologists or environmental specialists review new minor construction activities (unless they are covered under the developer's environmental documents) to evaluate their potential to disturb sensitive or protected habitats, such as wetlands, waterways, and the habitat of sensitive species, where a need is identified. Biological review includes searches of the CNDDB and review of other company files (where they exist) for relevant information from past biological survey results and reports; if necessary, the company's biologists also conduct pre-activity biological surveys. This enables identification of any additional species- or site-specific avoidance or protective measures that may be appropriate, in addition to the company's universal biological resources BMPs. In light of the small area of habitat loss anticipated, and the protection afforded by PG&E's existing biological resources program, which would carry forward under the proposed action, **minor construction is not expected to result in significant population-level impacts on the species listed in Table 5-7.**

In summary, impacts on noncovered special-status plants as a result of O&M and minor construction activities enabled under the proposed action are expected to be less than significant.

Mitigation Measure—No mitigation is required.

Impact BIO6—Potential effects on noncovered special-status wildlife species and their habitat. O&M and minor construction have some potential to result in injury, mortality, and/or loss of habitat to special-status species other than those covered by the HCP. Note that these species, listed in Table 5-4, were excluded

from HCP coverage because HCP species screening suggested that significant impacts were unlikely, or because they are not at present federally or state-listed, and are not expected to become listed during the 30-year permit term. Based on their distribution and the nature of the activities that would take place, the lead agencies have also concluded that significant impacts are unlikely. The following paragraphs explain this conclusion in greater detail.

Four species, the Merced Canyon shoulderband, Ciervo aegialian scarab, Dry Creek cliff strider bug, and Merced kangaroo rat have very narrow known home ranges. As discussed in Chapter 2 and the preceding impact analyses, PG&E's current practice is to avoid small, localized populations of special-status species where they are known to occur through past biological surveys, "white literature," species experts' input, and/or CNDDB records. Where biological screening indicates that it is warranted, species experts are consulted to assist the company's in-house biological staff in areas where species- or site-specific avoidance measures are necessary. In addition, PG&E's O&M activities are implemented in a manner to avoid or minimize effects on small, localized populations where this can be accomplished while continuing to meet CPUC's safety and other regulations; if O&M activities are required in an area used by any of these species in the future, company biologists would evaluate the potential for impact and identify appropriate site- and activity-specific avoidance or minimization measures. In light of these provisions, impacts on the four highly localized species (Merced Canyon shoulderband, Ciervo aegialian scarab, Dry Creek cliff strider bug, and Merced kangaroo rat) as a result of O&M and minor construction are expected to be **less than significant.**

Nine species—foothill yellow-legged frog, silvery legless lizard, two-striped garter snake, snowy egret (rookeries), great blue heron (rookeries), yellow rail, western snowy plover, LeConte's thrasher, and gray vireo—are known to occupy a small portion of the action area and have a broader distribution outside the action area. All nine of these species would be substantially protected during both new minor construction and ongoing O&M by PG&E's biological resources program, described under *PG&E's Existing Environmental Programs and Practices* in Chapter 2; impacts on birds would also be reduced by measures included in the company's Bird Protection Program (see HCP Appendix E). Additional protection would be afforded by the HCP's AMMs for species with similar habitat requirements. For example, foothill yellow-legged frog would benefit from AMM 17 (general protection for amphibian and reptile habitat) and possibly also from AMM 16 (protection for giant garter snake and California red-legged frog; two-striped garter snake would benefit from AMM 16, yellow rail would likely benefit to some extent from measures protecting wetland and grassland habitats; and the great blue heron and snowy egret would derive some benefit from protection of riparian habitat under AMM 26 (for riparian brush rabbit) and AMM 27 (for riparian woodrat). Impacts on heron and egret rookeries would be further minimized by PG&E's continuing compliance with protections for nesting birds embodied in Section 3503 of the California Fish and Game Code. In light of these PG&E's existing biological resources program and Bird Protection Program, measures included in the proposed HCP, and continued compliance with Section 3503 of the Fish and Game Code, the potential for

significant impacts on all nine of these species is evaluated as **less than significant.**

The remaining 18 species listed in Table 5-4 have wide distributions that encompass much or all of the action area and in many cases extend outside the action area as well. These species include California linderiella, Hopping's blister beetle, Moestan blister beetle, Molestan blister beetle, Morrison's blister beetle, western spadefoot, western pond turtle, California horned lizard, San Joaquin whipsnake, northern harrier, Cooper's hawk, long-eared owl, California horned lark, pale Townsend's big-eared bat, San Joaquin pocket mouse, short-nosed kangaroo rat, Tulare grasshopper mouse, and American badger. Impacts of O&M activities on these species' habitat would be localized and temporary; minor construction, although it would result in permanent effects, would be even more areally restricted. Population-level impacts on any of these species are unlikely in light of the small area of habitat affected annually and over the permit term. With the existing biological resources program continuing in force under the proposed action, impacts would be effectively addressed on an activity by activity basis. Some species would also benefit by implementation of the HCP's AMMs for covered species with similar habitat requirements. For instance, linderiella would be protected by AMM 15 (vernal pool protection); western spadefoot and western pond turtle would benefit from protection of wetland and riparian habitat under AMMs 6 and 7, from protection of covered amphibian and reptile habitat under AMM 17, and from protection of California red-legged frog and giant garter snake habitat under AMM 16; and northern harrier, San Joaquin pocket mouse, short-nosed kangaroo rat, Tulare grasshopper mouse, and probably also American badger would benefit from grassland protection and compensation. Consequently, impacts on these 18 species are also expected to be **less than significant.**

In summary, the potential for adverse effects on the noncovered special-status wildlife species listed in Table 5-4 is evaluated as less than significant.

Mitigation Measure—No mitigation is required.

Impact BIO7—Potential effects on aquatic habitat as a result of inchannel work. As discussed in Impact WR6 (see Chapter 8, *Water Resources*), both the O&M and minor construction programs enabled by the proposed action would require "wet crossings" where infrastructure traverses an active stream channel or other body of water. As many as 5 to 15 crossings could be required each year, with each crossing temporarily affecting an area of 0.10 to 0.50 acre. In some cases, it may be necessary to place fill, recontour, or otherwise modify the banks or bed of the affected water body; inchannel construction thus has the potential to temporarily or permanently reduce habitat values by altering the geomorphology, hydraulics, and/or shallow limnology of streams and lakes. It can also degrade water quality by remobilizing sediment from the channel bed and banks. Leaks or spills of fuel, lubricants, paving media, or other substances used in construction have additional potential to degrade water quality and reduce aquatic habitat values. If such effects were to occur, they could be significant.

As discussed in Chapter 2, PG&E will continue to implement the company's existing programs and practices for water quality protection for all activities enabled under the proposed action. In addition, as required by Section 1602 of the California Fish and Game Code, which regulates inchannel work, the proposed action would entail development of a master streambed alteration agreement between PG&E and DFG, which would include further commitments and measures to provide additional protection of water quality during inchannel work. Moreover, placement of fill or dredged material below the ordinary high water mark of any stream or wetland would require PG&E either to obtain an individual permit from the USACE under Section 404 of the federal Clean Water Act, or to qualify for an existing Section 404 Nationwide Permit. Compliance with CWA Section 404 could involve a further review of water quality issues. **With this state and federal regulatory protection in place, continuing implementation of the BMPs discussed in Chapter 2, and new protection afforded by the Master Streambed Alteration Agreement, impacts on habitat values for fish and wildlife as a result of inchannel work are expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact BIO8—Potential disturbance or loss of common wildlife species and their habitats. O&M and minor construction have some potential to result in injury, mortality, and/or loss of habitat to common wildlife species. Those most likely to be impacted are ground-dwelling mammals that occupy underground burrows, such as rodents and rabbits. The burrows of fossorial (digging) mammals provide important refuge and/or breeding habitat for special-status species such as California tiger salamander, western spadefoot, California red-legged frog, western burrowing owl, and San Joaquin kit fox. Rodents and rabbits also provide a significant source of food for special-status species such as Swainson's hawk, white-tailed kite, American badger, and San Joaquin kit fox. Thus, significant losses of common wildlife such as rodents and rabbits could indirectly impact populations of special-status species if their decline resulted in a substantial loss of suitable burrows or reduced their availability as a food source.

Because impacts from individual O&M and minor construction activities would be localized, and work sites would be distributed across a large geographic area, substantial losses of common wildlife species over large areas are not expected to occur, and any populations impacted by localized losses of individuals would likely recover. Because these losses are not expected to be substantial, the corresponding impact on special-status species that rely on these common species is likely to be small. Further protection would be provided by implementing the HCP's AMMs for special-status species. For example, several of the AMMs include avoiding burrows that may be occupied by special-status wildlife species. The proposed HCP's general AMMs (AMM 1 through AMM 10) would also avoid or minimize some impacts on common species such as rodents and rabbits. For instance, AMM 3 would minimize disturbance and loss of habitat by limiting the development of new access roads and blading for temporary vehicle access. AMMs 2 and 4 could minimize mortality of rodents and rabbits by restricting vehicles and equipment to previously disturbed areas to the extent practicable

and limiting vehicle speeds to 15 mph in ROWs and unpaved roads. **With these measures in place, impacts on common species are expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact BIO9—Potential to spread invasive nonnative plant species. O&M and minor construction have some potential to introduce and/or spread invasive species in the action area.[13] For instance, nonnative seeds can be carried into a work area on the tires or tracks of equipment. In addition, some invasive species are disturbance-adapted and may be more successful than competing native species in disturbed work areas. However, a~~A~~s described in Chapter 2, PG&E's existing biological resources program includes weed control measures such as requiring appropriate footwear, ensuring that seeds are removed from clothing, and inspecting and cleaning vehicles, all of which help to minimize the spread of seeds. These practices would continue in force under the proposed HCP, and additional protection would be afforded by AMMs required by the HCP, including minimizing ground disturbance and reseeding disturbed areas larger than 0.25 acre with weed-free seed mixes (see Table 2-9).

In addition to nonnative species control measures, PG&E's existing programs include extensive vegetation management activities, which would continue under the proposed HCP. Areas within ROWs that require vegetation removal are identified during routine patrols. As described in Chapter 2 (page 2-9), vegetation management for PG&E's natural gas system includes removal of brushy vegetation that prevents personnel from conducting safety inspections of existing infrastructure; and abatement of ruderal vegetation and annual grasses when local fire districts identify that a fire hazard exists. PG&E also has an Integrated Vegetation Management program in place for its electrical system; as discussed in Chapter 2 (pages 2-13 and 2-14), the IVM program comprises activities to control incompatible vegetation along transmission ROWs; provide firebreaks to protect the transmission system in the event of a fire; and to prevent fires related to vegetation growing too close to electrical infrastructure.

~~The proposed HCP will further require that seed mixtures and straw used for erosion control in sensitive habitats must be certified weed-free (AMM 10); see Table 2-9).~~ With PG&E's existing and new weed control measures and the new HCP AMMs in place, **impacts related to the spread of nonnative plant species under the proposed action are expected to be less than significant.**

Mitigation Measure—No mitigation is required.

[13] Note that no data have been collected to date on the spread and control of invasive nonnative plant species on PG&E's ROWs, because the majority of these areas are privately owned. However, more information on this issue is expected to become available over the long term, as the HCP data-gathering effort proceeds.

Alternative 1—HCP with Reduced Take

Alternative 1 would enable the same program of O&M and minor construction activities analyzed for the proposed action; differences between Alternative 1 and the proposed action center on mechanisms for avoiding take. Specifically, Alternative 1 focuses on increased avoidance of take, and would require much more comprehensive and stringent implementation of the HCP's AMM program, which would benefit both covered and noncovered special-status species, and would likely also provide corollary benefits for common species. Impacts on special-status species (covered and noncovered), identified as less than significant for the proposed action, are expected to be further reduced under Alternative 1. Impacts on common species, also expected to be less than significant under the proposed action, would likely also be somewhat reduced under Alternative 1.

Alternative 2—HCP with Enhanced Compensation

Like Alternative 1, Alternative 2 would enable the same program of O&M and minor construction activities analyzed for the proposed action. Alternative 2 would also implement the same AMMs; however, because Alternative 2 stresses increased compensation for unavoidable habitat losses, habitat compensation requirements would be substantially increased under Alternative 2. As a result, impacts on biological resources would be essentially the same under Alternative 2 as those described for the proposed action, but temporary and permanent habitat losses would be compensated at a higher ratio, so a greater acreage of compensation lands (with corollary benefits for covered, noncovered, and common species) would accrue under Alternative 2.

Alternative 3—HCP with Reduced Number of Covered Species

Alternative 3 would enable the same program of O&M and minor construction activities analyzed for the proposed action and the other action alternatives. The key difference between Alternative 3 and the proposed action is that a smaller number of species would be covered under the Alternative 3 HCP; AMMs and habitat compensation would otherwise be essentially the same as those described for the proposed action. Because the Alternative 3 HCP would protect fewer special-status species, it would provide less corollary protection for noncovered special-status species and common species, and would likely require less habitat compensation over the long term. Impacts on biological resources could thus be somewhat greater under Alternative 3 than under the proposed action.

Alternative 4—No Action

Under the No Action Alternative, PG&E would continue O&M and minor construction activities for its San Joaquin Valley natural gas and electricity facilities without implementing a program-wide HCP. Instead, potential take of threatened and endangered species would continue to be addressed on a case-by-case basis, pursuant to the requirements of ESA Section 7 and Section 2081 of the California Fish and Game Code. Through this consultation process, PG&E would address impacts on most of the species included in the proposed HCP, and measures implemented to avoid, minimize, and mitigate impacts on special-status species would probably also help to reduce or avoid impacts on common species, as identified for the proposed action. However, the HCP covers a number of species that qualify for some form of California special status but are not federally listed, thus providing more comprehensive assurance of consultation and ~~mitigation~~ compensation for impacts than case-by-case consultation is likely to offer.

The general types of impacts on natural vegetation, special-status species, and common species expected under the No Action Alternative would be very similar to those identified above for the proposed action. The key differences are (1) no new AMMs would be implemented to buffer potential impacts, so impacts are more likely to be significant; and (2) potential take would be dealt with on a case-by-case basis rather than through a coordinated conservation program. Consequently, conservation efforts under the No Action Alternative would be less integrated; in particular, the purchase of conservation lands would probably be more fragmented. While case-by-case ~~mitigation~~ compensation might be effective at targeting and preserving localized high-value habitat, the creation of a large number of smaller mitigation sites could result in less effective species conservation across the action area as a whole. Conservation lands would be less likely to offer preferred conditions such as larger contiguous areas of habitat or connectivity with other open space or conservation areas. This would be of particular concern for species such as the San Joaquin kit fox that require large areas of habitat or corridors allowing them to travel between areas of suitable habitat. The absence of a comprehensive monitoring and adaptive management program would also reduce opportunities to ensure the success of mitigation sites.

In summary, because the No Action Alternative would approach conservation on a case-by-case basis, it would not offer the advantages of integrated regional conservation planning provided by the action alternatives, and would provide less comprehensive assurance of ~~mitigation~~ compensation for impacts. Outcomes for all categories of habitats and wildlife are more likely to be adverse/significant under the No Action Alternative.

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Chapter 6

Aesthetics

Chapter 6
Aesthetics

This chapter analyzes the proposed action's anticipated effects on aesthetics and visual resources. Key sources for methods and information used in the preparation of this analysis include the following.

- The Federal Highway Administration's guidelines for the analysis of visual resources impacts, together with other standard visual resources analysis methodologies (Federal Highway Administration 1983, U.S. Forest Service 1974, Jones et al. 1975, Soil Conservation Service 1978).
- The general plan guidelines published by the Governor's Office of Planning and Research (Rivasplata and McKenzie 1998).
- The California Scenic Highway System website (California Department of Transportation 2004a, 2004b, 2004c).

Affected Environment

Regulatory Framework

Aesthetics and visual resources are regulated indirectly through a variety of federal, state, and local laws and programs. For example, the federal government does not explicitly regulate visual resources, but recognizes their value and preserves them under the aegis of the National Park, National Wildlife Refuge, National Monument, and National Scenic Byway Systems, and through protections afforded under the National Historic Preservation Act (see related discussion in Chapter 9, *Cultural Resources*). Similarly, aesthetic values are preserved at the state level through the establishment of state parks and preserves, and through the California Scenic Highway Program. In addition, although local jurisdictions are not required to address visual resources as a separate topic in their general plans, most do consider aesthetic values in developing their planning framework.

The following sections provide additional information on regulatory programs of greatest relevance in the action area: the California Scenic Highway Program and the general plan process. The National Park, National Wildlife Refuge, National Monument, and National Scenic Byway systems are not discussed further because they would not be directly affected by the proposed action.

California Scenic Highway Program

The California Legislature initiated the California Scenic Highway Program (Streets and Highways Code Sec. 260 *et seq*.) in 1963, with the goal of preserving and protecting the state's scenic highway corridors[1] from change that would diminish their aesthetic value. The State Scenic Highway System consists of eligible and officially designated routes. A highway may be identified as *eligible* for listing as a state scenic highway if it offers travelers scenic views of the natural landscape, largely undisrupted by development. Eligible routes advance to *officially designated* status when the local jurisdiction adopts ordinances to establish a scenic corridor protection program and receives approval from the California Department of Transportation (Caltrans). Scenic corridor protection programs are required to provide for

- regulation of land use and development within the scenic corridor;
- detailed land and site planning;
- careful attention to and control of earthmoving and landscaping activity;
- careful attention to design and appearance of structures and equipment; and
- control of outdoor advertising, including a ban on billboards.

Caltrans stresses the need for citizen participation in developing the guidelines that implement these requirements (California Department of Transportation 2004a, 2004b).

Preservation of Aesthetic Values through the General Plan Process

California law requires local jurisdictions to develop comprehensive, long-term general plans to guide their land use decision-making and physical development (Government Code Section 65300 *ff*.). Of the seven required "elements" or chapters in a general plan, several relate directly or indirectly to the aesthetic issues faced by a community as it manages its growth. For instance, the **land use element** identifies an appropriate balance and distribution of the various types of land uses—residential, commercial, industrial, recreational, etc.—present in a growing community. The **conservation element** establishes guidelines for the conservation and use of the area's natural resources, including rivers, streams, and lakes; forest lands; soil resources; and mineral deposits. The **open space element** contains goals and strategies to preserve open space for a range of purposes, including outdoor recreation. General plans may also contain additional elements on topics of concern to the local community; common themes that bear on aesthetics and visual resources include recreation and parks, community design, and heritage or cultural resources. Some communities also

[1] *Scenic highway corridor* refers to the land adjacent to and visible from a highway, based on a motorist's line of sight.

adopt ordinances or municipal code provisions in support of specific aesthetic or community design goals.

CPUC Regulations and Aesthetic Values

The requirement that PG&E comply with local jurisdiction aesthetics standards is preempted by the exclusive jurisdiction of the CPUC. However, as discussed in Chapter 2 (see *PG&E's Existing Environmental Programs and Practices*), CPUC requires that PG&E consult with local jurisdictions concerning land use matters, including the locations of proposed new facilities. PG&E in turn directs its project managers and construction leads to work with local jurisdictions during the project development process to ensure that new facilities are as consistent as possible with local planning guidelines, including visual resources goals. Because of the nature of much of PG&E's infrastructure, safe and efficient function must often take priority over aesthetic values, and the appearance of electrical and natural gas infrastructure reflects its power delivery function. Nonetheless, CPUC requires PG&E to provide public notice on some types of new construction projects, including some of the minor construction activities that would be enabled under the proposed action. The type of public noticing required and the avenues for public comment vary depending on the type of facility.

Existing Conditions

The action area covers all or part of nine Central Valley counties, stretching from the Sierra Nevada foothills on the east across the valley floor to the Coast Range foothills on the west, and south to the Tehachapi Mountains. It includes PG&E facilities in or adjacent to undeveloped lands, agricultural areas, small communities, and rapidly growing urban centers such as Stockton, Modesto, Bakersfield, and Fresno. Consequently, it offers a tremendous diversity of visual resources, ranging from essentially undisturbed views of diverse types of rural open space to crowded urban viewsheds, and from historic small towns to new construction in actively growing centers of development.

Table 6-1 lists eligible and officially designated state scenic highways in the action area counties; there are no national scenic byways in the action area. The action area's federal and state parklands, reserves, and open space resources are discussed in Chapter 15 (*Recreation*).

Table 6-1. State Scenic Highways in and near the Action Area

County	Highway/ Route	Location	Mileposts	Status
Kern	14	State Route 58 near Mojave to State Route 395 near Little Lake	16.0–64.5	Eligible
Mariposa	140	North of Mariposa Town Planning Area to west of El Portal Town Planning Area	22.8–49.866	Designated
Merced	152	Santa Clara County line to I-5 junction	0.0–13.848	Designated
Merced/ San Joaquin	5	State Route 152 near Los Banos to I-580 near Vernalis	17.6–0.7	Eligible
Merced	5	State Route 152 to Stanislaus County line	17.6–32.5	Designated
San Joaquin	5	Stanislaus County line to I-580	0.0–0.7	Designated
Stanislaus	5	Merced County line to San Joaquin County line	0.0–28.1	Designated

Source: California Department of Transportation 2004b, 2004c.

Environmental Consequences and Mitigation Strategies

Methodology for Impact Analysis

Overview of Visual Impact Assessment Methods

Typically, the analysis of impacts on visual resources is based on the three key parameters.

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

Visual character refers to the nature of a view—put simply, what does it look like, or what is there to see? Visual character may depend on a combination of natural and artificial (urban or "built") elements.

A view's **visual or scenic quality** is described in terms of its vividness, intactness, and unity. *Vividness* describes the power or "memorability" of landscape components as they combine in visual patterns. *Intactness* refers to the visual integrity of the natural or built landscape and its freedom from

encroaching elements; this factor can be present in well-kept urban and rural landscapes, as well as in natural settings. *Unity* is the visual coherence and compositional harmony of the landscape considered as a whole. Typically, high-quality views are highly vivid, relatively intact, and exhibit a high degree of visual unity. Low-quality views lack vividness, are not visually intact, and possess a low degree of visual unity (Federal Highway Administration 1983, Dunne and Leopold 1978, Jones et al. 1975).

Public viewer response to a view—and to potential changes in that view—depends on viewer exposure and viewer sensitivity. *Viewer exposure* is a function of the number of viewers, the distance from which they view the resource, and the duration of viewing. *Viewer sensitivity* describes the public's level of concern for particular views. It depends in part on viewer exposure, but is also affected by viewer activity, awareness, and expectations. For example, visual sensitivity is higher for views seen by people who are driving for pleasure; people engaging in recreational activities such as hiking, biking, or camping; and homeowners. Visual sensitivity tends to be lower for views seen by people driving to and from work or as part of their work (U.S. Forest Service 1974, Federal Highway Administration 1983, Soil Conservation Service 1978). Commuters and non-recreational travelers generally have fleeting views and tend to focus away from surrounding scenery and onto traffic. By contrast, residential viewers typically experience extended viewing periods; visual quality becomes a quality of life issue in this context, and may carry additional emotional weight because of its potential to affect real estate values. Views from recreation trails and areas, scenic highways, and scenic overlooks are generally assessed as having high visual sensitivity because visual quality is an important aspect of the recreational experience.

Methods Used in this EIS/EIR

Although the majority of activities enabled under the proposed action would take place within or immediately adjacent to existing PG&E ROWs, the precise locations of individual activities on these lands are not foreseeable at this time. Thus, it is not possible to identify either the specific views that would be affected or the likely viewer populations and their concerns. As a result, this analysis focuses on identifying the general types of visual changes that could result from activities enabled by the proposed action and determining which changes could result in adverse effects on visual resources or the viewer experience. Similarly, because specific impacts (i.e., specific locations affected, and the particularly nature and extent of visual changes) cannot be identified at this time, this document focused on identifying a strategy to ensure that an appropriate level of visual resources protection is provided on a case-by-case basis.

Impacts were analyzed qualitatively, based on professional judgment in light of the nature of the potential construction activities and the new facilities. Analysis assumed an ongoing commitment on PG&E's part to consult with local jurisdictions in locating and designing new facilities, to ensure that needed new facilities are as consistent with, and appropriate to, their setting as possible. Measures that might be implemented in support of consistency with local visual

character include designing structures for visual compatibility with nearby structures, if any; restoring natural ground surface contours following construction, to the extent feasible; and revegetating sites disturbed by construction earthwork.

Significance Criteria

For the purposes of this analysis, an impact was considered to be significant and to require mitigation if it would result in any of the following.

- Substantial adverse effects on a scenic vista, or historic buildings or other resources, along a scenic highway.
- Substantial damage to a region's visual resources, including but not limited to natural features such as trees and rock outcroppings.
- Substantial degradation of the existing visual character or quality of a site and its surroundings, as experienced from public spaces.
- New substantial sources of light or glare that would result in permanent adverse effects on daytime or nighttime views of or from an area's public spaces.
- New substantial permanent shading or reduction in sunlight in public spaces.

Impacts and Mitigation Measures

Proposed Action

Impact AES1—Potential for adverse effects on visual resources, visual character, or visual quality as a result of O&M activities. O&M activities could result in short-term temporary visual disturbance related to ground disturbance/earthwork; the presence of vehicles, personnel, and supplies in undeveloped areas; glare generated by reflections from metal and glass vehicle surfaces; and introduction of high-intensity nighttime construction lighting. However, the visual disturbances associated with O&M activities would involve comparatively small areas and most would be of short duration, limited to the work or construction window. Even longer-term or permanent changes associated with O&M activities—such as those associated with some types of vegetation control—would affect limited areas within or immediately adjacent to PG&E rights-of-way, and would be consistent with the general visual character of the rights-of-way, which is typically dominated by existing power delivery infrastructure. In addition, as described in Chapter 2 (see *Visual Resources Practices* under *PG&E's Existing Environmental Programs and Practices*), PG&E requires work crews to follow good construction site housekeeping practices to minimize construction-related visual disturbance, such as maintaining sites in a clean orderly condition, storing building materials and equipment in construction staging areas and/or away from public view, and

removing construction debris promptly at regular intervals. **As a result, visual resources impacts associated with O&M activities are expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact AES2—Potential for adverse effects on visual resources associated with scenic highways and other designated scenic vistas as a result of new minor construction. A number of scenic highways are present in the action area (Table 6-1). However, CPUC regulations prohibit the installation of overhead distribution facilities within 1,000 feet of the ROW of any officially designated state or county scenic highway, if the facilities would be visible to travelers on the highway (California Public Utilities Code Sec. 320).

Visual resources associated with scenic highways and other types of scenic vistas would be further and substantially protected by PG&E's obligations under generally applicable CPUC regulations, and by PG&E's standard business practices. As described in Chapter 2, PG&E will carry all of its standard business practices and BMPs—which reflect CPUC requirements for the company's operations—forward in all O&M and minor construction activities enabled under the proposed action. In siting needed new facilities, the company works with appropriate agencies, including local jurisdictions, to avoid or minimize conflicts with existing and planned land uses; this typically includes identifying any feasible approaches to address visual resources impacts. Depending on the type of facility and its location, typical measures under PG&E's visual resources program include

- modifications to siting and design of new facilities; design modifications may include the types of materials used for the visible surfaces of structures, pavement elements, etc., as well as other aspects;
- use of Dark Sky–friendly lighting components;
- finished grade contouring at the project site to provide a natural appearing landform upon completion of construction activities; and/or
- revegetation of disturbed areas using methods consistent with the setting and compatible with facilities.

The business practices and BMPs PG&E brings forward under the proposed action would substantially lessen the potential for significant impacts on the visual quality of scenic vistas in general. Accordingly, **visual impacts on scenic highways and designated scenic vistas as a result of new construction are expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact AES3—Potential for medium- and long-term degradation of visual character of public viewshed as a result of vegetation removal and earthwork for new minor construction. Many, if not all, minor construction projects enabled by the proposed action would entail some vegetation clearing

and some degree of earthwork at the work site and possibly also at a nearby construction laydown or staging area, if staging could not be accommodated at the work site. Vegetation removal creates a temporarily denuded surface that may contrast strongly with the surrounding area in terms of color and visual texture. Grading further modifies the work site by producing barren cut and/or fill areas; it may also create slopes that are unnaturally steep or unnaturally flat compared to the surrounding area. Visual changes associated with vegetation removal and grading would begin early in the construction period. Depending on the nature of the surrounding vegetation—grassland, chaparral, woodland, landscaping, etc.—vegetation impacts could continue to be apparent for some time; topographic alterations could be essentially permanent.

As described in Chapter 2 (*Proposed Action and Alternatives*), the total acreage of the area disturbed for minor construction, including construction staging and the new facility footprint, would be several acres or less. Some viewers might feel that adverse effects on a site of this size substantially degrade the area's visual character, depending on the nature of the surrounding viewshed and the characteristics of the viewing population. This is most likely to be the case in residential and open space contexts, where sensitivity to changes in the viewshed is typically highest. Where viewers experience earthwork and/or vegetation removal as substantially degrading the viewshed experienced from a public space such as a park, a significant impact would be considered to occur.

However, as discussed in *CPUC Regulations and Aesthetic Values* above, the CPUC process provides avenues for public comment on the design of some proposed new facilities. In addition, as described above and in Chapter 2 (see *PG&E's Existing Environmental Programs and Practices*), PG&E will carry all of its standard business practices and BMPs—which reflect CPUC requirements for the company's operations—forward in all O&M and minor construction activities enabled under the proposed action. In siting new facilities, the company works with appropriate agencies, including local jurisdictions, to avoid or minimize conflicts with existing and planned land uses. This typically includes identifying any feasible approaches to address visual resources impacts; depending on the type of facility involved, and its location, measures to protect visual resources could include but are not necessarily limited to siting, finished grade contouring at the work site, and landscape design/site revegetation. In light of the business practices and BMPs PG&E brings forward under the proposed action, **medium- and long-term visual impacts related to vegetation removal and construction earthwork are expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact AES4—Potential for long-term degradation of region's visual resources through introduction of built elements. As discussed above, the proposed action would enable various types of small construction projects, all or most of which would have some potential to result in visual changes at and near the work site. The maximum length of line extensions would be 1 mile, and the maximum area of new facilities would be 5 acres on average. Moreover, new facilities would be designed to be as consistent as possible with the visual character of their surroundings. Because new facilities would be areally limited

and would be designed for consistency with the surrounding viewshed, most are not expected to result in substantial degradation or elimination of visual resources in public spaces, and the majority of long-term visual impacts would be less than significant. However, some of the types of features introduced could still be experienced as having a meaningfully adverse effect on viewsheds, particularly in residential and/or open space areas, where viewer sensitivity is likely to be high, and where the introduction of additional built features is likely to be considered particularly undesirable. Thus, in some cases, the introduction of some new facilities could represent a significant impact on visual resources in public spaces.

As discussed under Impact AES2 above, PG&E will carry forward all of its standard business practices and BMPs (reflecting CPUC requirements for the company's operations) in all O&M and minor construction activities enabled under the proposed action. In siting new facilities, the company works with appropriate agencies, including local jurisdictions, to avoid or minimize conflicts with existing and planned land uses. This typically includes identifying any feasible approaches to address visual resources impacts. Depending on the type of facility involved, and its location, measures to protect visual resources could include modifications to facility siting; modifications to facility design, including the types of materials used for the visible surfaces of structures, pavement elements, etc.; finished grade contouring at the project site to provide a natural appearing landform upon completion of construction activities; and/or revegetation of disturbed areas using methods consistent with the setting and facility type. In light of the business practices and BMPs PG&E brings forward under the proposed action, **visual impacts related to the introduction of new built elements into local viewsheds are expected to be less than significant as experienced from public spaces.**

Mitigation Measure—No mitigation is required.

Impact AES5—Potential introduction of new substantial sources of light or glare. The construction of some types of new facilities would add pavement, cement block, metal, glass, painted wood, and/or other potentially reflective surfaces to the viewshed around work sites. Some types of facilities would also require nighttime security lighting. Depending on the design of new facilities and the nature of surrounding land uses, increases in glare or nighttime lighting could pose a concern for viewers in public spaces. This is most likely in residential areas, where viewer sensitivity is particularly high. It could also be a concern in open space, where viewer sensitivity is high and there is additional potential to disturb sensitive nocturnal or crepuscular wildlife. However, as described in Chapter 2 (see *PG&E's Existing Environmental Programs and Practices*), PG&E will carry forward all of its standard business practices and BMPs (reflecting CPUC requirements for the company's operations) in all O&M and minor construction activities enabled under the proposed action. This includes consultation with appropriate local agencies regarding the location and design of new facilities. In addition, consistent with the company's Dark Sky Initiative, new facilities will incorporate standard measures to minimize light pollution, including glare and nighttime fugitive light. Because of the business practices and BMPs PG&E brings forward under the proposed action, **visual**

impacts related to potential introduction of new substantial sources of light or glare are expected to be less than significant as experienced from public spaces.

Mitigation Measure—No mitigation is required.

Impact AES6—Potential introduction of substantial new shading on adjacent parcels. Most of the new facilities constructed under the proposed action would have little potential to increase shading on adjacent parcels. For instance, electric transmission lines would create shadows but would not substantially block sunlight. A small number of facilities would include small one-storey buildings, which could produce perceptible shading in public spaces, depending on their design, orientation, and location with respect to parcel boundaries. Concerns are most likely to arise in residential areas, where viewer sensitivity is particularly high. However, PG&E's land use consultations with local jurisdictions typically include shading issues where these are identified as relevant, and, as part of the standard business practices and BMPs carried forward under the proposed action, PG&E will work with local authorities to identify an acceptable means of addressing shading through facilities siting and design, if needed. Consequently, **visual impacts related to potential introduction of new substantial sources of new shading on adjacent parcels are expected to be less than significant as experienced from public spaces.**

Mitigation Measure—No mitigation is required.

Impact AES7—Aesthetic enhancement as a result of habitat compensation. The proposed action provides for the preservation and enhancement of offsite habitat as a means of compensating for the biological effects of PG&E's O&M and minor construction activities. The acreage required for compensation is expected to consistently exceed the actual acreage impacted, and the mitigation lands would consist of high quality open space that meets specific biological parameters. As a result, over the long term, the proposed action would ensure the preservation and improve the quality of natural open space in the Central Valley, resulting in **aesthetic benefits.**

Mitigation Measure—Because this impact would be beneficial, no mitigation is required.

Alternative 1—HCP with Reduced Take

Alternative 1 would enable the same program of O&M and minor construction activities as the proposed action. Consequently, Impacts AES1 through AES5 would be the same under Alternative 1 as those described above for the proposed action.

Differences between Alternative 1 and the proposed action center on the strategy for mitigating the biological effects of PG&E's O&M and minor construction activities; Alternative 1 stresses reducing take. However, although the level of

take would be reduced because of the increased stringency associated with implementation of the AMMs, compensation needs are expected to be similar under both alternatives because compensation acreages would be calculated based on acreage affected, not level of take. Consequently, under Alternative 1, impacts related to aesthetic resources would be similar to those described for the proposed action

Alternative 2—HCP with Enhanced Compensation

Alternative 2 would enable the same program of O&M and minor construction activities as the proposed action. Consequently, as with Alternative 1, Impacts AES1 through AES6 would be the same under Alternative 2 as those described above for the proposed action.

Differences between Alternative 2 and the proposed action center on the strategy for mitigating the biological effects of PG&E's O&M and minor construction activities; Alternative 2 would entail compensation at higher ratios than the proposed action, and thus is expected to require substantially larger compensation acreages. Aesthetic benefits related to the preservation of natural open space would thus be maximized under Alternative 2.

Alternative 3—HCP with Reduced Number of Covered Species

Alternative 3 would enable the same program of O&M and minor construction activities as the proposed action; Impacts AES1 through AES6 would thus be the same under Alternative 3 as those described above for the proposed action.

The key difference between Alternative 3 and the proposed action is that the Alternative 3 HCP would cover a smaller number of species, so the compensation acreages required under the Alternative 3 HCP are likely to be somewhat less. However, PG&E could still be required to consult separately with the U.S. Fish and Wildlife Service regarding potential take of other special-status species not covered by the Alternative 3 HCP, and any such consultation could result in the identification of additional habitat compensation needs; as identified in Chapter 3 (*Land Use and Planning*), the net result of Alternative 3 could be the preservation of a somewhat larger number of smaller and more areally distributed parcels compared to the larger, more consolidated preserve acreages anticipated under the proposed action. Smaller, more widely distributed preserves could ultimately result in benefits to more viewers. On the other hand, smaller, more areally distributed preserves could be less aesthetically effective than larger parcels. In summary, it is difficult to predict benefits under Alternative 3, but it is likely that they would be slightly less than those offered by the proposed action.

Alternative 4—No Action

Under the No Action Alternative, PG&E would continue its existing program of O&M activities unchanged. Impacts AES1 through AES6 would be essentially the same under the No Action Alternative as those described above for the proposed action.

No HCP would be implemented under the No Action Alternative, but PG&E would nonetheless be required to obtain permits for any incidental take of special-status species on a case-by-case basis. As described in Chapter 1 (*Introduction*), the permitting process would require conservation planning and consultation with USFWS, with the expectation that habitat losses would be compensated at ratios similar to those required under the proposed action. There would thus be some potential for aesthetic benefits related to the preservation of natural open space under the No Action Alternative. However, because conservation planning would be less centralized, and habitat preservation would occur in a less systematic way, smaller acreages would probably be preserved at any one time. The scenario for the No Action Alternative would be similar to that for Alternative 3, but is likely to result in even less centralized compensation planning.

As described for Alternative 3, if compensation lands were widely distributed, they could ultimately benefit more viewers than would benefit from larger, more consolidated preserves. On the other hand, smaller, more areally distributed preserves could be less aesthetically effective than larger ones. In summary, aesthetic benefits under the No Action Alternative are difficult to predict, but are likely to be less marked than those offered by any of the action alternatives.

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Chapter 7

Geology and Soils

Chapter 7
Geology and Soils

This chapter analyzes the proposed action's potential effects related to geology and geologic hazards, including earthquake and landslide hazards. It also discusses the proposed action's potential effects on soil resources. Related discussions are found in Chapter 8 (*Water Resources*), Chapter 10 (*Paleontological Resources*), and Chapter 14 (*Public Health and Environmental Hazards*).

Key sources of data used in the preparation of this chapter include the following.

- Regional geologic maps and fault maps prepared by the California Department of Conservation's California Geological Survey (formerly the Division of Mines and Geology) and U.S. Geological Survey.
- Soils information made available by the Earth System Science Center at Pennsylvania State University, based on soils mapping by the Soil Conservation Service (SCS) (now the Natural Resources Conservation Service [NRCS]).

Specific reference information is provided in the text.

Affected Environment

Regulatory Framework

Federal Regulations—Clean Water Act Section 402[p]

Amendments to the federal Clean Water Act (CWA) in 1987 added Section 402[p], which created a framework for regulating municipal and industrial storm water discharges under the National Pollutant Discharge Elimination System (NPDES) program. In California, the State Water Resources Control Board is responsible for implementing the NPDES program; pursuant to the state's Porter-Cologne Water Quality Control Act (see discussion in Chapter 8), it delegates implementation responsibility to the state's nine Regional Water Quality Control Boards.

Under the NPDES Phase II Rule, any construction project disturbing 1 acre or more must obtain coverage under the state's General Permit for Storm Water Discharges Associated with Construction Activity. The purpose of the Phase II rule is to avoid or mitigate the effects of construction activities, including earthwork, on surface waters. To this end, General Construction Permit applicants are required to file a Notice of Intent to Discharge Storm Water with the Regional Water Quality Board that has jurisdiction over the construction area, and to prepare a Storm Water Pollution Prevention Plan (SWPPP) stipulating best management practices (BMPs) that will be in place to avoid adverse effects on water quality.

Additional information on other aspects of the federal Clean Water Act is provided in Chapter 8 (*Water Resources*).

State Regulations and Policies

Alquist-Priolo Earthquake Fault Zoning Act

California's Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code Sec. 2621 *et seq*.), originally enacted in 1972 as the Alquist-Priolo Special Studies Zones Act and renamed in 1994, is intended to reduce the risk 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[1] 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 clearly identified by a trained geologist at the ground surface or in the shallow subsurface, using standard professional techniques, criteria, and judgment (Hart and Bryant 1997).

Seismic Hazards Mapping Act

Like the Alquist-Priolo Act, the Seismic Hazards Mapping Act of 1990 (PRC Sections 2690–2699.6) is intended to reduce damage resulting from earthquakes. While the Alquist-Priolo Act addresses surface fault rupture, the Seismic Hazards Mapping Act addresses other earthquake-related hazards, including strong

[1] With reference to the Alquist-Priolo Act, a *structure for human occupancy* is defined as one "used or intended for supporting or sheltering any use or occupancy, which is expected to have a human occupancy rate of more than 2,000 person-hours per year" (California Code of Regulations, Title 14, Div. 2, Section 3601[e]).

groundshaking, liquefaction[2], and seismically induced landslides. Its provisions are similar in concept to those of the Alquist-Priolo Act: the state is charged with identifying and mapping areas at risk of strong groundshaking, liquefaction, landslides, and other corollary hazards, and cities and counties are required to regulate development within mapped Seismic Hazard Zones.

Under the Seismic Hazards Mapping Act, permit review is the primary mechanism for local regulation of development. Specifically, cities and counties are prohibited from issuing development permits for sites within Seismic Hazard Zones until appropriate site-specific geologic and/or geotechnical investigations have been carried out and measures to reduce potential damage have been incorporated into the development plans.

Local Regulations

Many cities and counties include geologic hazards as a factor in their land use planning, with the result that their general plans and/or zoning ordinances reflect policies specifically aimed at reducing risk to life and property as a result of seismic and other types of geologic hazards. All of the counties in the action area (San Joaquin, Stanislaus, Mariposa, Merced, Madera, Fresno, Tulare, Kings, and Kern) have developed general plan goals that specifically address reduction of geologic hazards.

In California, earthwork and construction activities are regulated at the local jurisdiction level through a multi-stage permitting process—grading permits are required for most types of earthwork, and additional permits are typically needed for various types of construction.

The purpose of local jurisdiction permit review is to ensure that proposed earthwork will meet the jurisdiction's adopted codes and standards. Most jurisdictions in California have adopted either the Uniform Building Code (UBC) or the California Building Code (CBC) as a minimum standard. The UBC was specifically developed to foster consistency in building laws across the nation by offering local jurisdictions, agencies, and organizations adequate minimum standards to guide local regulation of design and construction. The CBC expands on the UBC by providing more stringent standards addressing reduction of earthquake risk to structures in this seismically active state; however, many jurisdictions have evaluated the UBC as providing adequate protection.

Portions of the UBC that are particularly relevant to geology and geologic hazards include Chapter 16 Division IV (*Structural Design Requirements—Earthquake Design*) and Appendix Chapter 16 (*Structural Forces*, including seismic loading); Chapter 18 (*Foundations and Retaining Walls*); Appendix Chapter 18 (*Waterproofing and Dampproofing Foundations*); Appendix Chapter

[2] *Liquefaction* is a phenomenon in which the strength and stiffness of a soil are reduced by earthquake shaking or other rapidly applied loading. Liquefaction and related types of ground failure are of greatest concern in areas where well-sorted sandy unconsolidated sediments are present in the subsurface and the water table is comparatively shallow.

31 Division I (*Flood-Resistant Construction*); and Chapter 33 (*Site Work, Demolition, and Grading*), together with Appendix Chapter 33 (*Excavation and Grading*). Chapter 33 of the Uniform Building Code specifically exempts excavation for utilities installation from the grading permit process, even where the chapter has been adopted by the local jurisdiction. However, as discussed in the following section, PG&E adheres to the UBC's earthwork standards where they are not in conflict with or superseded by CPUC regulations.

Depending on the extent, nature, and location of proposed earthwork and construction, the local jurisdiction permit process may require preparation of a site-specific geotechnical investigation, sometimes called a soils report. In some cases, this is required by state regulations (see discussion of Alquist-Priolo and Seismic Hazards Mapping Acts above). It may also be required by the UBC or CBC. The purpose of a site-specific geotechnical investigation is to provide a geologic basis for the development of appropriate project design. Geotechnical investigations typically assess bedrock and Quaternary geology, geologic structure, soils, and previous history of excavation and fill placement; as appropriate, they may also include information specifically addressing the stipulations of the Alquist-Priolo Act, the Seismic Hazards Mapping Act, and/or local regulations.

Engineering and Construction Codes and Standards for PG&E Activities

Design and construction of PG&E facilities is governed by a variety of codes and standards. A number of these specifically regulate topics relevant to geology and geotechnical engineering, such as earthwork standards and seismic safety, including the following.

- **CPUC General Order 95** provides general standards for design and construction of overhead electric transmission and distribution lines.
- **CPUC General Order 112E** provides general standards for design, construction, testing, maintenance and operation of natural gas piping systems.
- **"IEEE 693"** ***Recommended Practices for Seismic Design of Substations*** contains guidelines for earthquake-resistant substation design and construction. The IEEE (Institute of Electrical and Electronics Engineers, Inc.) is an international professional organization and a widely recognized authority in the development of industry standards for electrical engineering and electric power generation and transmission.
- **The UBC—**as discussed in *Local Regulations* above, the UBC is voluntarily adopted by jurisdictions and agencies. PG&E adheres to the earthwork standards in UBC Chapter 33 and Appendix Chapter 33 where they are not superseded by CPUC regulations.

Existing Conditions

The following sections describe the physiographic setting, geomorphology, and geology of the action area, with an emphasis on Quaternary geology and geologic hazards.

Physiography

The action area is located almost entirely within the Great Valley geomorphic province. As described in Chapter 1, it also includes adjacent low-lying portions of the Sierra Nevada and Coast Range foothills.

The Great Valley, also called the Central Valley, is a nearly flat alluvial plain that lies between the Sierra Nevada on the east and the Coast Ranges on the west. Its south end is defined by the Tehachapi Mountains north of Los Angeles, and its north end is defined by the Klamath Mountains. The valley has an average width of about 50 miles and is about 400 miles long overall. The Great Valley is subdivided into the Sacramento Valley to the north and the San Joaquin Valley to the south; the Sacramento Valley is drained by the south-flowing Sacramento River and the San Joaquin Valley is drained by the generally north-flowing San Joaquin River. The two rivers meet at the Sacramento–San Joaquin Delta, which empties into San Francisco Bay, ultimately connecting with the Pacific Ocean via the Golden Gate (Norris and Webb 1990, Harden 1998).

The elevation of the Valley floor ranges from a few hundred feet to about 1,000 feet above mean sea level (MSL) (Hackel 1966). Most of the action area is located on valley-floor topography with slopes of 0–2%. However, the east and west margins of the area are dominated by undulating foothills topography, where slopes as steep as 15–30% are common. Artificially induced land subsidence has been a concern in both the southern San Joaquin Valley and the Sacramento–San Joaquin Delta region. Principal causes of subsidence in the south include groundwater overdraft, leading to compaction and settling of over-exploited aquifer sediments; and excess irrigation, resulting in consolidation of dry near-surface deposits. In the Delta region, subsidence has been associated with accelerated decomposition of peat beds resulting from conversion of wetlands to agricultural uses (Poland and Everson 1966, Poland et al. 1975, Swanson 1998).

Geologic Framework

The following paragraphs describe the geology of the action area and vicinity, focusing on the Great Valley and adjacent portions of the Coast Ranges and Sierra Nevada.

The **Great Valley** 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 and/or mélange. Mesozoic sedimentary rocks now 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 (e.g., Norris and Webb 1990).

To the west, **the Coast Ranges geomorphic province** is characterized by en echelon northwest-trending mountain ranges formed over the past 10 million years or less by active uplift related to complex tectonics of the San Andreas fault/plate boundary system (e.g., Norris and Webb 1990, Buising and Walker 1995, Atwater and Stock 1998). The eastern rangefront is defined by faults that have been interpreted as contractile features associated with shortening along an axis approximately normal to the rangefront (e.g., Wong et al. 1988, Sowers et al. 1992, Unruh et al. 1992; see also Jennings 1977 for regional mapping), but may also locally accommodate a right-lateral component of motion (e.g., Richesin 1996).

East of the San Andreas fault, the Coast Ranges are broadly antiformal. The core of the uplift consists primarily of metasedimentary rocks and mélange of the Mesozoic Franciscan Complex (e.g., Jennings 1977). Outcrops of mafic and ultramafic units belonging to the Jurassic Coast Range Ophiolite are also locally present, and are particularly well developed along the Ortigalita fault in the vicinity of Del Puerto Canyon (Wagner et al. 1990, Evarts et al. 1999). Mesozoic ultramafic rocks are also well exposed in the vicinity of San Benito Mountain. The eastern Coast Range rangefront is flanked by a generally eastward-younging sequence of Cretaceous through Quaternary clastic sedimentary strata. The lower portion of this sequence, where it is present, typically records deep marine deposition, while the upper portion reflects progressive growth and erosional dissection of the Coast Range uplift (Unruh et al. 1992, Richesin 1996). Quaternary alluvial strata accumulated on essentially modern topography buttress against the rangefront, and are locally folded and/or faulted, particularly along the southern portion of the rangefront. Active alluvium and older Quaternary terrace deposits are present in the larger active stream valleys throughout the eastern portion of the Coast Ranges (e.g., Jennings, 1977, Wagner et al. 1990, Richesin 1996).

To the east of the action area, **the Sierra Nevada** preserves the dissected remnants of a Mesozoic volcanic arc system similar to the modern Andes. The core of the range consists of plutonic rocks representing the roots of the arc. It is bordered on the eastern margin of the action area by generally westward-younging metavolcanic and metasedimentary rocks ranging in age from Paleozoic to Mesozoic. These strata are in turn overlain by Miocene through Quaternary fluvial and alluvial sediments that pass laterally into valley floor strata, and reflect erosional dissection of the progressively uplifting Sierran massif (Jennings 1977, Bartow 1991).

Soils

This EIS/EIR used the Natural Resource Conservation Service's major land resource area (MLRA) classification system as the basis for characterizing soil resources in the action area. 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 severally geographically associated land resource units (LRUs). An *LRU*, 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. An LRU may be one continuous area or may comprise several separate nearby areas (Natural Resources Conservation Services 2004a).

The action area falls within three MLRAs identified by the USDA (Earth System Science Center 1998). Most of the action area is located within MLRA 17, the Sacramento and San Joaquin Valleys. The west and east margins of the action area are located in MLRA 15 (Central California Coast Range) and MLRA 18 (Sierra Nevada foothills) respectively. Table 7-1 summarizes key characteristics of surface soils in each MLRA.

Table 7-1. Soil Characteristics by Major Land Resource Area in the Action Area

MLRA	Geographic Extent	Soil Texture	Erosion Hazard	Runoff	Shrink-Swell Hazard
15—Central California Coast Range	Foothills along west margin of action area	Soils are nearly level to moderately sloping. Most soils are alluvial, although some are residual. Soil textures are generally loamy to clayey; bedrock outcrops and gravelly units are locally present, particularly at higher elevations. Soils range from shallow to moderately deep, and are typically deeper at lower elevations.	Moderate	Moderate to rapid	Moderate to high
17—Sacramento and San Joaquin Valleys	Central portion of action area	Soils are nearly level, and are alluvial, occurring on low terraces, fans, and floodplains, and in basins. Soil textures range from clay to loamy sand. Organic soils are present in the northern (Delta) portion of the action area. Soils are typically very deep.	None to slight	Very slow	Ranges from low to high, depending on soil texture
18—Sierra Nevada foothills	Foothills along east margin of action area	Soils are nearly level to moderately sloping. They are primarily alluvial, although residual soils are present at the highest elevations in this MRLA. Soil textures are generally loamy to sandy, with gravelly and cobbly units locally present. Soils range from shallow to deep.	Moderate	Moderate to rapid	Moderate to high

Source: Earth System Science Center 1998.

The soils in the action area have been mapped by the U.S. Department of Agriculture's Natural Resources Conservation Service (formerly the Soil Conservation Service), and are described in detail in the soil surveys for the action area counties. Additional information is available through the National Soil Survey Geographic (SSURGO) Database and State Soil Geographic (STATSGO) database (Natural Resources Conservation Service 2004b, Natural Resources Conservation Service 2004c).

Geologic Hazards

Primary Seismic Hazards—Surface Fault Rupture and Groundshaking

Within the action area, faults recognized as active by the State of California and zoned pursuant to the Alquist-Priolo Act include, from north to south, the Greenville, Ortigalita, Nuñez, San Andreas, Buena Vista, Kern Front and related structures, Pleito, White Wolf, and Garlock (Figure 7-1). All of these faults pose some risk of surface rupture related to seismic activity.

In addition to possible surface rupture, the action area is likely to experience strong groundshaking as a result of earthquakes on any of the region's principal active faults during the lifespan of the proposed project; in addition to those listed above, faults to consider in assessing the potential for groundshaking effects include the Hayward and Calaveras (Figure 7-1). 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 San Francisco Bay Area in the next 30 years, and a 10% probability of a magnitude 7.0 or greater event during the same timeframe (U.S. Geological Survey Working Group on California Earthquake Probabilities 2003). Table 7-2 summarizes current information on earthquake recurrence intervals and maximum credible earthquake (MCE) for key structures in and near the action area.

Table 7-2. Maximum Credible Earthquake and Recurrence Interval for Principal Active Faults

Fault	Magnitude of Maximum Credible Earthquake	Approximate Recurrence Interval
Greenville	6.9[a]	Southern segment: 623 years[c] Northern segment: 644 years[c]
Hayward	Entire fault: 7.1[a] Southern segment: 6.5[a]–6.9[c]	Entire fault: 330 years[a] Southern segment: 161[c]–167[b] years
Calaveras (southern)	6.2[a]	75 years[c]
Ortigalita	6.5–6.75[b], 6.9[a]	2,000–5,000 years[b]
San Andreas	7.0–7.9[a]	210–400[a]
Buena Vista	Has been undergoing active creep since about 1930, probably as a result of oil withdrawal[d]	
Kern Front and related faults	Have been undergoing active creep since the 1940s as a result of withdrawal of oil and groundwater[d]	

Fault	Magnitude of Maximum Credible Earthquake	Approximate Recurrence Interval
Pleito	6.3–7.3 [d]	Uncertain [d]
White Wolf	6.5–7.5 [d]	Unknown [d]
Garlock	6.8–7.6[d]	200–3,000 years (differs by segment) [d]

Note: See Figure 7-1 for fault locations.

[a]Source: International Conference of Building Officials 1997.
[b]Source: Anderson et al. 1982.
[c]Source: U.S. Geological Survey Working Group on California Earthquake Probabilities 2003.
[d]Source: Southern California Earthquake Center 2004.

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 (Petersen et al. 1996), the peak horizontal ground acceleration values for the action area range up to 0.5*g* (where 1*g* is equal to 1 gravity or an acceleration of 9.8 meters per second per second). This suggests that the groundshaking hazard in the action area ranges from low to moderate, with lower risks in the eastern and central portions of the action area, and higher risks in the west and south, closer to potential seismic sources.

Secondary Seismic Hazards—Liquefaction and Ground Failure

Secondary seismic hazards refers to liquefaction and related types of ground failure, as well as seismically induced landsliding. As discussed in *Regulatory Framework* above, the State of California maps areas subject to secondary seismic hazards pursuant to the Seismic Hazards Mapping Act of 1990. To date, this effort has focused on areas such as the Los Angeles Basin–Orange County region and the San Francisco Bay region, where dense populations are concentrated along active faults; seismic hazards maps have not been issued for the action area, and no such mapping is planned in the foreseeable future (California Geological Survey 2004). Detailed evaluation of liquefaction hazard is outside the scope of this EIS/EIR analysis. Broadly speaking, however, liquefaction is likely to be a substantial concern in parts of the plan area where soils and sediments are sandy and groundwater is shallow.

In the northern portion of the action area, soils are at least locally highly susceptible to liquefaction, and liquefaction may be associated with lateral spreading and/or differential settlement. Lateral spreading has historically occurred in the northern portion of the plan area and both liquefaction and differential settling probably represent important hazards (Association of Bay Area Governments 2001).

Liquefaction may be a concern elsewhere on the valley floor as well. Coarser alluvial materials along the margins of the action area are typically poorly sorted

and are not likely to pose a great risk of liquefaction or related types of ground failure.

Landslide and Other Slope Stability Hazards

The majority of the action area is situated on flat or very gently sloping topography where the potential for slope failure is minimal to low. In the foothill regions on the action area's west and east margins, landslide risk may be substantially greater. This is a particular concern in the Coast Range foothills, where rugged topography underlain by Franciscan rocks is commonly prone to landsliding and debris flows.

Environmental Consequences and Mitigation Strategies

Methodology for Impact Analysis

Effects related to geology, soils, and associated hazards were analyzed qualitatively, based on a review of soils and geologic information for the action area and on professional judgment. Analysis focused on the proposed action's potential to increase the risk of personal injury, loss of life, and damage to property, including new or upgraded facilities, as a result of existing geologic conditions in the action area. Analysis assumed that PG&E will comply with the requirements of the current UBC, relevant CPUC general orders, IEEE 693 seismic design standards, County General Plan seismic safety standards, and County grading ordinances.

Significance Criteria

For the purposes of this analysis, an impact was considered to be significant and to require mitigation if it would result in any of the following.

- Exposure of people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving
  - 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;
  - strong seismic groundshaking;
  - liquefaction and other related types of seismically induced ground failure; or
  - landslides.
- Substantial soil erosion or loss of topsoil.

- Location of structures on a geologic unit or soil that is unstable or that would become unstable as a result of construction, increasing the risk of on- or offsite landslide or slope failure.
- Location of structures on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (International Conference of Building Officials 1997), creating substantial risks to life or property.

Impacts and Mitigation Measures

Proposed Action

Impact GEO1—Potential for damage to new or upgraded facilities as a result of surface fault rupture. Portions of the action area could be subject to surface fault rupture in the event of an earthquake. Figure 7-1 shows faults recognized as active by the State of California; the corridors along these faults are the portions of the action area likely at greatest risk of surface rupture. O&M activities would not substantially affect risks related to surface fault rupture, and are not discussed further; this analysis focuses on new and upgraded facilities.

Two potential concerns are associated with surface rupture damage to PG&E's facilities: safety risk to personnel working in or around new structures, and cost of repairs. Damage to electrical transmission or distribution infrastructure also carries a corollary risk of service interruption, and of fire should power lines be downed as a result of surface rupture; similarly, damage to natural gas infrastructure could interrupt service or lead to fire or explosion. However, neither of these risks would alter substantially as a result of the proposed action, so no further analysis of this issue is needed.

Both the safety risk to personnel and the potential cost of repairs could increase somewhat under the proposed action as new infrastructure is added incrementally through facilities upgrades and new construction. Under a worst-case scenario, this could represent a significant impact, in part because the infrastructure that would be constructed or installed does not qualify as "structures for human occupancy" as defined by the State of California, and thus is not regulated under the Alquist-Priolo Act. However, precisely *because* new structures would not be "structures for human occupancy," increases in safety risks would be comparatively small.

Moreover, all new facilities would be designed and constructed to meet or exceed relevant CPUC standards and, where applicable (and not in conflict with CPUC requirements), earthwork requirements of the current UBC. Substations would be designed and constructed in conformance with IEEE 693 standards. These codes include a wide variety of stipulations relevant to reducing earthquake-related risk, including foundation and structural design, and structural tolerances. In addition, for some new construction (as required by CPUC), site-specific geotechnical studies would be performed by qualified personnel with appropriate expertise, and facilities design and construction would conform to all further recommendations of these investigations, which could expand on, modify, or

increase the stringency of code requirements, as well as constraining the siting of facilities.

In summary, adherence to CPUC, UBC, and IEEE 693 standards and to recommendations of site-specific geotechnical investigations performed by qualified professionals would reduce the potential for structural damage to facilities and corollary indirect impacts associated with surface fault rupture, including safety risk, to the extent feasible, although it cannot be entirely avoided. **This impact is thus considered less than significant.**

Mitigation Measure—No mitigation is required

Impact GEO2—Potential for damage to new or upgraded facilities as a result of seismic groundshaking. As described in *Affected Environment* above, the action area could be subject to groundshaking as a result of earthquake activity on any of a number of faults (Figure 7-1). Maximum ground accelerations are estimated at 0.5*g* or less (Peterson et al. 1996), but could be sufficient to damage new or upgraded facilities, raising two potential concerns: safety risk to personnel and cost of repairs. As with surface fault rupture, discussed in Impact GEO1 above, the risk of service interruption would not alter substantially as a result of the proposed action; this issue is not discussed further. In addition, O&M activities would not substantially affect risks related to seismic groundshaking, and are not discussed further; this analysis focuses on new and upgraded facilities.

Both the safety risk to personnel and the potential cost of repairs could increase somewhat under the proposed action, as new infrastructure is added incrementally through facilities upgrades and new construction, and the potential for seismic groundshaking damage could represent a significant impact. However, as discussed above, all new facilities would be designed and constructed to meet or exceed relevant CPUC standards and, where applicable (and not in conflict with CPUC requirements), earthwork requirements of the current UBC. Substations would be designed and constructed in conformance with IEEE 693 standards. As discussed above, these codes include a wide variety of stipulations relevant to reducing earthquake-related risk, including foundation and structure design, and structural tolerances. In addition, for some new construction (as required by CPUC), site-specific geotechnical studies would be performed by qualified personnel with appropriate expertise, and facilities design and construction would conform to all further recommendations of these investigations, which could expand on, modify, or increase the stringency of code requirements, as well as constraining the siting of facilities.

In summary, adherence to CPUC, IEEE 693, and UBC standards and to recommendations of site-specific geotechnical investigations performed by qualified professionals would reduce the potential for structural damage to facilities and corollary indirect impacts associated with strong seismic groundshaking, including safety risks, to the extent feasible, although it cannot be entirely avoided. **This impact is expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact GEO3—Potential for damage to new or upgraded facilities as a result of seismically induced liquefaction or other seismic ground failure. As discussed above for potential damage related to seismic groundshaking, parts of the action area are at varying degrees of risk related to liquefaction and other types of seismically induced ground failure. As identified above for surface fault rupture and seismic groundshaking, O&M activities would not substantially affect risks related to seismically induced ground failure, and are not discussed further; this analysis focuses on new and upgraded facilities. Concerns include safety hazard to staff and potential cost of repairs. Because new facilities would not be "structures for human occupancy" as defined by the state of California, the increase in safety risk would be comparatively small. In addition, as identified above, all new facilities would be designed and constructed to meet or exceed relevant CPUC standards. Substations would be designed and constructed in conformance with IEEE 693 standards. In addition, for some new construction (as required by CPUC), site-specific geotechnical studies would be performed by qualified personnel with appropriate expertise, and facilities design and construction would conform to all recommendations of this investigation. Adherence to CPUC, IEEE 693, and (where applicable and not in conflict with CPUC requirements) UBC standards and to recommendations of site-specific geotechnical investigations performed by qualified professionals would reduce the potential for structural damage related to seismically induced ground failure to the extent feasible, although it cannot be entirely avoided. **This impact is considered less than significant.**

Mitigation Measure—No mitigation is required.

Impact GEO4—Potential for damage to new or upgraded facilities as a result of slope failure; potential for construction activities to increase slope failure hazard. Concerns related to slope failure are the same as those identified above for earthquake damage: safety risk to personnel and potential costs of repair. Much of the action area is situated on flat or gently sloping topography where the risk of slope failure is minimal. In areas where slopes are steeper and substantial landslide hazard exists—such as the rugged topography underlain by Franciscan units in the eastern Coast Ranges—adherence to relevant CPUC and/or UBC earthwork standards and recommendations of site-specific geotechnical investigations where these are considered necessary by CPUC would reduce the risk of landslide damage to new or upgraded facilities to the extent feasible. Depending on the nature of the site and the type of facilities being constructed, applicable mitigation approaches could include constraining siting; recontouring or otherwise stabilizing slopes prior to construction; ensuring adequate slope drainage; and/or other approaches. These standards and adherence to the general standard of care for good earthwork and construction practice should also ensure that any new earthwork is properly designed and implemented, such that excavation, grading, or fill placement during O&M or new minor construction does not increase the potential for slope failure. For instance, the UBC specifies maximum permissible gradients for cut (excavated) and fill slopes and requires specific types of investigations and reviews performed by state-licensed professionals if these values are to be exceeded. Consequently, **this impact is expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact GEO5—Risks to new or upgraded facilities as a result of construction on expansive soils. Portions of the action area are situated on soils with moderate to high expansion potential. If improperly designed or installed, new and upgraded facilities in these areas could be subject to damage related to shrink-swell behavior. However, as identified above, facilities design and construction would comply with CPUC design and would incorporate recommendations of detailed site-specific geotechnical studies where these are considered necessary by CPUC. Depending on the nature of the facilities and the characteristics of the substrate at the work site, such standards and recommendations could require a variety of mitigation approaches, including specialized foundation design; overexcavation and placement of clean, nonexpansive engineered fill prior to construction; and/or other measures to reduce concerns related to expansive soils, consistent with the prevailing engineering standard of care for civil works. Consequently, **this impact is expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact GEO6—Potential for proposed action to result in accelerated soil erosion. Erosion hazard for soils in the action area ranges from slight to moderate (Table 7-1). Activities required for minor construction, including vegetation removal, excavation, grading, and fill placement have the potential to cause accelerated soil erosion, particularly at sites in steeper terrain.

As discussed in Chapter 8 (*Water Resources*), PG&E will continue to implement its existing erosion and sediment control BMPs, described in Chapter 2 (see *Water Quality Program* in *PG&E's Existing Environmental Programs and Practices*). In addition, for minor construction sites that exceed 1 acre, PG&E will be required to prepare a SWPPP pursuant to Section 402 of the federal Clean Water Act. The SWPPP will prescribe procedures and BMPs to control accelerated erosion and sedimentation; will require that the BMPs be monitored to ensure their efficacy until disturbed areas are thoroughly revegetated or otherwise appropriately stabilized; and will identify responsibility for monitoring and maintenance of BMPs. BMPs that may be prescribed by the SWPPP include limiting the area of disturbance; installing sediment barriers; salvaging and reapplying topsoil; seeding for temporary and permanent vegetation; and applying mulch and erosion control blankets until vegetation reestablishes. With PG&E's existing BMPs and additional regulatory protection afforded through the SWPPP requirement, **this impact is expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact GEO7—Potential loss of topsoil resources. The operations and maintenance activities enabled by the proposed action would be conducted in or immediately adjacent to existing PG&E rights-of-way (ROWs). Surface soils in existing ROWs have undergone varying degrees of disturbance; even where topsoil is present, these areas do not represent an important topsoil resource, so further disturbance by O&M activities would not result in significant loss of

topsoil. By contrast, minor construction projects could be sited outside existing ROWs, and could have footprints of several acres in some cases; some topsoil could be lost as a result of construction under these activities. AMMs implemented under the proposed HCP, such as stockpiling topsoil for use in revegetation, would help to offset losses but would not address loss of the soil profile within the footprint of new infrastructure. However, most if not all new facilities would be constructed near existing infrastructure, and some of the sites would likely be disturbed, offering little topsoil value. Construction on sites contiguous with open space or agricultural land could result in loss of undisturbed topsoil resources, but **losses would be small, and are expected to be less than significant on an activity-by-activity basis.**

Mitigation Measure—No mitigation is required.

Alternative 1—HCP with Reduced Take

Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. The same program of BMPs, and the same regulatory protection including codes and standards, would continue to apply. Consequently, impacts related to geology and soils would be essentially the same under Alternative 1 as those described for the proposed action.

Alternative 2—HCP with Enhanced Compensation

Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action. Differences between Alternative 2 and the proposed action would center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). As with Alternative 1, the same program of BMPs and the same regulatory protection, including codes and standards, would continue to apply. Thus, impacts related to geology and soils would be essentially the same under Alternative 2 as those described for the proposed action.

Alternative 3—HCP with Reduced Number of Covered Species

Alternative 3 would enable the same program of O&M and minor construction activities as that described for the proposed action. The key difference between Alternative 3 and the proposed action would relate to the number of species covered under the Alternative 3 (reduced by comparison with the proposed HCP, as described in Chapter 2). As described for the other action alternatives, the same program of BMPs and the same regulatory protection, including codes and standards, would continue to apply. Impacts related to geology and soils would

be essentially the same under Alternative 3 as those described for the proposed action.

Alternative 4—No Action

Under the No Action Alternative, PG&E would continue its existing program of O&M and minor construction activities unchanged. No HCP would be implemented, and no other new environmental commitments would be put in place. However, as identified for the three action alternatives, the same program of BMPs and the same regulatory protection, including codes and standards, would continue to apply under the No Action Alternative. Impacts related to geology and soils would thus be essentially the same under Alternative 4 as those described for the proposed action.

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Chapter 8

Water Resources

Chapter 8
Water Resources

This chapter analyzes the proposed action's anticipated effects on water resources. The activities enabled by the proposed action would not affect water supply; although water would be used for some types of maintenance and construction the amount and duration of increased demand would be limited and is expected to be well within the capacity of available supply. Consequently, the analysis in this chapter focuses on surface drainage, groundwater hydrology, and the quality of surface and groundwater.

Key sources of information and regulatory guidance used in the preparation of this chapter include the following.

- The water quality control plan (Basin Plan) for the Sacramento River and San Joaquin River Basins (Central Valley Regional Water Quality Control Board 1998).
- The State Water Resource Control Board's "Section 303[d]" list of water quality–impaired surface waters (State Water Resources Control Board 2004).

Additional specific reference information is provided in the text.

Affected Environment

Regulatory Framework

Federal Regulations

Clean Water Act

The Clean Water Act (CWA) is the primary federal law that protects the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. It operates on the principle that all discharges of pollutants into the nation's waters are unlawful unless specifically authorized by a permit; permit review is the CWA's primary regulatory tool. The following paragraphs provide additional details on specific sections of the CWA.

CWA Permits for Fill Placement in Waters and Wetlands

CWA Section 404 regulates the discharge of dredged and fill materials into "waters of the United States," or *jurisdictional waters*, which include oceans, bays, rivers, streams, lakes, ponds, and wetlands. Under Section 404, to legally place any dredged or fill material below the ordinary high water mark of any jurisdictional waters, the project proponent must obtain a permit from the U.S. Army Corps of Engineers (USACE). Many projects require *individual* or project-specific permits. Alternatively, some projects can streamline the permitting process by obtaining coverage under an existing *Nationwide Permit* that covers a range of related or similar activities.

Before any actions that may discharge dredged or fill material into surface waters or wetlands are carried out, a delineation of jurisdictional waters of the United States must be completed, following USACE protocols (Environmental Laboratory 1987), in order to determine whether the project area encompasses wetlands or other waters of the United States that qualify for CWA protection. These may include

- areas within the ordinary high water mark of a stream, including non-perennial streams with a defined bed and bank and any stream channel that conveys natural runoff, even if it has been realigned; and
- seasonal and perennial wetlands, including coastal wetlands, with a hydrologic connection to navigable waters.

Wetlands are defined for regulatory purposes as areas "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" (33 Code of Federal Regulations [CFR] 328.3, 40 CFR 230.3).

Section 404 permits may be issued only for the least environmentally damaging practicable alternative. That is, authorization of a proposed discharge is prohibited if there is a practicable alternative that would have less adverse impacts and lacks other significant adverse consequences.

CWA Permits for Stormwater Discharge

CWA Section 402 regulates construction-related stormwater discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program. The NPDES program is officially administered by the U.S. Environmental Protection Agency (EPA). However, in California, the EPA has delegated its authority to the State Water Resources Control Board; the SWRCB in turn delegates implementation responsibility to the nine Regional Water Quality Control Boards, as discussed in *Porter-Cologne Water Quality Control Act* below.

The NPDES program provides for both *general permits* (those that cover a number of similar or related activities) and *individual* (activity- or project-specific*) permits*, as described in the following sections.

NPDES General Permits

Most construction projects that disturb 1 acre of land or more are required to obtain coverage under the NPDES General Permit for Construction Activities (General Construction Permit), which requires the applicant to file a public notice of intent to discharge stormwater, and to prepare and implement a storm water pollution prevention plan (SWPPP). The SWPPP must include a site map and a description of the proposed construction activities; demonstrate compliance with relevant local ordinances and regulations; and present the best management practices (BMPs) that will be implemented to prevent soil erosion and discharge of sediment and other construction-related pollutants to surface waters. Permittees are further required to conduct annual monitoring and reporting to ensure that BMPs are correctly implemented and that they are effective in controlling the discharge of construction-related pollutants.

Projects constructed in California Department of Transportation (Caltrans) facilities or rights-of-way must comply with the requirements of Caltrans' statewide NPDES permit, which imposes requirements similar to those of the General Construction Permit.

Small Linear Underground/Overhead Project Permits

Projects that qualify as Small Linear Underground/Overhead Projects (Small LUPs) and that disturb at least 1 acre but less than 5 acres (including trenching and staging areas) may be covered by the Statewide General Permit for Storm Water Discharges Associated with Construction Activity from Small Linear Underground/Overhead Projects (Small LUP General Permit) in place of the General Construction Permit described above. (Note that linear projects disturbing 5 or more acres of land must obtain coverage under the Construction General Permit described in the preceding section.)

Application and permitting requirements under the Small LUP General Permit vary somewhat depending on the nature of the project, but do include completion of a SWPPP, as described in the preceding section.

Individual NPDES Permits

All point source discharges to waters of the United States not covered by a general permit are required to apply for an individual NPDES permit with the local Regional Water Quality Control Board (RWQCB). As conditions of permit issuance, the RWQCB issues waste discharge requirements (WDRs) and monitoring provisions to ensure compliance with CWA standards.

CWA Water Quality Certification

All projects that have a federal component[1] and may affect the quality of the state's waters must comply with CWA Section 401. Under Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must receive certification that the discharge would not adversely affect water quality, or must have the certification requirement waived by the agency with jurisdiction. In

[1] *Federal component* refers to federal agency involvement—as the project proponent, as a source of project funding, or by issuing permits required for the project to proceed.

California, Section 401 certifications are typically issued by the Regional Water Quality Control Board with jurisdiction (see *Porter-Cologne Water Quality Control Act* below).

CWA List of Impaired Waterbodies

Under CWA Section 303[d] and California's Porter-Cologne Water Quality Control Act of 1969 (discussed below), the State of California is required to establish beneficial uses of state waters and to adopt water quality standards to protect those beneficial uses. Section 303[d] of the CWA also established the TMDL process to ensure that state water quality standards continue to be met. A *total maximum daily load* represents the maximum amount or concentration of a given pollutant allowable in a given water body, based on the nature of the water body and its designated beneficial uses.

To identify water bodies in which TMDLs may be needed, the SWRCB maintains a *Section 303[d] list* of water bodies in which water quality is impaired by pollutants.[2] The most urgent impairments are then prioritized for development of TMDL programs, which create a means of limiting pollutant input.

Regulations for Development on Floodplains

Federal Flood Insurance Program

Alarmed by the increasing costs of disaster relief, Congress passed the National Flood Insurance Act in 1968, followed by the Flood Disaster Protection Act in 1973. The intent of these acts was to decrease the need for large publicly funded flood control structures and reduce disaster relief expenses by restricting development on floodplains.

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP), which provides subsidized flood insurance to communities that comply with FEMA regulations limiting development on floodplains. FEMA issues Flood Insurance Rate Maps (FIRMs) delineating flood hazard zones for communities participating in the NFIP.

Executive Order 11988

Executive Order 11988 (*Floodplain Management*) addresses floodplain issues related to public safety, conservation, and economics. It generally requires federal agencies to avoid incompatible development on floodplains and ensure that the projects they construct, fund, or permit are consistent with the standards and criteria established in the NFIP. It also emphasizes the need to restore and preserve natural and beneficial floodplain values.

[2] A stream, lake, or other water body is said to be *impaired* for a pollutant if established water quality standards for that water body are not met despite implementation of controls on pollutant input.

Safe Drinking Water Act

The Safe Drinking Water Act of 1974 is the primary federal law protecting the quality of the nation's drinking water. It empowers the EPA to set drinking water standards and to oversee the water providers—cities, water districts, and agencies—who actually implement those standards. It also includes provisions for the protection of surface waters and wetlands, in support of drinking water quality.

Under the Safe Drinking Water Act, the EPA establishes National Primary Drinking Water Standards. These are enforceable standards based on health criteria, and they apply to all water provided by public water supply systems. They include several types of limits. The maximum contaminant level (MCL) reflects the highest concentration of a given contaminant that is allowed in drinking water supply. Similarly, maximum residual disinfectant levels (MRDLs) provide an enforceable standard for residual concentrations of substances such as chlorine/chlorides that are used for water disinfection. For other types of contaminants, treatment techniques (TTs) reflect required treatment actions and define acceptable and unacceptable outcomes; for example, the TTs for the microorganisms *Cryptosporidium* and *Giardia,* both of which are associated with gastrointestinal illness, require 99% and 99.9% removal, respectively.

The EPA also establishes optional secondary standards for parameters that affect water taste, odor, and appearance. Each state has the right to choose whether to adopt and enforce the secondary standards, and California has elected to do so.

In California, the EPA delegates some of its implementation authority for the Safe Drinking Water Act to the California Department of Health Services' Division of Drinking Water and Environmental Management (DHS). DHS administers a wide range of regulatory programs pursuant of this responsibility, as discussed under *Drinking Water Standards* in *State Regulations* below.

State Regulations

Porter-Cologne Water Quality Control Act

Overview

The Porter-Cologne Water Quality Control Act, passed in 1969, articulates with the federal CWA (see *Clean Water Act* above). It established the State Water Resources Control Board (SWRCB) and divided the state into nine regions, each overseen by a Regional Water Quality Control Board (RWQCB). The SWRCB is the primary state agency responsible for protecting the quality of the state's surface and groundwater supplies, but much of its daily implementation authority is delegated to the nine RWQCBs, which are responsible for implementing CWA Sections 401, 402, and 303[d], as discussed above. In general, the SWRCB manages water rights and regulates statewide water quality, while the RWQCBs focus on water quality within their respective regions.

Basin Plans and Water Quality Objectives

The Porter-Cologne Act requires the RWQCBs to develop water quality control plans (Basin Plans) that designate beneficial uses of California's major surface water bodies and groundwater basins and establish specific narrative and numerical water quality objectives for those waters. *Beneficial uses* represent the services and qualities of a water body—i.e., the reasons why the water body is considered valuable. *Water quality objectives* reflect the standards necessary to protect and support those beneficial uses. Basin Plan standards are primarily implemented by using the NPDES permitting system to regulate waste discharges so that water quality objectives are met. Under the Porter-Cologne Act, Basin Plans must be updated every 3 years.

As discussed below in *Existing Conditions*, the majority of the action area is located in the Sacramento and San Joaquin River Basins. The two basins are covered in a single, joint Basin Plan (Central Valley Regional Water Quality Control Board 1998).

Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California

The state's *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (Policy) was intended to implement a consistent statewide approach for permitting discharges of toxic pollutants to non-ocean surface waters. As such, it provides strategies to control discharges of toxic pollutants into all of California's inland surface waters, enclosed bays, and estuaries subject to regulation under the Porter-Cologne Water Quality Control Act and the federal CWA. Its approaches include the issuance of NPDES permits, the issuance or waiver of WDRs, and other regulatory mechanisms such as the development of TMDLs and coordination with watershed management programs.

The Policy establishes implementation provisions for priority pollutant criteria promulgated by the EPA through the National Toxics Rule and the California Toxics Rule (CTR), and for priority pollutant objectives established by the RWQCBs in their various Basin Plans. These include ambient aquatic life criteria for 23 priority toxics, and ambient human health criteria for 57 priority toxics. The Policy also authorizes the state to issue schedules of compliance for new or revised NPDES permit limits under certain conditions.

Under Section 5.3 of the Policy, the RWQCBs may grant short-term or seasonal exceptions from priority pollutant criteria or objectives when it is necessary for resource or pest management activities conducted by public entities to fulfill statutory requirements, or to ensure that drinking water will fulfill statutory requirements under the federal Safe Drinking Water Act or the California Health and Safety Code. To qualify for such an exception, the agency must comply with CEQA. In addition, the agency must notify potentially affected public and

governmental agencies and submit the following items to the appropriate RWQCB for approval.

- A detailed description and proposed schedule for the proposed activity.
- A discharge and receiving water quality monitoring plan.
- CEQA documentation.
- Contingency plans.
- Identification of alternate water supply, if needed.
- Residual waste disposal plans.

Upon completion of the project, the agency must provide certification by a qualified biologist that the beneficial uses of the receiving waters have been restored.

Drinking Water Standards

In California, the EPA delegates some of its authority to enforce primary and secondary MCLs identified pursuant to the federal Safe Drinking Water Act of 1974 to DHS. Title 22 of the California Code of Regulations (CCR) outlines these standards as they apply in California. Primary MCLs can be found in 22 CCR Sections 64431–64444. Specific regulations for lead and copper are in 22 CCR Section 64670 et seq. Secondary MCLs that address the taste, odor, and appearance of drinking water are found in 22 CCR Section 64449. These MCL standards must be met by all public drinking water systems to which they apply.

DHS also administers a wide range of other regulatory programs that incorporate components aimed at drinking water quality and safety. These include permits for water well installation; potable water supply monitoring requirements for public drinking water systems and new domestic wells; regulations for septic and sewer systems; regulations governing generation, handling, and discharge/disposal of hazardous materials and wastes; and regulations for underground storage tanks (USTs) and solid waste disposal facilities.

California Fish and Game Code Section 1602 (Lake- or Streambed Alteration Agreement Program)

Under Section 1602 of the California Fish and Game Code, the California Department of Fish and Game (DFG) regulates projects that affect the flow, channel, or banks of rivers, streams, and lakes. Section 1602 requires public agencies and private individuals to notify and enter into a streambed or lakebed alteration agreement with DFG before beginning construction of a project that will

- divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake; or

- use materials from a streambed.

Section 1602 contains additional prohibitions against the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake.

Section 1602 may apply to any work undertaken within the 100-year floodplain of any body of water or its tributaries, including intermittent stream channels. In general, however, it is construed as applying to work within the active floodplain and/or associated riparian habitat of a wash, stream, or lake that provides benefit to fish and wildlife. It typically does not apply to drainages that lack a defined bed and banks, such as swales, or to very small bodies of water and wetlands such as vernal pools.

Groundwater Management Act of 1992 (AB 3030)

California's Groundwater Management Act of 1992 (Water Code Sections 10750–10756) gave existing local agencies expanded authority over the management of groundwater resources in basins recognized by the Department of Water Resources. Its intent was to promote the voluntary development of groundwater management plans in order to ensure stable groundwater supplies for the future. Under the Act, a groundwater management plan is defined as providing for "planned use of the groundwater basin yield, storage space, transmission capability, and water in storage." The Act stipulates the technical components of a groundwater management plan as well as procedures for such a plan's adoption, including passage of a formal resolution of intent to adopt a groundwater management plan, and holding a public hearing on the proposed plan. The Act also requires agencies to adopt rules and regulations to implement a plan once it has been adopted, and empowers agencies to raise funds to pay for the facilities needed to manage the basin, such as extraction wells, conveyance infrastructure, recharge facilities, and testing and treatment facilities.

Existing Conditions

Climate and Precipitation

The Central Valley region experiences Mediterranean- and steppe-type climate conditions characterized by hot, dry summers and mild winters (Planert and Williams 1995). In the spring, summer, and early fall, northerly winds are commonly associated with humidities of less than 10%, except in the Delta region, where strong marine inflow locally increases atmospheric moisture. During the winter, relative humidities are typically higher, and a shallow layer of dense "tule fog" may form overnight, lasting as long as 2–3 weeks (Western Regional Climate Center 2004).

Precipitation, almost all of which falls as rain in the Valley, is highly variable from year to year. Average precipitation ranges from about 23 inches per year in

the northern part of the Sacramento Valley to about 6 inches per year in the southern San Joaquin Valley. Throughout the Central Valley, annual evapotranspiration exceeds annual precipitation, so the region experiences a net moisture deficit (Planert and Williams 1995).

Precipitation rates in the Coast Ranges and Sierra Nevada are typically higher than on the Valley floor. On the east flank of the Coast Ranges, annual rates range from 15 inches in parts of the Sacramento Valley to 8 inches in most of the San Joaquin Valley. The west flank of the Sierra Nevada receives as much as 50 inches of precipitation per year. At elevations below 2,000 feet, this falls almost exclusively as rain; above 4,000 feet, most precipitation falls as snow (Western Regional Climate Center 2004).

Surface Water Drainage

Approximately the northern half of the action area is within the Sacramento River Basin and San Joaquin River Basin (Figure 8-1). Together, these two basins comprise about 25% of the state's total area and 30% of the State's irrigable land; the two rivers provide slightly more than half of the state's water supply. The Sacramento and San Joaquin River Basins are bounded by the Sierra Nevada uplift on the east and by the Coast Ranges on the west. The Sacramento River drains generally southward and the San Joaquin system drains generally northward; the two meet at the Sacramento–San Joaquin Delta (Delta), a complex system of natural and modified distributary channels that covers more than 1,000 square miles, flowing west to empty into San Francisco Bay (Figure 8-1) (Central Valley Regional Water Quality Control Board 1998).

The Sacramento River Basin has an area of about 27,200 square miles. It includes all watersheds north of the Cosumnes River watershed that are tributary to the Sacramento River, as well as the interior-drainage Goose Lake region. Principal tributaries draining the Sierran uplift include the Pit, Feather, Yuba, Bear, and American Rivers. Principal tributaries draining the Coast Ranges include Cottonwood, Stony, Cache, and Putah Creeks. Other important water bodies in the Sacramento Basin include Lake Shasta, Lake Oroville, Folsom Lake, Clear Lake, and Lake Berryessa (Central Valley Regional Water Quality Control Board 1998). Beneficial uses designated in the current Basin Plan are summarized in Table 8-1.

The San Joaquin River Basin has an area of about 15,900 square miles. It includes all watersheds tributary to the San Joaquin River as well as those that drain to the Delta south of the Sacramento River and the American River watershed. Principal year-round streams in the basin include the Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno Rivers, all of which drain the Sierra Nevada. The Coast Ranges are drained by a number of ephemeral streams (e.g., Richesin 1996); historically, some of the surface runoff from the Coast Ranges was likely influent via overland flow or small channels in alluvial fan systems, with flow from larger events eventually conveyed into the San Joaquin River. Important lakes and reservoirs in the San

Joaquin River Basin include Lake Pardee, New Hogan Reservoir, Millerton Lake, Don Pedro Lake, and New Melones Reservoir (Central Valley Regional Water Quality Control Board 1998). Beneficial uses designated in the current Basin Plan are summarized in Table 8-1.

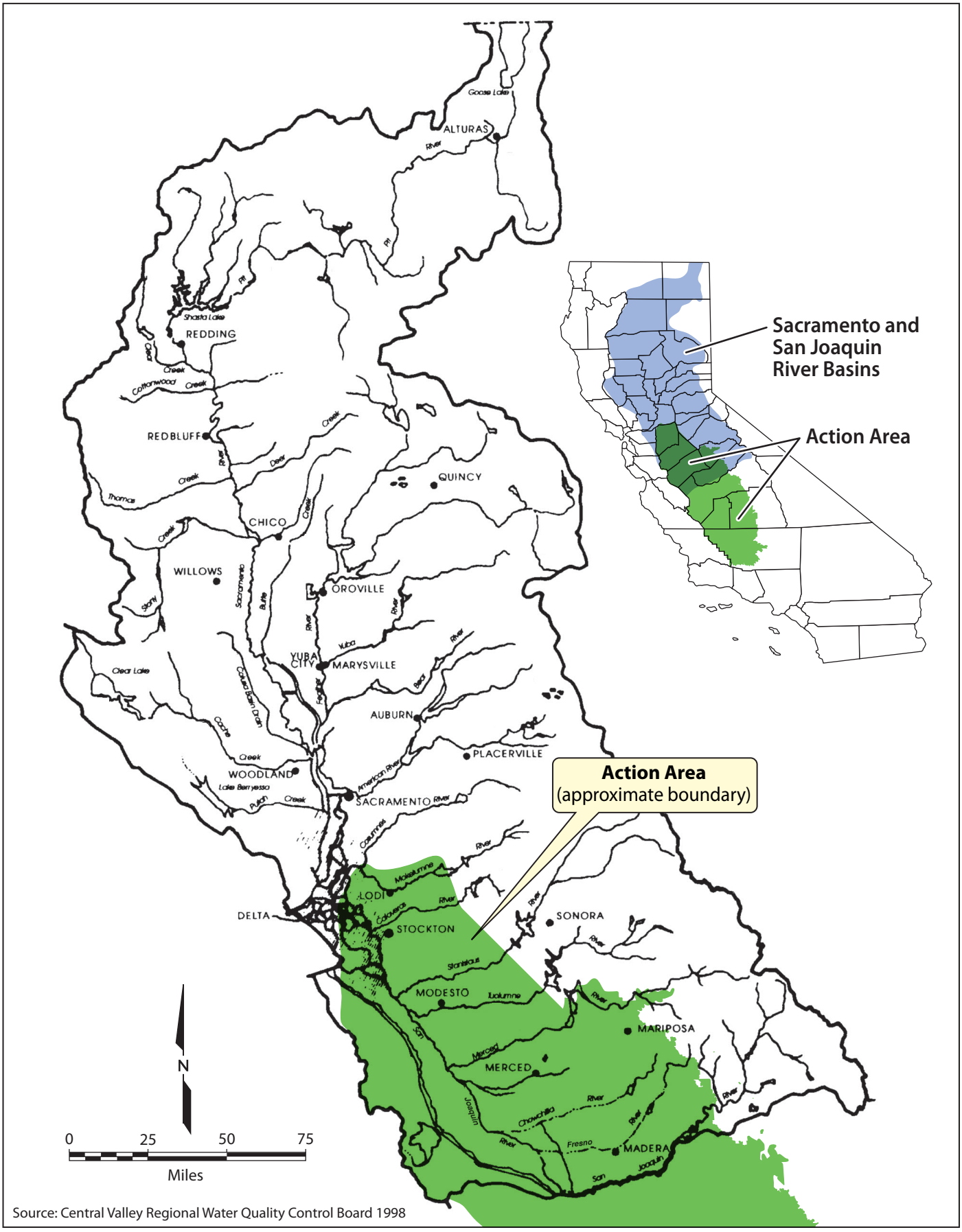
The southern portion of the San Joaquin Valley has interior drainage, and is recognized as hydraulically and hydrologically separate from the San Joaquin River Basin proper. It is referred to as the Tulare Basin (e.g., Planert and Williams 1995) or Tulare Lake Basin.

Although the general pattern of natural drainage in the Central Valley is still intact, the hydrologic system of the San Joaquin River Basin in particular has been substantially modified as a result of regional and local water supply efforts in support of agriculture and urban/suburban development. These include the State Water Project and federal Central Valley Project, which convey Delta supply to users in regions throughout central and southern California, including the San Francisco Bay Area, the San Joaquin Valley, the Tulare Basin, and the greater Los Angeles area.

Groundwater Hydrology

The Central Valley aquifer system comprises the subsurface portion of four distinct hydrologic subregions: the Sacramento Valley (Sacramento River Basin), Sacramento–San Joaquin Delta region, San Joaquin River Basin, and Tulare Basin. Aquifer horizons in the Central Valley system typically consist of sand and gravel containing substantial proportions of silt and clay. Volcanic units and dune sands are also locally important as aquifers. As discussed in Chapter 7 (*Geology and Soils*), these strata primarily record alluvial and fluvial deposition (Planert and Williams 1995).

Groundwater recharge typically occurs along the valley margins, with the bulk of recharge occurring in the northern and eastern parts of the valley where precipitation rates are highest. Historically, groundwater in most of the Central Valley flowed toward the San Joaquin River, with discharge occurring via evapotranspiration and surface outflow to the Sacramento and San Joaquin River systems. However, by the early 1960s, extensive use of groundwater to support agriculture and development had lowered the water table enough to alter the natural hydraulic gradient in the aquifer system, redirecting flow in confined aquifers toward withdrawal centers. The vertical hydraulic gradient was also reversed in much of the San Joaquin Valley, such that groundwater in the upper unconfined portion of the aquifer system—which had historically fed surface flow in the San Joaquin River and its tributaries—now infiltrated downward into the confined portion of the aquifer system. Since the 1970s, increased reliance on imported surface supply coupled with decreased groundwater withdrawals has allowed groundwater reserves to recover in the northern portion of the Central Valley. However, heavy groundwater usage and altered groundwater flow continues to be a concern in the San Joaquin Valley (Planert and Williams 1995).



Source: Central Valley Regional Water Quality Control Board 1998

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Figure 8-1
Sacramento River Basin and
San Joaquin River Basin

Table 8-1. Summary of Designated Beneficial Uses for Principal Water Bodies in the Sacramento River and San Joaquin River Basins

Surface Water Bodies	Municipal			Agriculture		Industry			Recreation			Freshwater Habitat		Migration		Spawning		Wildlife Habitat	Navigation
	Municipal and Domestic Supply	Irrigation	Stock Watering	Process	Service Supply	Power	Contact	Canoeing	Other Noncontact	Warm	Cold	Warmwater	Coldwater	Warmwater	Coldwater			
Sacramento River Basin																			
Sacramento River	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pit River	✓	✓	✓			✓	✓	✓	✓	✓	✓			✓	✓	✓			
Feather River	✓	✓	✓			✓	✓	✓	✓	✓	✓				✓	✓			
Yuba River	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Bear River	✓	✓	✓			✓	✓	✓	✓	✓	✓	P	P	P	P	✓			
American River	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Cottonwood Creek	✓	✓	✓	P	P	P	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	
Stony Creek		✓	✓				✓	✓	✓	✓	P		✓	✓	✓	✓	✓	✓	
Cache Creek	✓	✓	✓	✓	✓		✓	✓	✓	✓	P			✓	✓	✓	✓	✓	
Putah Creek	✓	✓	✓	✓		✓	✓	✓	✓	✓	P			✓		✓			
Goose Lake		✓	✓				✓		✓									✓	
Shasta Lake	✓	✓				✓	✓		✓	✓	✓			✓	✓	✓	✓	✓	
Lake Oroville	✓	✓				✓	✓		✓	✓	✓			✓	✓	✓	✓	✓	
Folsom Lake	✓	✓			P	✓	✓		✓	✓	✓			✓		✓		✓	
Clear Lake	✓	✓	✓				✓		✓	✓	P			✓		✓		✓	
Lake Berryessa	✓	✓	✓			P	✓		✓	✓	✓			✓		✓		✓	
San Joaquin River Basin																			
San Joaquin River	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Surface Water Bodies	Municipal	Agriculture		Industry			Recreation			Freshwater Habitat		Migration		Spawning		Wildlife Habitat	Navigation
	Municipal and Domestic Supply	Irrigation	Stock Watering	Process	Service Supply	Power	Contact	Canoeing	Other Noncontact	Warm	Cold	Warmwater	Coldwater	Warmwater	Coldwater		
Cosumnes River	✓	✓	✓			P	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Mokelumne River	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Calaveras River	✓	✓	✓	P	P	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Stanislaus River	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
Tuolumne River	✓	✓	✓			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
Merced River	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Chowchilla River	✓	✓	✓	✓			✓	P	✓	✓	✓					✓	
Fresno River	✓	✓	✓				✓	P	✓	✓	✓					✓	
Lake Pardee	✓					✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	
New Hogan Reservoir							✓		✓	✓	✓	✓		✓	✓	✓	
Millerton Lake	P	✓	✓				✓		✓	✓	P					✓	
Don Pedro Lake	P					✓	✓		✓	✓	✓					✓	
New Melones Reservoir	✓	✓	✓			✓	✓		✓		✓					✓	

Notes: Designated beneficial uses vary by reach; information presented here is summarized across all reaches.

✓ = existing beneficial use

P = proposed beneficial use

Source: Central Valley Water Quality Control Board 1998.

Designated beneficial uses for groundwater in the Central Valley include the following (Central Valley Regional Water Quality Control Board 1998).

- Municipal and domestic water supply.
- Agricultural supply.
- Industrial service supply.
- Industrial process supply.

Water Quality

The Central Valley region and tributary foothill drainages support a wide variety of land uses that have the potential to affect surface and/or groundwater quality. Following are the key water quality concerns in the action area, as identified by the Central Valley RWQCB (1998).

- Agricultural return waters (agricultural drainage) potentially containing salts, nutrients, pesticides, sediment, trace elements, nitrates, and/or other agricultural byproducts.
- Runoff from facilities such as stockyards, dairies, and poultry ranches where large numbers of livestock are kept in close confinement, potentially containing coliform bacteria, ammonia, nitrate, and sediments.
- Runoff from forestry activities, including timber harvesting and herbicide use.
- Runoff from urban and developed areas, which can contain oil, grease, aromatic hydrocarbons, pesticides, heavy materials, nutrients, and/or sediments.
- Discharges from mineral exploration and extraction activities.
- Hazardous waste disposal, spills, and releases; as of the preparation of this document, more than 7,000 sites with confirmed subsurface releases of hazardous substances have been identified in the Central Valley.
- Runoff and/or leachate from solid waste landfills.

Surface Water Quality

Table 8-2 provides an overview of water quality in the principal surface water bodies of the action area, based on the SWRCB's most recent Section 303[d] list.

Table 8-2. Water Quality in Action Area's Principal Surface Water Bodies

Surface Water Body	Identified Impairment(s)	Source(s)
Sacramento River Basin		
Sacramento River	Unknown toxicity	Unknown
	Diazinon	Agriculture
	Mercury	Former resource extraction activities
Pit River	Nutrients; organic impairments/low dissolved oxygen content; elevated temperature	All from agricultural/grazing uses
Feather River	Diazinon	Agriculture, urban runoff
	Group A pesticides	Agriculture
	Mercury	Former resource extraction activities
	Unknown toxicity	Unknown
Yuba River	*None identified as of 2002–2003*	
Bear River	Diazinon	Agriculture
	Mercury	Resource extraction
American River, Lower	Mercury	Resource extraction
	Unknown toxicity	Unknown
Cottonwood Creek	*None identified as of 2002–2003*	
Stony Creek	*None identified as of 2002–2003*	
Cache Creek, Lower	Mercury	Resource extraction
	Unknown toxicity	Unknown
Putah Creek, Lower	Mercury	Resource extraction/unknown
Goose Lake	*None identified as of 2002–2003*	
Shasta Lake	Cadmium, copper, zinc	Resource extraction
Lake Oroville	*None identified as of 2002–2003*	
Folsom Lake	*None identified as of 2002–2003*	
Clear Lake	Mercury	Resource extraction
	Nutrients	Unknown
Lake Berryessa	Mercury	Resource extraction
San Joaquin River Basin		
San Joaquin River	Boron, chlopyrifos, DDT, diazinon, electrical conductivity, Group A pesticides	Agriculture
	Mercury	Resource extraction
	Unknown toxicity	Unknown

Surface Water Body	Identified Impairment(s)	Source(s)
Cosumnes River	*None identified as of 2002–2003*	
Mokelumne River, Lower	Copper, zinc	Resource extraction
Calaveras River, Lower	Diazinon, organic enrichment/low dissolved oxygen content, pathogens	Urban runoff/storm sewers
Stanislaus River	Diazinon, Group A pesticides	Agriculture
	Mercury	Resource extraction
	Unknown toxicity	Unknown
Tuolumne River, Lower	Diazinon, Group A pesticides	Agriculture
	Unknown toxicity	Unknown
Merced River, Lower	Chlorpyrifos, diazinon, Group A pesticides	Agriculture
Chowchilla River	*None identified as of 2002–2003*	
Fresno River	*None identified as of 2002–2003*	
Lake Pardee	*None identified as of 2002–2003*	
New Hogan Reservoir	*None identified as of 2002–2003*	
Millerton Lake	*None identified as of 2002–2003*	
Don Pedro Lake	Mercury	Resource extraction
New Melones Reservoir	*None identified as of 2002–2003*	

Note: Impairments may vary by reach; information in this table is summarized across all reaches except as noted.

Source: State Water Resources Control Board 2004.

As shown in Table 8-2, the quality of surface waters in the action area varies widely. The quality of many water bodies is adequate for all designated beneficial uses, while others are impaired as a result of various types of contamination.

Groundwater Quality

Groundwater quality in the Sacramento River hydrologic region is generally excellent. In water quality tests performed between 1994 and 2000 on samples from some 1,300 public water supply wells representing more than half of the region's basins and subbasins, 95% of the samples tested met the state's primary MCLs for drinking water. Contaminants in the failed samples included heavy metals, radioactivity, nitrates, pesticides, and volatile organic compounds (VOCs). Some of heavy metals, salts, and radioactivity may have been naturally occurring; naturally high salinities and dissolved solids levels occur in groundwater at the north end of the Sacramento Valley, along the margins of the Valley, and in the Sutter Buttes area, and naturally occurring radioactivity and

heavy metals locally contaminate groundwater in parts of the Sierran foothills. Anthropogenic contaminants are most commonly related to leachate from improperly designed septic systems (California Department of Water Resources 2003); additional sources include agricultural and industrial activities.

Groundwater quality in most of the San Joaquin River hydrologic region is suitable for designated beneficial uses. In water quality tests performed between 1994 and 2000 on samples from 689 public water supply representing 10 of the region's 11 basins and subbasins, 76% of the samples tested met the state's primary MCLs for drinking water. Contaminants in the failed samples included excess aluminum, arsenic, manganese, iron, dissolved solids, radioactivity, nitrate, pesticides, VOCs, and semivolatile organic compounds (SVOCs). Other local groundwater impairments include elevated levels of dissolved solids, boron, and chloride. Common organic contaminants include dibromochloropropane (DBCP), which was once used extensively as a soil fumigant on grapes and cotton but has been banned because it is carcinogenic; and industrial solvents, including trichloroethylene (TCE) and dichloroethylene (DCE) (California Department of Water Resources 2003).

Environmental Consequences and Mitigation Strategies

Methodology for Impact Analysis

As identified in the introduction to this chapter, the activities enabled by the proposed action are not expected to affect water supply, so this analysis focused on surface water drainage, groundwater hydrology, and the quality of surface water and groundwater. Impacts were evaluated qualitatively, based on professional judgment in light of the activities, methods, and techniques entailed by PG&E's San Joaquin Valley O&M program, and the additional AMMs that would be enacted under the proposed HCP (see Chapter 2, *Proposed Action and Alternatives*). Analysis also assumed that PG&E would continue to implement the company's existing programs and practices for water quality protection and hazardous materials handling, as summarized in Chapter 2, including promotion and dissemination of water quality educational materials; onsite tailboard briefings for jobs requiring environmental oversight; BMPs to avoid and minimize effects to water quality; and monitoring and reporting of environmental impacts associated with construction or operational activities. PG&E's BMPs are further described in the company's *Draft Water Quality Construction Best Management Practices Manual* and *Spill Prevention Control and Countermeasures Manual*.

Significance Criteria

For the purposes of this analysis, an impact was considered to be significant and to require mitigation if it would result in any of the following.

- Diversion, obstruction, or alteration of the natural flow or the bed, channel, or bank of any river, stream, or lake.
- Other substantial alteration of the existing drainage pattern of the site or area, such that flood risk and/or erosion and siltation potential would increase.
- Alteration in the quantity or quality of surface runoff.
- Creation of or contribution to runoff that would exceed the capacity of an existing or planned stormwater management system.
- Unregulated use of materials from a streambed.
- Degradation of water quality; violation of any water quality standards or waste discharge requirements.
- Placement of structures that would create a hazard to life or property by impeding or redirecting floodflows within a 100-year floodplain; exposure of people, structures, or facilities to new significant risk from flooding.
- Reduction in groundwater quantity or quality.

Impacts and Mitigation Measures

Proposed Action

Impact WR1—Potential to divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake. The O&M and minor construction programs enabled by the proposed action would require "wet crossings" where infrastructure traverses an active stream channel or other body of water. Based on the nature and location of the company's existing infrastructure in the action area, and the company's best-estimate projections of near-term O&M and minor construction needs, PG&E anticipates that as many as 5 to 15 crossings could be required each year over the 30-year permit term, with each crossing affecting an area of 0.10 to 0.50 acre. In some cases, it may be necessary to place fill, recontour, or otherwise modify the banks or bed of the affected water body to accomplish needed maintenance or repairs, or to install new infrastructure. Such activities have the potential to divert, obstruct, or modify the natural flow or geomorphology of the affected water body; thus, there is the potential for significant impacts.

However, as required by Section 1602 of the California Fish and Game Code, and as discussed in Chapters 1 and 2 of this EIS/EIR, PG&E intends to enter into a master lake and streambed alteration agreement with DFG. Consistent with Section 1602, the purpose of the master streambed alteration agreement will be to expand on PG&E's existing water quality program to provide additional

assurance against substantial adverse effects on existing fish and wildlife resources and the aquatic habitat that supports them; to that end, it will include all reasonable measures, limitations, and precautions identified as necessary by DFG for the protection of such resources. Although the streambed alteration agreement is still in development, it will include provisions that specifically address the potential for diversion, obstruction, and modification of natural flow and/or geomorphology. As discussed in *Requirements of Master Streambed Alteration Agreement* in Chapter 2, these provisions are expected to be generally similar in substance and spirit to the following. Additional requirements may also be developed.

- Grading of the bed and bank will be kept to a minimum to install facilities.
- All fill will be limited to the minimal amount necessary to accomplish the activity. Excess material will be removed from the project site and disposed of in a legal manner.
- No native soil may be pushed into the watercourse's high flow channel. If grading of the banks is required, all material will be graded away from the watercourse.
- The bank and streambed will be restored to near original condition as soon as appropriate upon completion of the stream zone activity.
- If the watercourse channel has been altered during the operations, its low flow channel will be returned as nearly as possible to its preactivity state, including its shape and gradient. If necessary, low-flow shape and gradient may be modified in order to maintain low flow.
- Equipment may be operated in the channel of flowing watercourses only as may be necessary to construct crossings; install palisades; or install grout mats or any other protective structure.
- Temporary diversion structures used to isolate work areas, together with any fill or trapped sediments, will be removed when the activity is complete.
- Vehicle access to rivers, streams, and lakes will be limited to a predetermined ingress and egress corridor on existing roads. New access routes will be limited to the number and width required for safe operation for that location. Vehicle corridors will be flagged. All other natural areas will remain off-limits to vehicles.

As discussed under *State Regulations* in the *Regulatory Context* section of this chapter, Section 1602 of the State Fish and Game Code may apply to any work undertaken within the 100-year floodplain of any body of water or its tributaries, including intermittent stream channels, but is typically construed as applying to work within the active floodplain and/or associated riparian habitat of a wash, stream, or lake that provides benefit to fish and wildlife. It typically does not apply to drainages that lack a defined bed and banks. **With PG&E's existing water quality program and the proposed new streambed alteration agreement in place, impacts related to diversion, obstruction, and alteration in natural streamflow, and impacts related to geomorphic modification of water bodies with defined bed and banks are expected to be less than**

significant. (Other impacts on surface drainage are addressed in Impact WR2 below, water quality impacts related to inchannel work for wet crossings are addressed separately under Impact WR8 below, and the potential effects of wet crossings on aquatic habitat, fish, and wildlife are addressed in Impact BIO7 in Chapter 5, *Biological Resources*.)

Mitigation Measure—No mitigation is required.

Impact WR2—Potential for other alteration of existing drainage patterns, increasing flood risk and/or erosion and siltation potential. Some of the activities enabled by the proposed action would have the potential to result in alteration of surface drainage patterns in areas that drain by overland sheet flow or via small drainages that lack a defined bed or banks; such activities would not be covered under the provisions of the master streambed alteration agreement discussed in Impact WR1 above and thus are analyzed separately.

The potential for alterations to existing drainage would be greatest for new minor construction activities, many of which would require earthwork (grading and/or fill placement) to create a building pad, or would extend infrastructure and service along a new ROW. Some O&M activities would also have the potential to alter surface drainage, especially those that would require excavation or grading in previously undisturbed or minimally disturbed areas outside existing ROWs. The O&M activities most likely to alter surface drainage all involve natural gas infrastructure; they include anode bed replacement and possibly also pipeline lowering and pipeline replacement. The only electrical system O&M activity likely to result in sufficient surface disturbance to affect drainage patterns would be replacement of electrical system towers, which would take place within existing ROWs and thus would primarily be a concern for the purposes of this analysis where a ROW crosses a small ephemeral drainage. In addition, clearing and grading to create construction laydowns for any type of activity could result in some alteration of surface drainage patterns.

Depending on extent and severity, alteration of existing surface drainage patterns could represent a significant impact. Because of the relatively small footprint of the activities enabled under the proposed action (less than about 5 acres on average, and much smaller in most cases), overland drainage is unlikely to be altered sufficiently to result in a significant increase in flood risk. However, if excavation, grading, or fill placement is improperly designed or executed, slopes could be modified to the extent that erosion and siltation is substantially increased, which would represent a significant impact.

As discussed in Chapter 2 (*see Drainage Plans and Restoration of Surface Drainage* in Water Quality Protection Program), PG&E's typical practice for O&M and minor construction activities is to return the work 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, CPUC regulations and the company's SPCC manual require that a site be graded to provide interior drainage and/or passive water treatment to prevent spills from contaminating surface waters.

As described in Chapter 7 (*Geology and Soils*), earthwork in California is regulated at the local jurisdiction level through the grading permit process; a primary purpose of grading permit review is to ensure that the proposed earthwork will meet the jurisdiction's adopted codes and standards. Most jurisdictions in California have adopted either the Uniform Building Code (UBC) or the California Building Code (CBC) as a minimum standard. Both the UBC and the CBC contain regulations for appropriate finished site drainage and erosion control; portions of the UBC that are particularly relevant to site drainage include Chapter 33 (*Site Work, Demolition, and Grading*) and Appendix Chapter 33 (*Excavation and Grading*). Chapter 33 of the Uniform Building Code specifically exempts excavation for utilities installation from the grading permit process, even where the chapter has been adopted by the local jurisdiction. However, in some cases PG&E does obtain local jurisdiction permits and in these cases is typically required to meet UBC/CBC earthwork standards as a condition of permitting, and as a general practice the company adheres to the UBC's earthwork standards where they are not in conflict with or superseded by CPUC regulations. Several other codes and standards also regulate design and construction of PG&E facilities, including CPUC General Order 95, which provides general standards for design and construction of overhead electric transmission and distribution lines; and CPUC General Order 112E, which provides general standards for design, construction, testing, maintenance and operation of natural gas piping systems. Although details vary depending on site characteristics and the type of infrastructure involved, the combined effect of these codes, standards, and regulations is to ensure that PG&E's facilities are designed and constructed consistent with the prevailing engineering standard of care for civil works.

In addition, for some facilities, as discussed under *Water Quality Program* in the Chapter 2 (see *PG&E's Existing Programs and Practices*), PG&E develops a drainage and/or runoff quality control plan. Key goals include ensuring that construction earthwork does not adversely modify existing surface drainage patterns; and that, if surface drainage must be altered to accommodate construction, measures are implemented to maintain flow in natural, modified, and constructed channels.

With PG&E's continued compliance with all relevant codes and standards, **impacts on overland surface drainage and drainages without defined bed and banks are expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact WR3—Potential for increased flood risks as a result of facilities installation. In some cases, it could be necessary to construct facilities such as pipelines, tower footings, and/or power poles in the 100-year flood zone. Because they would either be placed underground (e.g., pipelines) or would be small in size, these structures would not substantially reduce flood conveyance capacity, nor would they create a safety hazard or increase risks to any existing structures through impedance or redirection of floodflows. In addition, all facilities would be designed and constructed to meet or exceed flood-resistant construction standards established by the CPUC in its General Orders 95, 128,

and 112E, so risks to the new structures themselves would be less than significant. Therefore, **there would be no significant impact on flood conveyance under events up to and including the 100-year flood, and no significant increase in flood hazards to life or property.** (Effects related to localized increases in runoff are discussed in Impact WR4 below.)

Mitigation Measure—No mitigation is required.

Impact WR4—Potential for increased stormwater runoff, and corollary effects. Some of the minor construction activities enabled by the proposed action would replace permeable surfaces with hardscape (paved) surfaces, locally decreasing infiltration and increasing runoff. The same would be true of some O&M activities that entail facilities upgrades.

Increased runoff has the potential to contribute to elevated flood hazard, and/or to accelerate erosion, increasing the delivery of sediment to surface waters.[3] However, in most cases, the area of new hardscape resulting from minor construction under the proposed action is not expected to exceed 1 acre, and the resulting increase in runoff would be small. The largest areas of impermeable surface would be associated with new or expanded substation facilities, but even in these cases, only a portion of the footprint would be paved (hence, impermeable), and effects on infiltration/runoff would still be small.

As identified above, PG&E's typical practice for O&M and minor construction activities is to return the work site as close as possible to its pre-existing grade once work is completed. Facilities are generally designed to minimize drainage disruption, although CPUC regulations and the company's SPCC manual require that some types of sites (including substations) be graded to provide interior drainage and/or passive water treatment. In addition, as discussed in Impact WR2 above, all new earthwork and construction would be designed to meet the requirements of codes and standards that embody the prevailing standard of care for civil engineering works in California (e.g., UBC, CPUC General Order 95, and CPUC General Order 112E; see discussion in Impact WR2 above). For some types of facilities, PG&E also develops a drainage and runoff quality control plan consistent with the prevailing civil engineering standard of care. Key goals include design such that postconstruction runoff from the site does not exceed preproject levels.

Increased hardscape area could also increase the delivery of waterborne contaminants such as oil, grease, metals, bacteria, and trash to surface- and groundwaters. Oil and grease could be particularly harmful to water quality and to aquatic ecosystems since small quantities of these contaminants have the potential to render comparatively large quantities of water poisonous to aquatic organisms. However, the increased impermeable area would be comparatively small, and effects on water quality are expected to be minor. In addition, where it is required, the drainage plan prepared for some types of new facilities would typically provide for design measures and/or BMPs as appropriate to maintain

[3] Effects of decreased infiltration are addressed separately under Impact WR6 below.

the quality of runoff waters. Such measures could include passive treatment features such as grassy swales.

In light of these existing water quality programs and practices, which PG&E would carry forward for all new construction under the proposed action, when considered on an activity by activity basis, the increased hardscape area that would result from new minor construction under the proposed action is not expected to increase stormwater runoff significantly; increase erosion or siltation potential; exceed the capacity of existing or new stormwater drainage facilities; substantially alter the quantity or quality of runoff; or result in violation of any water quality standards or in other substantial degradation of water quality. **This impact is expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact WR5—Potential use of streambed materials. As discussed in Impact WR1 above, the O&M and minor construction programs enabled by the proposed action could require as many as 5 to 15 wet crossings each year, where new, repaired, or upgraded infrastructure traverses an active stream channel or other body of water. In some cases, site soils, potentially including streambed and/or streambank materials, could be suitable for reuse onsite as fill during infrastructure repairs or installation. Unregulated use of streambed materials would represent a significant impact, because of the potential for adverse effects on stream geomorphology and function as a result of borrow activities.

However, as discussed in Impact WR1 above, included in the proposed action PG&E will enter into a master lake and streambed alteration agreement with DFG, pursuant to the requirements of Section 1602 of the California Fish and Game Code. The purpose of the streambed alteration agreement will be to expand on PG&E's existing water quality program to provide additional assurance against substantial adverse effects on existing fish and wildlife resources and the aquatic habitat that supports them; to that end, it will include all reasonable measures identified as necessary by DFG for the protection of such resources, including any limitations, conditions, or strictures DFG deems appropriate for reuse of streambed materials. Although the streambed alteration agreement is still in development, it is expected to include provisions to prohibit inappropriate use of streambed materials, likely including measures similar to the following. Additional measures may also be developed.

- Grading of the bed and bank will be kept to a minimum to install facilities.
- No native soil may be pushed into the watercourse's high flow channel. If grading of the banks is required, all material will be graded away from the watercourse.
- The bank and streambed will be restored to near original condition as soon as appropriate upon completion of the stream zone activity.
- If the watercourse channel has been altered during the operations, its low flow channel will be returned as nearly as possible to its preactivity state,

including its shape and gradient. If necessary, low-flow shape and gradient may be modified in order to maintain low flow.

With PG&E's existing water quality program and the proposed new master streambed alteration agreement in place, impacts related to use of streambed materials would be less than significant.

Mitigation Measure—No mitigation is required.

Impact WR6—Potential for reduction in groundwater recharge. Most if not all new construction, and some O&M activities entailing facilities upgrades, would result in small local increases in hardscaped area, as discussed in Impact WR4 above. In addition to increasing runoff, as described above, new hardscape has the potential to impede groundwater recharge, resulting in a long-term reduction in groundwater availability. However, this is unlikely to represent a concern in practice because the area of new hardscape created by each activity would be small, and most of the activities resulting in new hardscape are unlikely to be located in areas important for groundwater recharge. Consequently, **impacts are expected to be less than significant.**

Moreover, as discussed in Impact WR2 above, all new earthwork and construction would be designed to meet the requirements of codes and standards that embody the prevailing standard of care for civil engineering works in California (e.g., UBC, CPUC General Order 95, and CPUC General Order 112E; see discussion in Impact WR2 above), providing additional protection against adverse impacts on groundwater recharge. As identified above, for some types of facilities, PG&E develops a drainage and runoff quality control plan consistent with the prevailing civil engineering standard of care; key goals include designing to avoid substantial reduction in groundwater infiltration. The plan typically also provides for design measures and/or BMPs such as water treatment swales as appropriate to maintain the quality of runoff waters and waters that infiltrate into the subsurface.

In summary, because of the small extent of new hardscape expected to result from activities under the proposed action, and the additional protection provided by the existing water quality programs and practices that PG&E would carry forward under the proposed action, **impacts on groundwater recharge are expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact WR7—Potential for temporary degradation of surface water quality as a result of ground disturbance during O&M and construction activities. [4] All of the minor construction projects and many of the O&M activities enabled by the proposed action would result in surface disturbance with the potential to accelerate erosion and temporarily increase the delivery of soil/sediment to surface waters. Increased sediment content can interfere with filter feeding

[5] Long-term impacts related to the potential for increased site erosion are addressed separately in Impact WR4 above.

mechanisms; blanket spawning, incubation, and rearing areas; and otherwise decrease habitat quality. Increased sediment loads can also decrease aesthetic and recreational values, and can increase the difficulty and cost of water treatment, potentially impairing beneficial uses. Because of the potential to degrade water quality, impacts could be significant.

However, as discussed in Chapter 2, PG&E will carry its existing water quality program forward for all activities enabled under the proposed action. As described under *PG&E's Existing Environmental Programs and Practices*, PG&E's existing water quality program includes a comprehensive palette of measures for erosion and sediment control during construction, presented in the company's *Draft Water Quality Construction Best Management Practices (BMP) Manual* and *Spill Prevention Control and Countermeasures (SPCC) Manual*. Some further protection would be provided by several AMMs implemented under the proposed HCP (AMMs 6, 9, and 10; see Table 2-9 for details). In addition, activities that disturb more than 1 acre will also be required to prepare a SWPPP, in compliance with the federal CWA's NPDES program.

PG&E's existing BMP program provides a palette of erosion and sediment control measures consistent with the prevailing standard of care in the engineering and construction industry. Measures are implemented based on site conditions and the nature of the activity. Commonly used measures include minimizing the extent of ground disturbance; installing fiber rolls or silt fences to contain sediment-laden runoff from the work site; stabilizing disturbed areas with erosion control mats or soil stabilizers; and reseeding disturbed areas once work is completed, if appropriate. Additional specifics are provided in Chapter 2.

AMMs 6, 9, and 10 respectively would prohibit refueling vehicles within 100 feet of a wetland, stream, or other waterway unless a bermed and lined refueling area is constructed; require erosion control measures during O&M activities that have the potential to increase erosion and sedimentation in wetlands and habitat occupied by HCP-covered animal and plant species; and provide guidelines for revegetation of disturbed areas larger than 0.25 acre.

Typical SWPPP provisions include the following.

- Prohibitions on discharging concrete, solvents, adhesives, thinners, paints, fuels, sawdust, dirt, gasoline, asphalt and concrete saw slurry, or chlorinated water into streets, shoulder areas, inlets, catch basins, gutters, and natural, modified, or agricultural drainages.
- Erosion and sediment control practices such as
  - conducting major construction activities involving excavation and spoils haulage during the dry season, to the extent possible;
  - conducting all construction work in accordance with site-specific plans that minimize the potential for increased sediment inputs to storm drains and surface waters;

- grading and stabilizing spoils sites to minimize erosion and sediment input to surface waters and generation of airborne particulate matter (see discussions under Measures to Protect Air Quality below); and
- using measures such as erosion control blankets, silt fencing, and fiber rolls to minimize delivery of sediment to storm drains and surface waters.

In light of the existing water quality programs and practices that PG&E would carry forward for all activities under the proposed action, and additional protection afforded by the HCP's AMM program and requirements of the federal CWA, activities enable by the proposed action are not expected to substantially increase erosion rates or delivery of sediment to surface waters. No violation of water quality standards or waste discharge requirements and no substantial degradation of water quality are expected as a result of O&M or construction activities. **This impact is expected to be less than significant.** (Effects of inchannel work on water quality are addressed separately under Impact WR8 below.)

Mitigation Measure—No mitigation is required.

Impact WR8—Potential temporary degradation of surface water quality and wetland habitat as a result of ~~inchannel~~ work in aquatic environments.[5] Both the O&M and minor construction programs enabled by the proposed action would require "wet crossings" where infrastructure traverses an active stream channel or other body of water. As many as 5 to 15 crossings could be required each year, with each crossing affecting an area of 0.10 to 0.50 acre. ~~Inchannel~~ Ceonstruction in aquatic environments has substantial potential to degrade water quality and aquatic habitat values by remobilizing sediment from the channel bed and banks. Leaks or spills of fuel, lubricants, and other substances also pose a hazard to water quality and aquatic habitat. Because of the potential to degrade water quality, impacts on aquatic and wetland environments could be significant.

However, as discussed in Chapter 2, PG&E will carry the company's existing programs and practices for water quality protection forward in implementing all O&M and minor construction activities enabled by the proposed action. In addition, ~~inchannel~~ work in aquatic environments ~~work~~ is strictly regulated under Section 1602 of the California Fish and Game Code. As described in Chapter 2 and in Impact WR1 above, the proposed action would entail development of a master streambed alteration agreement between PG&E and DFG, which would include specific commitments and measures for the protection of water quality during inchannel work. Although the streambed alteration agreement is still in development, it is expected to include provisions similar to the following, and additional requirements may also be developed.

- No native soil may be pushed into the watercourse's high flow channel. If grading of the banks is required, all material will be graded away from the watercourse.

[5] Long-term impacts related to the potential for increased site erosion are addressed separately in Impact WR4 above.

- Discharge of sediment will be avoided to the maximum extent practicable. In no case will the discharge of sediment result in amounts deleterious to fish.
- If prolonged turbidity may be created, the flow will be diverted around the work area.
- If it is necessary to move equipment across a flowing watercourse, such operations will be conducted without causing a prolonged visible increase in watercourse turbidity. For repeated crossings, a bridge, culvert, or rock-lined crossing will be installed.
- Equipment may be operated in the channel of flowing watercourses only as may be necessary to construct crossings; install palisades; or install grout mats or any other protective structure.
- Temporary diversion structures used to isolate work areas will be constructed in a manner that prevents seepage from the work area. Said structures will be constructed of nonerodible materials and they, and any fill or trapped sediments, will be removed when the activity is complete.
- All wet fords will have unarmored portions of the approaches rocked with at least 4 inches compacted depth of rock, or will be paved or otherwise armored from the edge of the watercourse for a minimum of 25 feet, or to the nearest waterbar, to prevent tracking of soil into the crossing.
- Staging areas for equipment, materials, fuels, lubricants, and solvents will be located outside the stream channel and banks and away from all preserved aquatic resources. All stationary equipment—such as motors, pumps, generators, compressors, and welders—that must be within the stream zone will be positioned over drip pans.
- Equipment entering the stream zone will be inspected daily for leaks that could introduce deleterious materials into the watercourse.

In addition, placement of fill or dredged material below the ordinary high water mark of any stream or wetland would require PG&E either to obtain an individual permit from the USACE under Section 404 of the federal Clean Water Act and/or Section 10 of the Rivers and Harbors Act, or to qualify for an existing Section 404 Nationwide Permit. ~~Compliance with CWA Section 404 could involve a further review of water quality issues.~~ Although the majority of PG&E's O&M activities do not encroach on U.S. jurisdictional waters or wetlands, a small percentage of future activities may require Section 404 permitting. Most of these activities are expected to obtain permit authorization under USACE's Nationwide Permit (NWP) program; only a few, if any, would be expected to require individual Section 404 permits. If USACE jurisdiction is triggered, PG&E would typically prepare a wetland delineation that outlines the extent of USACE jurisdiction on the particular project site, along with a preconstruction notification (PCN) package for submittal to USACE.[6] PG&E

[6] Note that triggering USACE jurisdiction would entail a further requirement that USACE comply with Section 7 of the ESA. As discussed on page 1-6 of the proposed HCP (Appendix B of this EIS/EIR), it may be possible for USACE to use elements of the HCP to streamline its consultations with USFWS under the Section 7 process~~.~~ If an individual permit is required, separate (EA- or EIS-level) NEPA compliance will also be necessary. PG&E will be

would also be required conduct an alternatives analysis at the time the PCN is submitted, to ensure that the activities proposed represent the least environmentally damaging practicable alternative to meet the identified operational or maintenance need.[7]

With this state and federal regulatory protection in place and continuing implementation of the company's existing water quality program, adverse effects of O&M activities on water quality and wetland environments ~~as a result of inchannel work~~ are expected to be less than significant.

Mitigation Measure—No mitigation is required.

Impact WR9—Potential for degradation of surface and groundwater quality as a result of hazardous materials spills or releases. The proposed action would entail the handling and use of a wide variety of chemicals. For example, facilities inspections would require fuels, lubricants, and hydraulic fluid for the vehicles used to patrol PG&E infrastructure. Maintenance and repair activities would require vehicle fuels, lubricants, and hydraulic fluid for vehicles and equipment, and could also require concrete, epoxy, paints, and/or asphalt paving. Vegetation management would periodically require the use of herbicides. Minor construction activities could use any of the substances identified above for the O&M program, as well as additional paints, adhesives, waterproofing compounds, and other substances needed for specific projects. Spills or releases of fuels or any of the other substances identified above would have the potential to degrade surface- and groundwater quality, and thus could result in significant impacts could be significant.

AMM 6 established by the proposed HCP would prohibit fueling any vehicle within 100 feet of a wetland, stream, or other waterway unless a bermed and lined refueling area is constructed. Herbicides would typically be mixed offsite and hauled to the application site as a dilute, ready-to-apply mixture, so the risk of overland spills or releases at work sites would be low. However, smaller equipment such as chainsaws could require fueling in the field.

As discussed in Chapter 2, PG&E will carry forward the company's existing programs and practices for water quality protection, hazardous materials handling, and herbicide use in implementing all O&M and minor construction activities enabled by the proposed action. PG&E's hazardous materials program includes requiring measures such as the following.

- Implementing industry-standard BMPs as specified by Material Safety Data Sheets (MSDSs) and/or product labeling when handling any hazardous or

responsible for assisting the USACE in preparing the documents necessary for NEPA compliance. It is also PG&E's practice to comply fully with all record search, site evaluation, and reporting/documentation requirements of NHPA Section 106 when federal permitting is required, and this practice is expected to continue throughout the lifetime of the proposed HCP.

[7] By law, USACE may only issue an individual Section 404 permit for the least environmentally damaging practicable alternative (LEDPA) that would meet a project's identified purpose and need.

potentially hazardous substances (specific BMPs depend on the substance involved).

- To the extent practicable, avoiding storage of hazardous substances such as paints, solvents, epoxies, etc., at the work site and in the staging area; minimizing the quantities stored and keeping materials in secure, closed containers located away from drainage courses, storm drains, and areas of stormwater infiltration.
- Ensuring that maintenance and construction personnel have been trained in current procedures and best available technology (BAT) for spill prevention and cleanup of accidental spills.
- Keeping a spill kit or kits at the worksite at all times when hazardous materials are in use, and ensuring that all personnel know how to access and use the kit(s).

In the event of a spill or release of hazardous materials, work is stopped immediately, and best available technology (BAT) cleanup measures are implemented as necessary to remediate the spill. Adjacent land uses and emergency responders are notified immediately if a substantial spill or release occurs. PG&E also has BMPs in place for herbicide use (see Table 2-5).

In addition to these precautions, as identified above, all activities with the potential to disturb >1 acre would be required under the CWA to prepare and implement a SWPPP incorporating a Spill Prevention and Response Plan, which would likely include measures such as those listed above, but could include additional provisions or details as well (see Chapter 2 for discussion of requirements for plan contents). Further limitations will be imposed under the streambed alteration agreement included in the proposed action, if DFG identifies a need.

In view of the regulatory safeguards imposed by the CWA and Section 1602 of the California Fish and Game Code, and PG&E's additional programs and practices for water quality protection, hazardous materials handling, and herbicide use, which would remain in force, **the potential for water quality degradation as a result of spills or releases of hazardous substances used under the proposed action is evaluated as less than significant.**

Mitigation Measure—No mitigation is required.

Alternative 1—HCP with Reduced Take

Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Alternative 1 would incorporate the same environmental commitments for water resources protection identified in this EIS/EIR for the proposed action. Consequently, any adverse effects on water resources would be essentially the same under Alternative 1 as those described for the proposed action.

Alternative 2—HCP with Enhanced Compensation

Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action. Differences between Alternative 2 and the proposed action would center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). Alternative 2 would incorporate the same environmental commitments for water resources protection identified in this EIS/EIR for the proposed action. As with Alternative 1, any adverse effects on water resources would be essentially the same under Alternative 2 as those described for the proposed action. Alternative 2 could offer a slight benefit for water resources by comparison with the proposed action and action alternatives, because its enhanced compensation ratios would maximize the preservation of natural drainage patterns and permeable natural surfaces, and preserve the greatest area from recontouring, cultivation, development and other types of ground disturbance.

Alternative 3—HCP with Reduced Number of Covered Species

Alternative 3 would enable the same program of O&M and minor construction activities as that described for the proposed action. The key difference between Alternative 3 and the proposed action would relate to the number of species covered under the Alternative 3 HCP (reduced by comparison with the proposed HCP, as described in Chapter 2), which would likely reduce the total compensation acreage preserved. Alternative 3 would incorporate the same environmental commitments for water resources protection identified in this EIS/EIR for the proposed action. Any adverse effects on water resources would be essentially the same under Alternative 3 as those described for the proposed action. Potential benefits related to preservation of compensation lands would be less than those afforded under Alternative 2, and probably also less than those under the proposed action.

Alternative 4—No Action

Under the No Action Alternative, PG&E would continue its existing program of O&M activities unchanged. No HCP would be implemented, and no other new or environmental commitments in addition to those already in place would be put implemented. However, PG&E would continue to follow the same standard methods and techniques for carrying out O&M activities, and would continue to implement the company's existing environmental programs, practices, and BMPs, and the same regulatory protection would apply. Therefore, impacts on water resources would be very similar under Alternative 4 to those described for the proposed action. Slight differences could result from variations in compensation requirements, but would be speculative to predict at this time.

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Chapter 9
Cultural Resources

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This chapter examines the proposed action's potential impacts on cultural resources. *Cultural resources* include prehistoric and historic archaeological sites; historic buildings and structures; historic districts with multiple buildings or structures; districts of archaeological sites; cultural landscapes, traditional cultural properties; and resources of interest to Native American groups. Paleontological resources are discussed separately in Chapter 10.

Affected Environment

Regulatory Framework

Federal Regulations

Antiquities Act

The federal Antiquities Act of 1906 was enacted with the primary goal of protecting cultural resources in the United States. It explicitly prohibits appropriation, excavation, injury, and destruction of "any historic or prehistoric ruin or monument, or any object of antiquity" located on lands owned or controlled by the federal government, without permission of the secretary of the federal department with jurisdiction. It also establishes criminal penalties, including fines and/or imprisonment, for these acts. As such, the Antiquities Act represents the foundation of modern regulatory protection for cultural resources.

National Environmental Policy Act

NEPA requires that federal agencies assess whether federal actions would result in significant effects on the human environment. The Council on Environmental Quality's (CEQ's) NEPA regulations further stipulate that identification of significant effects should incorporate "the degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register for Historic Places or may cause loss or destruction of significant scientific, cultural, or historic resources" (40 CFR 1508.27[b][8]).

Government-to-Government Relationship With Native American Tribes

Several federal policies require USFWS to interact with Native American tribes on a government-to-government basis. These include Secretarial Order 3206, dated June 5, 1997 (*American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act*); Executive Order 13175; and the U.S. Department of the Interior's 512 DM 2. The intent of these regulations is to streamline the ESA consultation process, and to ensure full Tribal representation.

State Regulations

CEQA Protection for Historical (Cultural) Resources

CEQA requires that public or private projects financed or approved by state or local public agencies be assessed to determine their potential to affect historical resources. CEQA uses the term *historical resources* to include buildings, sites, structures, objects, or districts, each of which may have historical, pre-historical, architectural, archaeological, cultural, or scientific importance.

CEQA states that if implementation of a project would result in significant effects on historical resources, then alternative plans or mitigation measures must be considered; however, only significant historical resources need to be addressed (14 CCR 15064.5, 15126.4). Therefore, before impacts and mitigation measures can be identified, the significance of historical resources must be determined.

The state's CEQA guidelines define three ways that a property may qualify as a historical resource for the purposes of CEQA review.

1. The resource is listed in or determined eligible for listing in the California Register of Historical Resources (CRHR).
2. The resource is included in a local register of historical resources, as defined in Section 5020.1[k] of the Public Resources Code or identified as significant in an historical resource survey meeting the requirements of section 5024.1[g] of the Public Resources Code, unless the preponderance of evidence demonstrates that it is not historically or culturally significant.
3. The lead agency determines the resource to be significant as supported by substantial evidence in light of the whole record (California Code of Regulations, Title 14, Division 6, Chapter 3, section 15064.5[a]).

Each of these ways of qualifying as an historical resource for the purpose of CEQA is related to the eligibility criteria for inclusion in the CRHR (PRC 5020.1[k], 5024.1, 5024.1[g]). A historical resource may be eligible for inclusion in the CRHR if it meets any of the following conditions.

1. The resource is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
2. The resource is associated with the lives of persons important in our past.
3. The resource 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 values.
4. The resource has yielded, or may be likely to yield, information important in prehistory or history.

Properties that are listed in or eligible for listing in the NRHP are considered eligible for listing in the CRHR, and thus are significant historical resources for the purpose of CEQA (PRC 5024.1[d][1]).

According to CEQA, a project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant impact on the environment (14 CCR 15064.5[b]). Under CEQA, a *substantial adverse change* in the significance of a resource means the physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the historical resource would be materially impaired. Actions that would *materially impair* the significance of a historic resource are any actions that would demolish or adversely alter the physical characteristics that convey the property's historical significance and qualify it for inclusion in the CRHR or in a local register or survey that meet the requirements of PRC 5020.1[k] and 5024.1[g].

California Health and Safety Code—Treatment of Human Remains

Under Section 8100 of the California Health and Safety Code, six or more human burials at one location constitute a cemetery. Disturbance of Native American cemeteries is a felony (Health and Safety Code Sec. 7052).

Section 7050.5 of the Health and Safety Code requires that construction or excavation be stopped in the vicinity of discovered human remains until the County Coroner can determine whether the remains are those of a Native American. If the remains are determined to be Native American, the Coroner must then contact the Native American Heritage Commission (NAHC), which has jurisdiction pursuant to Section 5097 of the California Public Resources Code.

When human remains are discovered or recognized in any location other than a dedicated cemetery, no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains may take place until the County Coroner has been informed and has determined that no investigation of the cause of death is required; and, if the remains are of Native American origin, either

- the descendants of the deceased Native American(s) have made a recommendation to the landowner or the person responsible for the excavation work for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in PRC 5097.98; or
- 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.

Cultural Setting

Prehistory

South of the Stockton District, the San Joaquin Valley is one of the least known archaeological areas in California. In addition, the southern San Joaquin Valley covers a large area, and significant variation is apparent in archaeological materials (Moratto 1984).

Although few archaeological sites demonstrate evidence of human occupation of the San Joaquin Valley during the late Pleistocene and early Holocene (14,000 to 8,000 B.P. [before present; *present* is understood to refer to A.D. 1950]), this is likely a product of the archaeological record itself rather than lack of use of this area. Most Pleistocene- and Holocene-epoch sites are deeply buried in accumulated gravels and silts or have eroded away. The earliest sites in the San Joaquin Valley are believed to be the Farmington Complex sites in San Joaquin and Stanislaus Counties (Riddell 1949, Treganza 1952), the Tranquillity Site in Fresno County (Riddell 1949, Treganza 1952), and the Witt Site in Kings County (Riddell and Olsen 1969, Wallace 1991). Archaeologists have also identified fluted projectile points on the margin of Tulare Lake. The points, which are morphologically similar to Clovis points, may date as early as 11,000–12,000 B.P. (Wallace 1991). Fluted projectile points have also been discovered near the City of Newman (Dillon 2002).

As summarized in Moratto (1984), a chronological sequence was devised for the southern San Joaquin Valley in 1969 by Olsen and Payen based on western valley excavations. It is composed of four temporally distinct complexes: Positas, Pacheco, Gonzaga, and Panoche.

The **Positas Complex** ranges from 5300 to 4600 B.P. and is characterized by small shaped mortars, short cylindrical pestles, millingstones, perforated flat

cobbles, and spire-lopped *Olivella* beads. This complex is represented by cultural materials excavated from CA-Mer-S94.

The **Pacheco Complex**, beginning in approximately 4600 B.P. and ending roughly 1700 B.P., has been divided into two phases. The Pacheco, Phase B (4600–3600 B.P.) is characterized by foliated bifaces; rectangular *Haliotis* ornaments; and thick, rectangular *Olivella* beads. The Pacheco, Phase A (3600–1700 B.P.) is represented by more varied types of shell beads; *Olivella* beads of spire-ground, modified saddle, saucer, and split-drilled types are present, as well as *Haliotis* disc beads and ornaments. Other artifacts characteristic of this phase are perforated canine teeth; bone awls, whistles, and grass saws; large-stemmed and side-notched points; and an abundance of millingstones, mortars, and pestles. The shell and bone industries of the Pacheco Complex are most comparable to those of the Delta Middle Horizon Period. Other traits indicate relations with areas to the west and south.

The **Gonzaga Complex** (1700–1000 B.P.) is represented by an assemblage similar to that of the Delta Late Horizon, Phase 1. This complex is characterized by extended and flexed burials; bowl mortars and shaped pestles; squared and tapered stem projectile points; few bone awls and grass saws; and a shell industry composed of distinctive *Haliotis* ornaments and rectangular, split-punched, and oval *Olivella* beads.

The **Panoche Complex** (500 B.P. to European contact) is most comparable to the Delta Late Horizon, Phase 2. This complex is characterized by the presence of few millingstones and varied mortars and pestles; small side-notched arrow points; clamshell disc beads; *Haliotis* epidermis disc beads; *Olivella* lipped, side-ground, and rough disc beads; and bone awls, whistles, saws, and tubes. Flexed burials and primary and secondary cremations are found.

Ethnography

At the time of European contact, the San Joaquin Valley south of Stockton was inhabited by two groups—the Northern Valley Yokuts and the Southern Valley Yokuts.

Northern Valley Yokuts

Ethnographic work with the Northern Valley Yokuts is lacking. Because of the early decimation of the aboriginal populations in the lower San Joaquin Valley, most information regarding this group is gleaned from accounts of Spanish military men and missionaries that have been translated. A summary of these sources has been compiled by W. J. Wallace (1978), and it is upon this work that this brief ethnographic overview is based.

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

southern boundary is approximately where the San Joaquin River bends northward, and the northern boundary is roughly half way between the Calaveras and Mokelumne Rivers. The Yokuts may have been fairly recent arrivals in the San Joaquin Valley, perhaps being pushed out of the foothills about 500 years ago.

Population estimates for the Northern Valley Yokuts vary from 11,000 to more than 31,000 individuals. Populations were concentrated along waterways and on the more hospitable east side of the San Joaquin River. Villages, or clusters of villages, made up "miniature tribes" (tribelets) lead by headmen. The number of tribelets is estimated at 30 to 40; each tribe spoke 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 (Shipley 1978).

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.

Subsistence among the Northern Valley Yokuts revolved around the waterways and marshes of the lower San Joaquin Valley. Fishing with dragnets, harpoons, and hook and line yielded salmon, white sturgeon, river perch, and other species of edible fish. Waterfowl and small game attracted to the water also provided a source of protein. The contribution of big game to the diet was probably minimal. Vegetal staples included acorns, tule roots, and seeds.

Goods not available locally were obtained through trade. Paiute and Shoshone groups on the eastern side of the Sierra were suppliers of obsidian. Shell beads and mussels were obtained from Salinan and Costanoan groups. Trading relations with Miwok groups yielded baskets and bows and arrows. Overland transport was facilitated by a network of trails, and tule rafts were used for water transport.

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. Escaped neophytes brought foreign (European and Native American) habits and tastes, as well as Spanish expeditions to recover escapees. Epidemics of European diseases played a large role in the decimation of the native population. With the secularization of the mission and the release of neophytes, tribal and territorial adjustments were set in motion. People left the missions to return to other Native American groups, and a number of polyglot "tribes" were formed. The final blow to the aboriginal population came with the Gold Rush and its aftermath. In the rush to the southern mines, native populations were pushed out of the way, out of their territories. Ex-miners settling in the fertile valley applied further pressure to the native groups and altered the landforms and waterways of the valley. 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.

Southern Valley Yokuts

Historical accounts of the Southern Valley Yokuts were given by Pedro Fages, Francisco Garces, and Lieutenant Jose Maria Estudillo. Ethnographic descriptions are provided by Powers (1877), Curtis (1907–1930), Kroeber (1925), and Latta (1949). Wallace (1978) summarizes these works and, unless otherwise noted, it is from this summary that the brief ethnography provided here is drawn.

Southern Valley Yokuts territory encompassed the upper (southern) end of the San Joaquin Valley, from the lower Kings River south to the Tehachapi Mountains. Included in this area were Tulare, Buena Vista, and Kern Lakes and their connecting sloughs and the lower portions of the Kings, Kaweah, Tule, and Kern Rivers. Adjacent to these lakes, rivers, and sloughs was an extensive swamp that expanded and contracted seasonally. The valley floor was essentially a large wetland, treeless with the exception of cottonwoods, sycamores, and willows lining the banks of rivers and sloughs.

At the time of European contact, at least 15 Yokuts groups inhabited the southern San Joaquin Valley (Kroeber 1925). Population estimates for this period range from 5,250 to 15,700. This group was composed of a number of small tribes, each of which spoke a distinct dialect of the Yokuts language (Shipley 1978).

The Yokuts depended on a mixed subsistence economy, emphasizing fishing; hunting game and waterfowl; and collecting shellfish, roots, and seeds. A variety of fish species were obtained through the use of dragnets, hand nets, spears, poison, bows and arrows, and weirs. Waterfowl were hunted with snares, bows and arrows, decoys, and long-handled nets. Turtles, mussels, and the eggs of waterfowl were gathered. Relatively few insect food sources were exploited. Small game was taken with snares or traps, bows and arrows, and nets.

Vegetal resources consisted of roots and seeds of wetland plants, brush, and bunch grasses. Acorns, the staple of so many native California groups, were not readily available in the area because oaks did not extend very far onto the valley floor. However, the Southern Valley Yokuts obtained acorns from their eastern neighbors in exchange for fish. Another important trade item in the area was asphaltum, used to waterproof baskets (Latta 1949).

Structures built by Southern Valley Yokuts were usually tule covered and, because of the generally high water table, were not dug into the ground. Small single-family dwellings were constructed of a wood frame and covered with tule mats. Long, steep-roofed dwellings of similar construction, with a shaded outdoor porch, slept 10 or more families. Each family had its own portion of the structure, with its own fireplace and door. Most cooking and household chores were performed outside, on the shaded porch, which ran the length of the building. Other structures included granaries, used to store food above ground,

and sweathouses, which were usually dirt covered. No structures were associated with dances or rituals.

Wood- and stoneworking technology remained relatively undeveloped among the Southern Valley Yokuts because these resources were generally scarce in or absent from the area. These materials usually were obtained through trade. Very abundant resources were tule reeds and other material used in basketry. Baskets included cooking containers, conical burden baskets, flat winnowing trays, seed beaters, and necked water bottles. Tules were also used to construct canoe-shaped rafts used for travel on water.

The nuclear family formed the basic domestic and economic unit. The Southern Valley Yokuts were organized in patrilineal totemic lineages that in some groups (including the Tachi) were associated with one of two patrilineal moieties. The totemic lineages were essentially mechanisms for transmitting offices and performing particular ceremonial functions. The patrilineal moieties had very little effect on the day-to-day lives of their members but were important for mourning rituals and games. Moiety exogamy was customary but not obligatory.

There was no overarching political unity among the Southern Valley Yokuts. The population was split into various self-governing tribelets, averaging roughly 350 individuals, each with its own name, dialect, and territory. Some of these political units were composed of a single village, but more often they consisted of several settlements, one of which, usually the largest, was recognized as dominant. Official positions in each village were associated with totemic lineages. Relations between local groups were generally friendly although occasional conflicts did occur.

The earliest contact the Southern Valley Yokuts had with Europeans probably occurred in the late 18th century, when Spanish explorers ventured into the southern San Joaquin Valley. No missions were established in the Southern Valley Yokuts territory; therefore, compared to their neighbors to the west, few Southern Valley Yokuts came under control of the Franciscan missionaries. Although some were settled at Soledad, San Luis Obispo, San Antonio, San Juan Bautista, and other missions, the infiltration of runaway neophytes from various Native American groups had a more significant impact on the Southern Valley Yokuts population in general. The runaway mission Indians introduced practices from their cultures and practices they learned in the missions. Horse riding was among the introduced practices, which led to raids on mission and rancho herds. In the 1820s, rancheros began to organize punitive expeditions to recover stolen livestock, punish horse thieves, and capture slaves. This practice, in addition to introduced diseases, had a comparatively small effect on the native population of the area. The decimation of the native population and rapid changes to its native culture began with the annexation of California by the United States. The native populations were not warlike and were an easy target for genocide and relocation. Southern Valley Yokuts populations were relocated to the Tejon, Fresno, and Tule River reservations. Today, the Tule River and Santa Rosa reservations host a number of Southern Valley Yokuts tribal members.

Historic Context

The action area is centrally located in California and primarily encompasses the region known as the San Joaquin Valley. Specifically, this area is comprised of the following nine counties: San Joaquin, Stanislaus, Merced, Mariposa, Madera, Fresno, Kings, Tulare, and Kern. The northern region of the project area is comprised of San Joaquin, Stanislaus, and Merced Counties. Mariposa, Madera, and Fresno counties represent the central region. Kings, Tulare, and Kern counties comprise the Southern region of the project area.

Settlement

Generations of Native Americans inhabited the San Joaquin Valley long before Spanish explorers and missionaries started traveling through the region in the late 1700s. Compared to the California coastal regions, which supported the earliest Spanish settlement, the San Joaquin Valley remained largely unsettled during the Spanish and Mexican Periods. Mexican land grants common to many coastal counties were sparsely scattered along the San Joaquin Valley. In fact, much of the region consisted of public lands. Following California's Gold Rush, settlement of the San Joaquin Valley gradually increased as former gold seekers realized the potential for crop production and cattle raising in the region. Many small towns were founded in the San Joaquin Valley because of railroads developed throughout the area, providing access, goods, and employment; these small towns further influenced settlement patterns in the area. The region has historically been used for agricultural and ranching practices, and these practices continue into the present (Jones & Stokes 2002).

Political and Economic History of the Area

San Joaquin County is located at the tip of the northern region of the project area. The county was established as one of the original 27 counties after California became a state in 1850. The city of Stockton, which is centrally located within San Joaquin County, remains the seat of government. Below San Joaquin County lies Stanislaus County, which was created in 1854 from a portion of Tuolumne County. At the time the county was created the town of Adamsville was designated the county seat. The Stanislaus County seat of justice moved four times before Modesto was given the designation in 1871. The county of Merced located south of Stanislaus County was organized in 1855 from part of Mariposa County. After relocating the county seat twice, the town of Merced was given the designation of Merced County's seat of government in 1872 (Hoover 1995).

Mariposa, Madera, and Fresno counties represent the central region of the project area. Mariposa County is located to the west of Merced County, and was one of the original 27 counties. Its present configuration dates from 1880. Agua Fria was the county seat between 1850 and 1851 until Mariposa became the seat of government for Merced County. Below Mariposa County lies Madera County,

which was organized from part of Fresno County in 1893. The principal town of Madera that continues to act as the county seat was given the designation at the time of the county's formation. In 1856, Fresno County was created from Mariposa, Merced, and Tulare counties. Between the year that Fresno County was established and 1909, the boundaries were altered several times. Millerton was the first county seat until Fresno was given the designation in 1874. Fresno County comprises a significant portion of land south of Madera County (Hoover 1995).

Kings, Tulare, and Kern counties comprise the southern region of the project area. Established in 1893, Kings County is comprised of a portion of Tulare County. Kings County is located south of the western portion of Fresno County. In 1909, two small additions from Fresno County altered the boundaries of Kings County. The county seat has always been Hanford. The County of Tulare lies to the east of Kings County. In 1852, the division of the southern portion of Mariposa County resulted in the creation of Tulare County. In 1852, the seat of justice in Tulare County was located to Visalia where it remains. Kern County comprises a large section of land and is located directly south of Kings and Tulare Counties. Kern County was organized from parts of Los Angles and Tulare counties in 1866. The central location of Bakersfield replaced the first county seat of Havilah in 1874 (Hoover 1995).

Agriculture and Irrigation

The railroad played a significant role in the development of the San Joaquin Valley region by influencing a change in the direction of land use from ranching to farming. The Central Pacific Railroad (CPRR) pushed through the San Joaquin Valley in the 1870s and resulted in 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 and raising livestock became central to the San Joaquin Valley economy. Migrants who initially came to California in search of gold found they had better luck making a living in cattle ranching. The newly established CPRR provided an efficient and reliable method of shipping freight and farm products throughout the state. Technological advances in agricultural machinery such as the combine and threshers allowed farmers to produce large harvests with less effort. By 1874, the United State Geological Survey commenced the partitioning of the nation into 640-acre sections, and subsequently opening the public domain for private ownership. A fence law was adopted that same year and forced ranchers to enclose their lands and keep livestock from roaming free. More ranchers and farmers existed on neighboring lands after the invention of the machine that produced barbed wire made fencing relatively inexpensive. As a result of these developments, open-range cattle ranches began to decline and the cultivation of wheat and other agricultural crops increased (County of Merced 2001).

Stimulated largely by the more arid conditions they faced, settlers in the San Joaquin Valley were among the first American-era farmers in California to put in works specifically for irrigation. During the late 1850s and 1860s, their ditches were typically earthen, short, and roughly made, and they diverted water by

means of temporary brush dams constructed across the lower courses of the streams running west out of the Sierra. Further north in the valley, grain could be dry-farmed so irrigation development was slower. The great floods of 1862 and 1868 destroyed most early ditch systems, but San Joaquin Valley farmers continued to experiment with irrigation. Farmers had also begun to irrigate bottomlands on the streams in the southern San Joaquin Valley. Like other Californians, most early San Joaquin settlers in the period from 1850 through the 1870s were not particularly interested in investing time and money in irrigation, focusing instead on cattle raising and dry-farm cultivation of small grains to meet the economic opportunities created by the Gold Rush (JRP Historical Consulting Services 1995).

By the early 1900s, irrigated agriculture far surpassed "dry farming" as the most profitable method of agriculture. This allowed smaller farms to produce a variety of high-yielding cash crops including cotton, figs, sweet potatoes, tomatoes, and onions. After World War II, the irrigation systems of the region improved structurally when irrigators began the replacement of the old wooden irrigation features with stronger concrete.

Over time, immigrants to the region emerged as leaders in the agricultural and dairy industries. For example, Italian immigrants excelled at the production of tomatoes during the 1950s. Processing of agricultural products (e.g., packing, freezing) greatly contributed to the economy of Merced County. The dairy industry, led by Portuguese immigrants, emerged in the early 1990s as a major contributor to the county's economy (County of Merced 2001).

PG&E's Existing Facilities

As described in Chapter 1, PG&E facilities are present in all portions of the action area, which was defined in part on the basis of PG&E's infrastructure network. Many of the facilities were constructed prior to 1970, so no NEPA or CEQA analysis of construction effects on cultural resources at these sites was required. Consequently, the extent and significance of any cultural resources that may have existed prior to construction on the sites are unknown, and effects on cultural resources at these sites as a result of construction-related ground disturbance are also difficult or impossible to assess. The integrity of some cultural resources may have been reduced to such an extent as to render them ineligible for assessment under the environmental analysis for the current proposed action. However, the integrity of other cultural resources may remain intact notwithstanding the construction of the existing facilities.

Environmental Consequences and Mitigation Strategies

Methodology for Impact Analysis

Contact with Tribal Authorities

As required by Secretarial Order 3206, USFWS contacted the tribes that own lands within the action area to solicit input on the proposed action during preparation of this EIS/EIR. Seven tribal authorities were contacted: Big Sandy Rancheria, Cold Springs Rancheria, North Fork Rancheria, Picayune Rancheria, Santa Rosa Rancheria, Table Mountain Rancheria, and Tule River Reservation. An initial letter was sent on August 3, 2005, describing the proposed action and summarizing the nature of the activities it would enable and their potential effects on cultural resources. USFWS made follow-up telephone calls in the weeks after the letter was delivered.

~~To date, the~~The following tribes ~~have~~ requested to be included on the mailing list for distribution of the draft HCP and EIS/EIR: Big Sandy Rancheria, Cold Springs Rancheria, and North Fork Rancheria. The Picayune Rancheria requested additional information on the location of PG&E's existing facilities, and was referred to PG&E.

Analysis Methods

The proposed HCP addresses a large number and a wide variety of activities over a very large geographic area. Given the nature of cultural resources sites, it is not possible to predict their locations with respect to potential work sites with any real accuracy. In general, prehistoric habitation sites are more likely to be located near streams or other water sources, and in sheltered, flat areas. However, prehistoric campsites or special use sites may be located at nearly any point on the landscape. Historic habitation sites can be predicted to some extent based on historic maps, but some habitations and many special use sites (mines, refuse deposits, etc.) were never mapped.

Although most of the activities enabled under the proposed action would occur within or immediately adjacent to existing PG&E ROWs, specific work sites within PG&E's infrastructure network are not reasonably foreseeable at this time, so it is infeasible to survey individual work sites for this analysis. Consequently, analysis focused on (1) assessing and minimizing the potential for damage to significant cultural resources as a result of various types of activities enabled under the proposed action, should any such resources be present on work sites; and (2) developing strategies to ensure appropriate avoidance or mitigation of potential impacts. Analysis assumed that PG&E would continue to implement the company's existing program of cultural resources BMPs, discussed under *Environmental Commitments* in Chapter 2.

Significance Criteria

For the purposes of this analysis, an impact was considered to be significant and to require mitigation if it would result in any of the following.

- A substantial adverse change in the significance of a historical resource as defined in Section 15064.5.
- A substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.
- Disturbance of any human remains, including those interred outside of formal cemeteries.
- An adverse effect on any district, site, highway, structure, or object listed in or eligible for listing in the NRHP.
- Loss of significant cultural or historical resources.

Impacts and Mitigation Measures

Proposed Action

Impact CR1—Potential disturbance or destruction of cultural resources as a result of O&M activities. A number of the O&M activities enabled by the proposed action would result in ground disturbance, with the potential to disturb or damage buried cultural resources if any are present on or in the subsurface at work sites. As discussed in Chapter 2, O&M activities would take place within existing ROWs and immediately adjacent areas. Most ROWs have already experienced some degree of ground disturbance, and the likelihood that they support significant buried cultural resources is considered low. In many areas, the corridor immediately adjacent to existing ROWs has also experienced some disturbance. Thus, O&M activities are considered unlikely to result in disturbance or damage sufficient to cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5, or a historical resource as defined in Section 15064.5; an adverse effect on any district, site, highway, structure, or object listed in or eligible for listing in the NRHP; or loss of significant cultural or historical resources. Disturbance of Native American remains is also considered unlikely during O&M activities. However, the possibility of impacts cannot be entirely ruled out, and significant impacts are possible.

Accordingly, as described in Chapter 2 (see *Cultural Resources Program* under *PG&E's Existing Environmental Programs and Practices*), PG&E implements a companywide cultural resources program to avoid and minimize impacts, consistent with the requirements of federal and state regulations governing treatment of cultural resources. This program would continue to be implemented as part of the HCP program. Preactivity searches of the California Historical Resources Information System (CHRIS) database and/or PG&E's in-house

cultural resources database are conducted by the company's cultural resource specialists for larger O&M activities in generally undisturbed areas, and also for some smaller activities where visible features at a project site, or information obtained from PG&E's records or knowledgeable local sources, suggests that cultural resources may be present. PG&E maintains a confidential database of cultural resources sites that is made available on a limited basis to qualified cultural resources experts to assess potential cultural resource impacts from PG&E activities. Limited relevant information from the database is provided to PG&E crews so that harm to known cultural resources can be avoided or minimized.

As discussed in more detail in Chapter 2 (see *Cultural Resources Program* under *PG&E's Existing Environmental Programs and Practices*), BMPs that are routinely implemented include

- 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 PG&E cultural resources specialists, and
- removing only materials brought onsite.

Crews are required to stop work within 100 feet if cultural material is discovered, to avoid damage until a qualified archaeologist can assess the significance of the find. If necessary, treatment measures are then developed in consultation with appropriate agencies and tribal representatives. Such measures could include requiring that the site be avoided, conducting recovery excavations, and/or capping the site to avoid further disturbance of artifacts.

Similarly, if human remains of Native American origin are discovered, PG&E complies with all federal and state laws relating to the disposition of Native American burials. Excavation of the site and all nearby areas reasonably suspected to overlie adjacent human remains is halted until the County Coroner has been contacted to determine that no investigation of the cause of death is required, and, if the Coroner determines that the remains are Native American,

- the Coroner has contacted the Native American Heritage Commission;
- the Native American Heritage Commission has identified the person or persons it believes to be the most likely descended from the deceased Native American; and
- the most likely descendent has made recommendations to the landowner or the person responsible for the excavation work for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods, unless the Native American Heritage Commission was unable to identify a descendant or the descendant failed to make a recommendation within 24 hours after being notified by the commission.

In light of the cultural resources program PG&E currently implements and will carry forward under the proposed action, **impacts on cultural resources as a result of routine O&M activities are expected to be less than significant.**

As discussed in Chapter 2 (see *Cultural Resources Program* under *PG&E's Existing Environmental Programs and Practices*), when emergency repairs are needed, PG&E is required to conduct them as rapidly as possible to ensure continuity of service and protect public safety. As a result, it is typically infeasible to incorporate cultural resources studies and treatment into the emergency repairs process. However, by their nature, emergency repairs affect existing infrastructure and thus would take place in ROWs and immediately adjacent areas that have already undergone some level of disturbance associated with installation and maintenance of existing utilities infrastructure. In addition, emergency repairs occur infrequently and represent a very small fraction of the activities enabled under the proposed action. Moreover, in the event that PG&E emergency O&M work affects cultural resources, the company's practice is to follow up with appropriate treatment measures to minimize damage and avoid additional disturbance in the future. Measures may include

- conducting recovery excavations,
- capping the site to avoid further disturbance of artifacts, or other procedures.

If any find is determined to be significant, PG&E representatives and the qualified archaeologist meet to determine the appropriate course of action. All significant cultural resource materials recovered are subject to scientific analysis, professional museum curation, and documentation in a report prepared by the qualified archaeologist according to current professional standards.

In light of these measures, which will continue in force under the proposed action, **impacts on cultural resources as a result of emergency repairs are also expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact CR2—Potential disturbance or destruction of cultural resources as a result of minor construction activities. The proposed action would enable a range of minor construction activities, including limited expansion of electrical substations and extension of natural gas pipelines and electric transmission and distribution lines. All of these activities would entail ground disturbance, with the potential to disturb or destroy cultural resources present on or in the subsurface portion of the site. At least some minor construction activities would likely disturb previously undisturbed ground, with greater potential to result in disturbance or damage sufficient to cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5, or a historical resource as defined in Section 15064.5; an adverse effect on any district, site, highway, structure, or object listed in or eligible for listing in the NRHP; loss of significant cultural or historical resources; and/or disturbance of Native American remains. Any of these outcomes would represent a significant impact.

However, as discussed above and in Chapter 2 (see *Cultural Resources Program* under *PG&E's Existing Environmental Programs and Practices*), PG&E would implement its existing cultural resources program, reflecting the requirements of federal and state regulations governing the treatment of cultural resources, under the proposed action. This would include new minor construction. PG&E maintains a confidential in-house database of cultural resources sites that is made available on a limited basis to qualified cultural resources experts to assess potential cultural resource impacts from PG&E activities. PG&E performs database searches for areas where new construction has been proposed, and limited relevant information from the database is provided to PG&E crews so that harm to known cultural resources can be avoided or minimized. PG&E also routinely implements a variety of BMPs to protect cultural resources (see discussion in Impact CR1 above, and in Chapter 2), and requires a "stop work" if cultural material is discovered, until a qualified archaeologist can assess the significance of the find. If necessary, treatment measures are then developed in consultation with appropriate agencies and tribal representatives. Such measures could include

- requiring that the site be avoided,
- conducting recovery excavations, and/or
- capping the site to avoid further disturbance of artifacts.

If human remains of Native American origin are discovered, PG&E complies with state and federal laws relating to the disposition of Native American burials, consistent with the procedures outlined in Impact CR1 above.

In light of PG&E's existing cultural resources program, which will continue to be implemented under the proposed action, **impacts on cultural resources as a result of minor construction activities are expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact CR3—Potential impacts on cultural resources as a result of habitat enhancement, restoration, or creation. As described in Chapter 2, the proposed HCP prioritizes acquisition/preservation of high-quality habitat as compensation for habitat disturbance during O&M and minor construction activities. Enhancement, restoration, or creation of habitat would likely also be required on at least some compensation lands.

Habitat enhancement, restoration, and creation can involve ground disturbing activities, and would be likely to disturb previously undisturbed ground, so there is some potential for significant impacts on cultural resources, although it is speculative to foresee the exact nature or level of impact without specific information on the location and nature of compensation lands, which is not available at this time because of the proposed action's extended planning horizon. However, PG&E's existing cultural resources program, which reflects the requirements of federal and state regulations governing treatment of cultural resources, would be implemented under the proposed action, including the

enhancement, restoration, and creation of habitat. As discussed above and in Chapter 2, the program includes database searches for new construction, particularly in generally undisturbed areas, along with a program of BMPs to avoid and minimize damage. In light of these measures, which will continue in force under the proposed action, **impacts on cultural resources as a result of habitat enhancement, restoration, and creation are expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Alternative 1—HCP with Reduced Take

Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. PG&E's current cultural resources program would continue in force under Alternative 1. Consequently, impacts on cultural resources would be essentially the same under Alternative 1 as those described for the proposed action.

Alternative 2—HCP with Enhanced Compensation

Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action, and PG&E's current cultural resources program would continue in force under Alternative 2. Differences between Alternative 2 and the proposed action would center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). As with Alternative 1, impacts on cultural resources would be similar under Alternative 2 to those described for the proposed action, but could be somewhat greater because of the enhanced compensation requirements. However, because PG&E's existing cultural resources program would continue in force under Alternative 2—including pre-activity database searches for larger activities, and BMPs consistent with relevant federal and state regulations for all activities—impacts are nonetheless expected to be less than significant.

Alternative 3—HCP with Reduced Number of Covered Species

Alternative 3 would enable the same program of O&M and minor construction activities as that described for the proposed action, and PG&E's current cultural resources program would also continue in force under Alternative 3. The key difference between Alternative 3 and the proposed action would relate to the number of species covered under the Alternative 3 (reduced by comparison with the proposed HCP, as described in Chapter 2). Impacts on cultural resources would be similar under Alternative 3 to those described for the proposed action, although they could be somewhat reduced because the reduced number of

covered species could reduce compensation acreage somewhat. Because the same protective measures would apply—including pre-activity database searches for larger activities, and BMPs consistent with relevant federal and state regulations for all activities—impacts are expected to be less than significant.

Alternative 4––No Action

Under the No Action Alternative, PG&E would continue its existing program of O&M and minor construction activities unchanged, but no HCP would be implemented, and any habitat compensation would occur on a case-by-case, piecemeal basis. The company's existing cultural resources program—including pre-activity database searches for larger activities, and BMPs consistent with relevant federal and state regulations for all activities—would continue in force, although compliance would be performed on a case-by-case basis as projects arise. Consequently, O&M and minor construction impacts on cultural resources under the No Action Alternative would be very similar to those described for the proposed action. Impacts related to ground disturbance for habitat enhancement, restoration, or creation are speculative to predict because the nature and location of compensation parcels remains speculative at this time.

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Chapter 10

Paleontological Resources

Chapter 10
Paleontological Resources

This chapter analyzes the proposed action's potential effects on paleontological resources. Related information, including an overview of bedrock and Quaternary geology in the action area, is presented in Chapter 7 (*Geology and Soils*). Cultural resources are addressed separately in Chapter 9.

For the purposes of this analysis, *paleontological resources* is defined as including fossilized remains of vertebrate and invertebrate organisms, fossil tracks and trackways, and plant fossils. Because of the action area's size and geologic diversity, detailed investigation of paleontological resources in the action area is beyond the scope of this EIS/EIR. Instead, this analysis focused on developing a strategy to (1) assess risks to nonrenewable paleontological resources and (2) avoid and minimize impacts. Key information used in the preparation of this chapter was derived from published geologic literature and maps, and from guidelines published by the Society of Vertebrate Paleontology (SVP). Specific reference information is provided in the text.

Affected Environment

Regulatory Framework

A variety of federal, state, and local regulations and policies protect paleontological resources. These include NEPA, CEQA, the federal Antiquities Act of 1906, the National Natural Landmarks (NNL) Program, the California Public Resources Code, and the recently enacted federal Paleontological Resources Preservation Act. Professional standards of practice such as those adopted by SVP (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995) offer additional guidance for control and mitigation of adverse impacts on paleontological resources. The following paragraphs describe key regulatory provisions relating to paleontological resources.

Federal Regulations

Antiquities Act

As discussed in Chapter 9 (*Cultural Resources*), the federal Antiquities Act of 1906 was enacted with the primary goal of protecting cultural resources in the United States. As such, it explicitly prohibits appropriation, excavation, injury, and destruction of "any historic or prehistoric ruin or monument, or any object of antiquity" located on lands owned or controlled by the federal government, without permission of the secretary of the federal department with jurisdiction. It also establishes criminal penalties, including fines and/or imprisonment, for these acts. Neither the Antiquities Act itself nor its implementing regulations (Title 43, Code of Federal Regulations [CFR], Part 3) specifically mentions paleontological resources. However, several federal agencies—including the National Park Service, the Bureau of Land Management, and the U.S. Forest Service—have interpreted *objects of antiquity* as including fossils. Consequently, the Antiquities Act represents an early cornerstone for efforts to protect the nation's paleontological resources.

National Environmental Policy Act

NEPA does not provide specific guidance regarding paleontological resources, but the NEPA requirement that federal agencies take all practicable measures to "preserve important historic, cultural, and natural aspects of our national heritage" (NEPA Sec. 101[b][4]) is interpreted as applying to paleontological materials. Under NEPA, paleontological resources are typically treated in a manner similar to that used for cultural resources.

Paleontological Resources Preservation Act

The federal Paleontological Resources Preservation Act of 2002 (PRPA) was specifically intended to codify the generally accepted practice of limiting collection of vertebrate fossils and other rare and scientifically significant fossils to qualified researchers who obtain a permit from the appropriate state or federal agency and agree to donate any materials recovered to recognized public institutions where they will remain accessible to the public and to other researchers. The PRPA incorporates the following key findings of a recent report issued by the Secretary of the Interior with input from staff of the Smithsonian Institution, the U.S. Geological Survey, various federal land management agencies, paleontological experts, and the public (Society of Vertebrate Paleontology 2003).

- Most vertebrate fossils, and some fossils of other types (invertebrates, plants) represent a rare resource.
- Illegal collection and theft of fossil materials from public lands is a serious problem; penalties for fossil theft should be strengthened.

- Effective stewardship requires accurate information; federal fossil collections should be preserved and made available for research and educational use.
- Federal management of fossil resources should emphasize opportunities for public involvement.

National Natural Landmarks Program

The 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 includes 587 sites, ranging in size from 7 acres to almost 1 million acres. Examples of sites designated as NNLs for their paleontological value include Sharktooth Hill in Kern County, Rancho La Brea in Los Angeles, and Rainbow Basin north of Barstow in San Bernardino County.

The NNL Program is administered by the National Park Service. 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 50% of the nation's NNLs are managed by public agencies, about 30% are privately owned and managed, and about 20% are managed through collaboration between agencies and private entities.

The National Park Service (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 Regulations and Policies

California Environmental Quality Act

CEQA includes in its definition of *historical resources* "any object [or] site … that has yielded or may be likely to yield information important in prehistory"(CEQA Guidelines Sec. 15064.5[3]), which is typically interpreted as

including fossil materials and other paleontological resources. In addition, destruction of a "unique paleontological resource or site or unique geologic feature" constitutes a significant impact under CEQA (CEQA Guidelines Appendix G). Treatment of paleontological resources under CEQA is generally similar to treatment of cultural resources, requiring evaluation of resources in a project's area of potential affect, assessment of potential impacts on significant or unique resources, and development of mitigation measures for potentially significant impacts, which may include monitoring combined with data recovery and/or avoidance.

California Public Resources Code

Several sections of the California Public Resources Code protect paleontological resources. Section 5097.5 prohibits "knowing and willful" excavation, removal, destruction, injury, and defacement of any paleontologic feature on public lands (lands under state, county, city, district, or public authority jurisdiction, or the jurisdiction of a public corporation), except where the agency with jurisdiction has granted express permission. Section 30244 requires reasonable mitigation for impacts on paleontological resources that occur as a result of development on public lands. The sections of the California Administrative Code relating to the State Division of Beaches and Parks afford protection to geologic features and "paleontological materials" but grant the director of the state park system authority to issue permits for specific activities that may result in damage to such resources, if the activities are in the interest of the state park system and for state park purposes (California Administrative Code Sec. 4307–4309).

Local Regulations and Plans

Many County and City general plans specifically protect paleontological resources. In addition, general plan and local ordinance protection for cultural and "heritage" resources also covers paleontological resources in some jurisdictions. The goal of general plan policies is typically to recognize the importance of these resources as part of a jurisdiction's unique character and heritage, and to ensure that they are preserved as development proceeds. Some jurisdictions also emphasize the need to increase public awareness of such resources.

Professional Standards and Guidelines

In response to a recognized need for standard guidance, the SVP published a set of *Standard Guidelines* (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995) that are now widely followed. The SVP guidelines identify two key phases in the process for protecting paleontological resources from project impacts, as follows.

1. Assess the likelihood that the project's area of potential effect contains significant nonrenewable paleontological resources that could be directly or indirectly impacted, damaged, or destroyed as a result of the project.
2. Formulate and implement measures to mitigate potential adverse impacts.

An important strength of the SVP's approach to assessing potential impacts on paleontological resources is that the SVP guidelines provide some standardization in evaluating a project area's paleontological sensitivity. Table 10-1 defines the SVP's sensitivity categories for paleontological resources and summarizes SVP's recommended treatments to avoid adverse impacts in each sensitivity category.

Table 10-1. Society of Vertebrate Paleontology's Recommended Treatment for Paleontological Resources, by Sensitivity Category

Sensitivity Category	Definition	Recommended Treatment
High potential (High sensitivity)	Areas underlain by geologic units from which vertebrate or significant invertebrate fossils or suites of plant fossils have been recovered.	▪ Preliminary survey and surface salvage before construction begins. ▪ Monitoring and salvage during construction. ▪ Specimen preparation; identification, cataloging, curation, and storage of materials recovered. ▪ Preparation of final report describing finds and discussing their significance. ▪ *All work should be supervised by a professional paleontologist who maintains the necessary collecting permits and repository agreements.*
Undetermined potential (Undetermined sensitivity)	Areas underlain by geologic units for which little information is available.	▪ Preliminary field surveys by a qualified vertebrate paleontologist to assess project area's sensitivity ▪ Design and implementation of mitigation if needed, based on results of field survey
Low potential (Low sensitivity)	Areas underlain by geologic units that are not known to have produced a substantial body of significant paleontologic material.	Protection and salvage are generally not required. However, a qualified paleontologist should be contacted if fossils are discovered during construction, in order to salvage finds and assess the need for further mitigation.

Source: Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995.

SVP's guidelines also provide a working definition of *significance* as applied to paleontological resources. According to SVP, significant paleontological resources are those that fulfill one or more of the following criteria (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995).

- Provides important information shedding light on evolutionary trends and/or helping to relate living organisms to extinct organisms.
- Provides important information regarding the development of biological communities.
- Demonstrates unusual circumstances in the history of life.
- Represents a rare taxon or a rare or unique occurrence; is in short supply and in danger of being destroyed or depleted.
- Has a special and particular quality, such as being the oldest of its type or the best available example of its type.
- Provides important information used to correlate strata for which it may be difficult to obtain other types of age dates.

Significant paleontological resources may include vertebrate fossils and their associated taphonomic and environmental indicators; invertebrate fossils; and/or plant fossils.

Existing Conditions

Paleontological Resources in the Action Area

A number of geologic units in the action area have some potential to contain significant paleontological resources. These include the Cretaceous Moreno Formation along the northwest margin of the action area; various other marine units of Cretaceous and Paleogene age, primarily exposed at the surface along the west margin of the action area and also present in the subsurface throughout the Central Valley; Neogene marine and terrestrial strata exposed along the Valley margins and present in the subsurface throughout the Valley, including the Temblor Formation of Early to mid-Miocene age; and valley-filling Pleistocene alluvial units. The following sections provide additional information on the Moreno Formation, Temblor Formation, and Pleistocene alluvium, which are considered particularly sensitive on a regional basis. Other units are also locally sensitive.

Moreno Formation

The Moreno Formation consists of shale deposited in a deep-marine environment. It is highly fossiliferous, yielding a variety of marine reptiles; fish skeletons; various marine invertebrates; plant remains, including wood, leaves, and needles; and the remains of dinosaurs (Hilton 2003). Fossil remains from 5 types of hadrosaur dinosaurs, 20 plesiosaurs and 84 mosasaurs (marine reptiles), and several turtles have been collected from the Moreno Formation in Fresno County, many from the Panoche Hills area (Hilton 2003). Dinosaurs are rarely found in California and many of the plesiosaurs and mosasaurs found in California come from the Moreno Formation (Discovery Works 2003). Various

molluscs, fish, and crabs have also been recovered from the Moreno Formation (Payne 1962).

An assemblage of bivalves interpreted to be from an ancient cold seep has been discovered in the upper Moreno Formation in the Panoche Hills area (Weberling and Moore 2003). Modern cold seeps were discovered relatively recently (in the late 1980s), and paleontologists are just beginning to recognize them in the fossil record (Campbell and Bottjer 1993, Campbell et al. 1993). Fossil cold seep faunas are thus unusual and potentially important fossils that can add to our understanding of evolutionary processes and ancient geochemistry.

Because it contains abundant vertebrate fossils as well as potentially important invertebrate faunas, the Moreno Formation is evaluated as having high potential to contain significant paleontological resources. Its paleontological sensitivity is considered high.

Temblor Formation

The Temblor Formation consists of sandstone and siltstone deposited in a nearshore marine environment. It is famous for the richness and diversity of its fossil assemblage, which includes evidence of large land mammals such as horses (e.g., *Merychippus* sp.), marine mammals such as cetaceans and the sea cow *Desmostylus*; sharks; birds, including a new genus and species of condor-like vulture identified in part from remains in the Temblor Formation; and marine invertebrates (Garrison 1959, Norris and Webb 1990, Emslie 1988, Barnes et al. 2005). Exposures of the Temblor Formation at Sharktooth Hill in Kern County have been designated as an NNL (see *National Natural Landmarks Program* in *Regulatory Context* above) because of their remarkable fossil content.

Pleistocene Alluvial Units

As discussed in Chapter 7, the Quaternary alluvial and fluvial strata flooring the Central Valley record erosional dissection of the Sierran and Coast Ranges uplifts. Fossil remains of vertebrates are common in Pleistocene units throughout California, and Pleistocene alluvial units in particular can contain diverse vertebrate faunas representing various evolutionarily important taxa. Sloths, horses, camels, mammoths, and bison have been collected from middle to late Pleistocene sediments in all of the action area counties (Jefferson 1991, Dundas et al. 1996, Hilton et al. 2000).

PG&E's Existing Facilities

As described in Chapter 1, PG&E has facilities in all portions of the action area, which was defined on the basis of PG&E's infrastructure network. Many of the facilities were constructed prior to 1970, so no NEPA or CEQA analysis of construction effects on paleontological resources at these sites was required.

Consequently, the extent and significance of any paleontological resources that may have existed prior to construction on the sites is unknown, and an unknown amount of damage to paleontological resources at these sites may have occurred as a result of construction-related ground disturbance. As a result, some existing paleontological resources may already have been substantially disturbed, damaged, or destroyed. However, there is the potential that others may remain intact or largely undisturbed.

Environmental Consequences and Mitigation Strategies

Methodology for Impact Analysis

Impacts on paleontological resources were analyzed qualitatively, based on professional judgment.

As discussed above, some of the action area's geologic units are known to be highly sensitive paleontologically. However, because of the action area's size and geologic diversity, detailed investigation of paleontological resources—which would typically result in site-specific assessments of paleontological sensitivity followed by development of corresponding site-specific avoidance and/or treatment protocols—was infeasible. Instead, this analysis focused on (1) identifying activities with the potential to disturb, damage, or destroy paleontological resources if any are present on the work site; and (2) developing a strategy to ensure that mitigation requiring paleontological sensitivity assessment and appropriate treatment developed on a site-specific basis is in place for those activities identified as likely to result in damage.

Significance Criteria

Based on the state's CEQA Guidelines and standards developed by SVP (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995), this analysis evaluated an impact as *significant* if it would have the potential to result in

- substantial damage to or destruction of significant paleontological resources, as defined in *Regulatory Framework* above.

Impacts and Mitigation Measures

Proposed Action

Impact PAL1—Potential for damage to paleontological resources. As discussed in *Existing Conditions* above, some of the action area's geologic units have the potential to contain significant paleontological resources. Many of the activities that would be enabled by the proposed action would result in some degree of ground disturbance, and thus could damage paleontological resources if any are present on the work site. This is most likely to occur where ground disturbance is greater and the work site has not experienced substantial prior disturbance; thus, the greatest concern focuses on new minor construction activities, which are likely to occur on previously undisturbed, or largely undisturbed, parcels. Substantial damage to or destruction of significant paleontological resources as defined by the SVP (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995) would represent a significant impact. In most cases, new minor construction would require preparation of a site-specific geotechnical investigation; **to avoid significant impacts in these cases, PG&E will implement the following measure.**

> **Mitigation Measure PAL1.1—Include site-specific evaluation of paleontological sensitivity for projects requiring site-specific geotechnical investigation.** For any project that requires a site-specific geotechnical investigation under applicable state regulations, applicable local permitting processes, and/or PG&E's standard environmental programs and practices, PG&E will ensure that preconstruction studies include assessment of the site's paleontological sensitivity by a state-registered professional geologist (PG) or qualified professional paleontologist. If the paleontological assessment determines that any of the substrate units that would be affected by the planned activity are highly sensitive for paleontological resources, the report will also include recommendations for appropriate and feasible procedures to avoid or minimize damage to any resources present, prepared by a qualified professional paleontologist. PG&E will be responsible for ensuring implementation of the measures identified.

The potential for significant impacts on paleontological resources as a result of routine O&M activities is lower, because ground disturbance associated with these activities is typically confined to existing ROWs and immediately adjacent areas, which have already undergone some level of disturbance associated with installation and maintenance of existing infrastructure. **To ensure that further ground disturbance does not result in additional, significant damage to paleontological resources, PG&E will also implement the following measure for all activities except emergency repairs**; note that this measure would also ensure against significant impacts as a result of any new minor construction not subject to site-specific geotechnical investigation.

Mitigation Measure PAL1.2—Stop work if substantial fossil remains are encountered during construction. If substantial fossil remains (and particularly, vertebrate remains) are discovered during O&M or construction activities, work on the site will stop immediately until a state-registered professional geologist (PG) or qualified professional paleontologist can assess the nature and importance of the find and a qualified professional paleontologist can recommend appropriate treatment. Treatment may include preparation and recovery of fossil materials so that they can be housed in an appropriate museum or university collection, and may also include preparation of a report for publication describing the finds. PG&E or the appropriate agency will be responsible for ensuring that recommendations regarding treatment and reporting are implemented.

As discussed in Chapters 2 and 9, when emergency repairs are needed, PG&E is required to conduct them as rapidly as possible to ensure continuity of service and protect public safety. As a result, it is typically infeasible to implement a stop work order such as that required under Mitigation Measure PAL1.2 during emergency repairs. By their nature, emergency repairs affect existing infrastructure and thus would take place in ROWs and immediately adjacent areas that have already undergone some level of disturbance associated with installation and maintenance of existing utilities infrastructure. Consequently, the potential for significant impacts as a result of emergency repairs is considered low, but some potential nonetheless remains. Implementation of the following measure would reduce impacts to the extent feasible. **With this measure in place, impacts related to emergency repairs are expected to be less than significant.**

Mitigation Measure PAL1.3—Implement follow-up assessment and remediation in the event paleontological resources are discovered during emergency repairs. If paleontological resources are discovered during emergency repairs, PG&E will ensure that they are evaluated by a state-registered professional geologist (PG) or qualified professional paleontologist as soon as practicable following the completion of all necessary and required repair work. If appropriate, a qualified professional paleontologist will develop a remedial treatment plan consistent with the prevailing standard of care for paleontological resources. The treatment plan may provide for any or all of the following: measures to prevent additional damage; recovery excavations; museum curation; preparation of a report documenting the find; and/or development of public outreach or educational materials or displays. PG&E will be responsible for ensuring that the recommendations of the treatment plan are implemented.

With Mitigation Measures PAL1.1, PAL1.2, and PAL1.3 in place, impacts on paleontological resources as a result of activities enabled under the proposed action are expected to be less than significant.

Alternative 1—HCP with Reduced Take

Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Consequently, impacts on paleontological resources would be essentially the same under Alternative 1 as those described for the proposed action, and the same mitigation strategy would apply.

Alternative 2—HCP with Enhanced Compensation

Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action. Differences between Alternative 2 and the proposed action would center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). As with Alternative 1, impacts on paleontological resources would be very similar under Alternative 2 to those described for the proposed action, and the same mitigation strategy would apply.

Alternative 3—HCP with Reduced Number of Covered Species

Alternative 3 would enable the same program of O&M and minor construction activities as that described for the proposed action. The key difference between Alternative 3 and the proposed action would relate to the number of species covered under the Alternative 3 (reduced by comparison with the proposed HCP, as described in Chapter 2). Impacts on paleontological resources would be very similar under Alternative 3 to those described for the proposed action, and the same mitigation strategy would apply.

Alternative 4—No Action

Under the No Action Alternative, PG&E would continue its existing program of O&M activities unchanged. No HCP would be implemented, and no other new or additional environmental commitments would be put in place. However, because the activities most likely to affect paleontological resources would not change substantially, paleontological impacts would be essentially the same as those described for the proposed action. The same mitigation strategy would apply.

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Chapter 11

Transportation and Circulation

Chapter 11
Transportation and Circulation

This chapter analyzes the proposed action's potential effects related to transportation. Activities enabled under the proposed action would take place primarily within PG&E's existing ROWs and adjacent areas; thus, the proposed action is not expected to affect airports or air traffic, mass transit, bicycles, pedestrians, or alternative transportation, and this chapter accordingly focuses on motor vehicle traffic. Effects on emergency vehicle access and emergency services' response times are discussed in Chapter 14 (*Public Health and Environmental Hazards*). Other related information is presented in Chapter 15 (*Recreation*).

Key sources of data used in the preparation of this chapter include the Transportation Research Board's *Highway Capacity Manual* (Transportation Research Board 2000). Additional specific reference information is provided in the text.

Affected Environment

Regulatory Context

Traffic analysis in the State of California is guided by standards set at the federal level by the Federal Highway Administration (FHWA), at the state level by the California Department of Transportation (Caltrans), and at the local level by local jurisdictions. Interstates fall under the jurisdiction of the FHWA, and state highways fall under the jurisdiction of Caltrans. Other roadways are under city or county jurisdiction, depending on whether they are located within city planning limits or on unincorporated county lands.

LOS or *level of service* is the primary measure used to describe the operating quality of a roadway facility. LOS is evaluated based on operational conditions within the traffic stream, including parameters such as speed and travel time, freedom to maneuver, traffic interruptions/delays, comfort, and convenience. LOS can be quantitatively estimated based on volume-to-capacity (V/C) ratio (the ratio between the number of vehicles actually traveling on a roadway and the number of vehicles it was designed to convey), or based on the average delay experienced by vehicles on the facility.

The *Highway Capacity Manual* (Transportation Research Board 2000) is the recognized source for the techniques used to measure transportation facility performance. Using the *Highway Capacity Manual*'s procedures, the quality of traffic operation is graded into one of six LOS designations: A, B, C, D, E, or F. LOS A represents the best range of operating conditions and LOS F represents the worst. Table 11-1 summarizes the characteristic traffic flow for each LOS designation.

Table 11-1. Volume to Capacity Ratio and Traffic Flow Conditions for Level of Service Designations

LOS	Approximate Maximum V/C	Description
A	0.3	Free-flow operations; vehicles unimpeded in ability to maneuver in traffic stream.
B	0.5	Reasonable free-flow conditions; only slightly restricted ability to maneuver.
C	0.7	Flows still near free-flow speed but noticeably restricted ability to maneuver.
D	0.9	Speeds begin to decline; maneuverability limited and queues begin to form.
E	1.0	Operation at capacity of roadway; maneuverability extremely limited and queues form with any disruption.
F	>1.0	Failure conditions indicating breakdowns in vehicular flow with long queues forming at breakdown points.

Source: California Department of Transportation 1999.

California Government Code 65300 requires each local government to include a circulation element as part of its general plan. The circulation element must address the general location and extent of existing and proposed major thoroughfares, transportation routes, terminals, any military airports and ports, and other local public utilities and facilities, and must be correlated with the land use element of the plan (California Government Code 65300).

As part of its planning process, each local jurisdiction establishes an LOS standard for the roadway facilities under its authority. This defines the minimum acceptable roadway operating conditions and allows deficiencies to be identified. To the extent feasible, transportation planning policies generally aim to ensure that facilities and services will be able to provide the minimum LOS for all planned land uses. This process requires jurisdictions to balance the following key factors.

- Long-term land development policies and community development standards.
- Adopted LOS standards.
- Financial policies and strategies, which determine available revenues and realistic levels of expenditure.

Any segment of roadway that operates at an LOS below the standard is considered a deficiency in the roadway system. Identified deficiencies often provide the basis for prioritizing improvement projects under capital improvement programs.

Existing Conditions

The action area encompasses part or all of nine San Joaquin Valley counties: San Joaquin, Stanislaus, Merced, Fresno, Kings, Kern, Mariposa, Madera, and Tulare (Figure 1-1). The action area is largely rural, with several major centralized urban areas and smaller areas of development scattered throughout.[1] Figure 11-1 represents existing county highways and the portion of the state highway system that occurs in the action area. In addition to state and county highways, each local jurisdiction has an extensive network of local roadways. Figure 11-1 also indicates the general distribution of development in the action area.

Environmental Consequences and Mitigation Strategies

Methodology for Impact Analysis

Impacts were evaluated qualitatively, based on professional judgment in light of the activities, methods, and techniques entailed by PG&E's San Joaquin Valley O&M program, and the additional avoidance and minimization measures (AMMs) that would be enacted under the proposed HCP. See Chapter 2 (*Proposed Action and Alternatives*). Because the proposed action would not enable any activities expected to affect airports or air traffic, mass transit, bicycles, pedestrians, or alternative transportation, analysis focused on motor vehicle traffic. Analysis assumed implementation of the additional environmental commitments enacted under this EIS/EIR, as described in Chapter 2.

PG&E's ongoing O&M program (which includes operation, maintenance, and minor construction activities) would not differ between the proposed action, Alternative 1 (HCP with Reduced Take), Alternative 2 (HCP with Enhanced Compensation), Alternative 3 (HCP with Reduced Number of Covered Species), and Alternative 4 (No Action). The principal features expected to differentiate traffic impacts between the proposed action and alternatives are the establishment of preserves and allowed uses on the preserves (e.g., limited passive recreation). Because actual traffic effects would vary depending on site-specific constraints,

[1] See Chapter 3 (*Land Use and Planning*) for additional information regarding land uses in the action area.

potential traffic impacts are of necessity discussed qualitatively, at a program level of detail.

Significance Criteria

For the purposes of this analysis, an impact was considered to be significant and to require mitigation if it would result in any of the following.

- Substantial increase in traffic compared to existing traffic volumes and the capacity of the roadway system.
- Exceedance of an established LOS standard for designated roads or highways.
- Safety hazards due to design features or incompatible uses (e.g., hazards to vehicular, pedestrian, and bicycle transit) or inadequate emergency access.
- Inadequate parking capacity.
- Conflict with adopted transportation plans, programs, or projects.

Impacts and Mitigation Measures

Proposed Action

Impact TR1—Potential to result in temporary construction-related traffic increases and traffic safety hazards (O&M, minor construction, and preserve enhancements). Minor, temporary traffic increases would result from construction associated with O&M activities (including expansion or upgrades of existing facilities, construction of new facilities, pipeline lowering, and replacement of various system components); construction of associated roadways; and preserve enhancements. Increases in traffic would occur mainly as a result of construction worker commute trips and transport of construction materials and equipment.

Construction related to O&M activities and preserve enhancements is unlikely to produce large traffic increases because of the nature of the projects involved. O&M activities are typically small and short-term, and require at most a few vehicles and staff. Preserve enhancement activities would likely also focus on relatively small geographic areas and would not entail a prolonged construction window or require large numbers of workers. O&M and preserve enhancement projects are also expected to have comparatively small delivery and haulage requirements because of their small scale and short duration.

Some types of minor construction activities could require a longer construction window (months instead of days) and a larger number of workers, and result in a larger number of haulage and delivery trips. Because specific O&M sites,

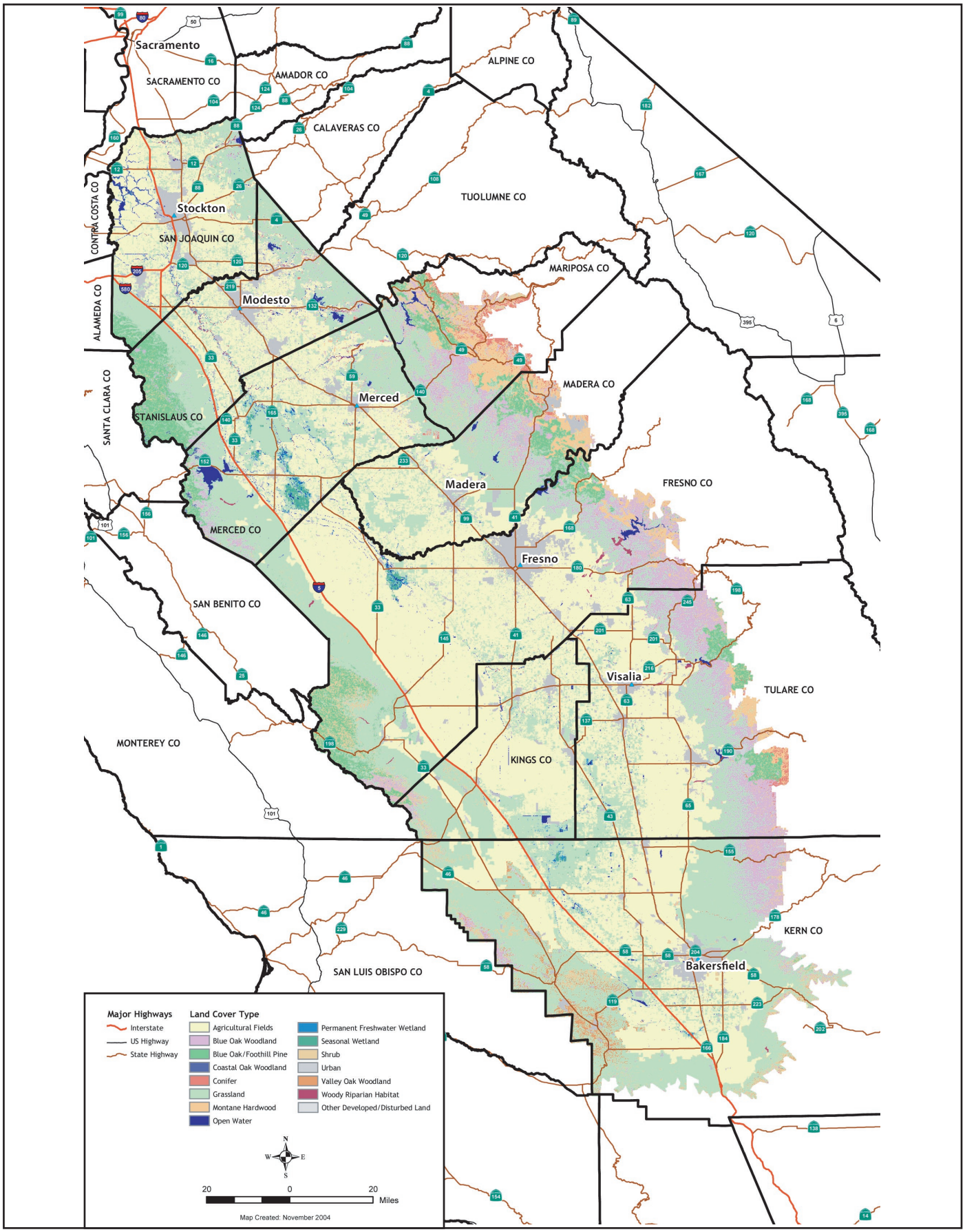

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Figure 11-1
US, State, and Interstate Highways in the Action Area

locations of new facilities, and locations of habitat requiring enhancement (if any) cannot be foreseen at this time, it is not possible to identify specific roadways and intersections likely to be affected by traffic related to these activities. However, it is possible to make some general inferences about possible effects. For example, increased traffic volume could create traffic delays and/or roadway safety concerns. Movement of large, slow construction equipment or vehicles could also result in delays and safety hazards, particularly at ingress points where these vehicles enter the traffic stream. Delays could also occur as a result of lane closures that reduce carrying capacity for a portion of the roadway, and full roadway closures would necessitate detours around construction areas.

Based on this general assessment, some O&M/construction/enhancement activities could adversely affect traffic flow, generate traffic in excess of established LOS standards, or result in traffic safety hazards. Many of the off-highway roadways in the action area are rural in nature, with narrow lanes or a minimal number of lanes. Even a small number of construction traffic trips on such roadways could adversely affect traffic flow; heavy, slow-moving construction equipment could be a particular concern in this situation. Similarly, in rapidly expanding urban/suburban areas, where traffic congestion is a prime concern, additional traffic including heavy equipment and/or truck traffic would be a concern for traffic flow.

To address potential adverse effects on traffic flow and safety, PG&E is committed to a range of industry-standard BMPs to reduce effects of construction trip generation on traffic flow and safety (see Chapter 2). These include

- providing through access for emergency vehicles or notifying emergency service providers in advance of any needed lane or route closures;
- maintaining access for private roads;
- providing adequate off-road parking and staging for vehicles, equipment, and materials throughout the work period;
- restricting all construction parking and staging to right-of-way (ROW) and pre-approved staging areas, and keeping construction equipment in designated staging areas when not in use;
- posting construction warning signs in advance of the construction area and at intersections that provide access to the construction area;
- restricting all non-emergency 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; and
- avoiding key commute routes and “rate-limiting” intersections during peak traffic periods, and working with local jurisdictions to identify the routes and intersections that should be avoided, and appropriate alternate travel routes or times.

PG&E will also be required to operate vehicles in accordance with the terms of Caltrans encroachment permits where activities occur in Caltrans ROW. Finally, the larger-scale activities that pose the greatest concern for traffic flow are expected to occur infrequently (see HCP Table 3-1 in Appendix B of this EIS/EIR).

In summary, because traffic increases associated with most O&M, minor construction, and preserve enhancement activities would be comparatively small and of short duration, and in view of the traffic control commitments in place, activities enabled by the proposed action are not expected to result in a substantial increase in traffic or significant traffic safety hazards. Traffic effects of infrequent larger-scale activities would also be offset by PG&E's traffic control measures. **This impact is thus considered less than significant.**

Mitigation Measure—No mitigation is required.

Impact TR2—Potential long-term traffic increases and traffic safety hazards due to O&M activities and staffing at new facilities. Most new or expanded facilities would not require full-time staffing. Those that would need attendance (primarily new substations) would require only a few (less than 5–10) new full-time employees. Patrol and maintenance of new and expanded facilities would be added onto existing trips—the extent of facilities involved would be slightly greater, but the overall number of trips is not expected to increase substantially over the permit term, and new patrol and maintenance work would be covered by the same traffic commitments described in Chapter 2 and Impact TR1 above. Ongoing O&M activities at new or expanded facilities would result in very minor increases in traffic, and would continue to be covered by the same commitments to minimize impacts on traffic flow already in place (see Chapter 2 and above). Consequently, **this impact is expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact TR3—Potential long-term traffic increases and traffic safety hazards due to activities at preserves. Management and very limited recreational use of new preserves established as habitat compensation under the proposed action are unlikely generate significant increases in traffic or result in additional traffic safety hazards.

The preserves would not require full-time staffing and would therefore not result in long-term daily traffic increases related to staff commute trips. However, preserve management activities (including site inspections and surveys, maintenance activities and minor repairs, and vegetation management) would periodically generate a small number of trips for example, biological surveys would take place once per year and some types of maintenance could occur seasonally). However, trip generation would be small enough that it is not expected to alter LOS, to create safety hazards, or to require reconfiguration of existing public roadways.

Some preserves may allow passive recreational activities such as birdwatching (see additional discussion in Chapter 15), which would generate new vehicle trips to and from preserves as recreationists access preserves. However, non-management activities at the preserves would be very rare and strictly regulated; recreational activities on preserves are expected to be strictly limited in the interest of maintaining relatively undisturbed conditions and preserving quality wildlife habitat. Due to the limited nature of these activities, recreation-related traffic is not expected to substantially increase or generate traffic in excess of established LOS standards. As described in Chapter 2 *(Proposed Action and Alternatives)*, PG&E has committed to consulting with local jurisdictions and appropriate transportation agencies and/or authorities to ensure that management and limited recreational use of preserves does not adversely affect traffic flow or safety. As part of this dialogue, it is anticipated that recreational activities with the potential to degrade LOS would be prohibited until or unless local roadway infrastructure is upgraded or the LOS standard is adjusted to reflect new uses. Consequently, management and use of preserves is not expected to result in long-term degradation of LOS on area roadways, or to create long-term safety hazards. **This impact is thus considered less than significant.**

Mitigation Measure—No mitigation is required.

Impact TR4—Potential to result in inadequate parking capacity. O&M and—particularly—minor construction activities enabled under the proposed action would create a temporary need for parking to accommodate construction crews, as well as staging areas for construction equipment and supplies. As described in Chapter 2, PG&E has committed to ensure that adequate construction parking and staging areas are identified outside existing public roadways, so construction is not expected to have an adverse effect on traffic flow or on regional parking demand; work crews will be accommodated and staging sites will be selected to avoid displacing a substantial amount of parking in existing designated parking areas.

The parking and staging commitments identified in Chapter 2 of this EIS/EIR also include a long-term commitment to ensure that adequate parking is provided for new facilities, and for management and recreational uses at preserves. Note that recreational use is expected to require little additional parking beyond what is needed to support preserve management, because recreational use at the preserves would be very limited and strictly regulated.

Thus, activities enabled by the proposed action are not expected to result in excess parking demand or inadequate parking capacity. **This impact is considered less than significant.**

Mitigation Measure—No mitigation is required.

Impact TR5—Potential conflicts with transportation plans, programs, and planned projects. Establishment of preserves and acquisition of new ROWs could result in conflicts with future transportation projects. Establishment of preserves and acquisition of new ROWs in or adjacent to areas where land may

be required for transportation ROWs could impair construction of these projects; transportation projects could also limit the suitability of nearby areas as resource preserves due to the incompatibility of many types of transportation corridors with habitat conservation and enhancement.

As discussed in Chapter 2, PG&E intends to consult with local, state, and federal transportation agencies to identify the location of planned transportation projects within the action area. Lands within or adjacent to proposed transportation ROWs would be acquired for compensation use only when adequate AMMs could be provided to ensure that the transportation project could be constructed without adversely affecting achievement of the proposed HCP's conservation goals. Potential conflicts with future transportation projects would thus be minimized through the consultative planning process between PG&E and the appropriate transportation agencies. **This impact is considered less than significant.**

Mitigation Measure—No mitigation is required

Alternative 1—HCP with Reduced Take

Alternative 1 would enable the same program of O&M and minor construction activities described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Alternative 1 would enact the same additional environmental commitments for other resource areas identified in this EIS/EIR for the proposed action, and compensation ratios for loss or disturbance of habitat would be the same as under the proposed action.

The key difference between the proposed action and Alternative 1 is an additional level of stringency associated with the implementation of AMMs at a lower level of effect than under the proposed action, with the intent of reducing take. As discussed in Chapter 2 (*Proposed Action and Alternatives*), the AMMs implemented under Alternative 1 would be the same as those described above for the proposed HCP. However, under Alternative 1, AMMs for certain activities would be implemented at a lower level of disturbance. Although the level of take would be reduced because of the increased stringency associated with implementation of the AMMs, compensation is expected to be similar under both alternatives because compensation acreages would be calculated based on acreage affected, not on level of take. Consequently, under Alternative 1, impacts on traffic would be similar to those described for the proposed action.

Alternative 2—HCP with Enhanced Compensation

Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Alternative 2 would enact the same additional environmental commitments for other resource

areas identified in this EIS/EIR for the proposed action. Differences between Alternative 2 and the proposed action center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action).

Under Alternative 2, assuming the same level of habitat disturbance, overall compensation needs would likely be greater than under the proposed action. Thus, as identified in Chapter 3 (*Land Use and Planning*), Alternative 3 would probably result in the establishment of a greater number of preserves, or preserves that encompass larger geographic areas, compared to the proposed action.

Criteria for identifying suitable compensation lands would remain the same under Alternative 2, and selection of appropriate compensation lands would be subject to the same USFWS and DFG approval process. Thus, as the demand for compensation lands increases, availability of lands that support the appropriate habitat types would decrease, both within and outside of PG&E ROWs. Where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options would still be available (e.g., purchase of mitigation credits, donations, and enhancement), and might be used to a greater extent; reliance on compensation options other than acquisition by purchase or easement might offset some of the difference in compensation ratios. However, Alternative 2's enhanced compensation requirements would probably still result in greater overall compensation requirements and hence a greater number and/or larger acreage of preserves. Thus, impacts on traffic under Alternative 2 would be similar to but somewhat greater than those described for the proposed action.

Alternative 3—HCP with Reduced Number of Covered Species

Alternative 3 would enable the same program of O&M and minor construction activities described for the proposed action, and would enact the same additional environmental commitments for other resource areas identified in this EIS/EIR. The key difference between Alternative 3 and the proposed action relates to the number of species covered under Alternative 3 (reduced by comparison with the proposed action, as described in Chapter 2). Reducing the number of covered species could result in the establishment of a smaller number of preserves or preserves that encompass smaller geographic areas by comparison with the proposed action. At the same time, separate, case-by-case consultation for level of effect and compensation needs could be necessary for noncovered species, depending on the species potentially affected, and their status at the time of the proposed activity.

It is difficult to determine the precise effect that this approach would have on traffic since locations and other details about specific compensation lands are unknown at this time. However, because some compensation requirements might

be assessed on a case-by-case basis, Alternative 3 would have the potential to result in a greater number of smaller preserve areas, potentially requiring slightly increased management-related trips while distributing traffic effects related to use and management of preserves over a greater area. In summary, impacts on traffic would likely be similar under Alternative 3 to those described for the proposed action, but could be somewhat greater overall.

Alternative 4—No Action

Under the No Action Alternative, PG&E would continue its existing program of O&M activities unchanged. No HCP would be implemented, and no other new or additional environmental commitments would be put in place.

Individual actions affecting suitable habitat for listed special-status species would be assessed through case-by-case consultation with USFWS and DFG for level of effect and compensation needs. Because the compensation requirements for habitat disturbance would be assessed on a case-by-case basis, smaller parcels of land would likely be identified for enhancement at any given time; case-by-case assessment could also result in the establishment of a greater number of preserves. This is similar to but more extreme than the case described above for Alternative 3, where most compensation would likely occur under the auspices of an HCP process.

The availability of desirable compensation lands is expected to decrease over time, as lands are used for compensation or other purposes. However, as described for the action alternatives, where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options would likely still be available (e.g., purchase of mitigation credits, donations, and enhancement), and might be used to a greater extent.

It is difficult to determine the precise effect that this approach would have on traffic since locations and other details about specific compensation lands are unknown at this time. However, since the resulting compensation requirements would be assessed on a case-by-case basis, Alternative 4 could result in a greater number of smaller contiguous preserve areas, requiring more management-related trips but distributing traffic effects over a wider area. Thus, impacts on traffic would likely be similar under the No Action Alternative to those described for the proposed action, but could be somewhat greater overall.

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Chapter 12

Noise and Vibration

Chapter 12
Noise and Vibration

This chapter identifies and evaluates noise concerns in the action area, and analyzes the proposed action's potential impacts related to noise and groundborne vibration. Key sources of information used in the preparation of this chapter include the following.

- The *Guidelines for the Preparation and Content of the Noise Element of the General Plan* prepared by the California Governor's Office of Planning and Research (2003).
- Standard noise analysis and reduction methodologies developed by the U.S. Forest Service (USDA Forest Service 1980), the Federal Transit Administration (1995), Nelson (1987), Hoover and Keith (1996), and others.

Background

Sound, Acoustics, and Noise

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 defined as unwanted, intrusive, or unpleasant sound.

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. 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 12-1.

Table 12-1. Typical A-Weighted Sound Levels

Sound Source	Sound Level (dBA)	Typical Response
Carrier deck jet operation	140	Painfully loud
Limit of amplified speech	130	
Jet takeoff (200 feet) Auto horn (3 feet)	120	Threshold of feeling and pain
Riveting machine Jet takeoff (2,000 feet)	110	Very annoying
Shout (0.5 foot) New York subway station	100	
Heavy truck (50 feet) Pneumatic drill (50 feet)	90	Hearing damage (8-hour exposure)
Passenger train (100 feet) Helicopter (in flight, 500 feet) Freight train (50 feet)	80	Annoying
Freeway traffic (50 feet)	70	Intrusive
Air conditioning unit (20 feet) Light auto traffic (50 feet)	60	
Normal speech (15 feet)	50	Quiet
Living room Bedroom Library	40	
Soft whisper (15 feet)	30	Very quiet
Broadcasting studio	20	
	10	Just audible
	0	Threshold of hearing

Noise levels that vary with time are often quantified by two descriptors: the equivalent sound level (L_{eq}) and the "percentile-exceeded" sound level. L_{eq} represents the *equivalent steady-state sound level*, or the steady-state level of sound that would contain the same acoustic energy as the actual time-varying sound level measured during a given time period. The *percentile-exceeded noise level* is the noise level that is exceeded for the indicated percentage of the specified period. For example, L_{10} is the relatively loud noise level exceeded only 10% of the time during the measurement period, while L_{90} is the relatively quiet noise level exceeded 90% of the time. An additional descriptor for time varying sound levels is the *day-night level (L_{dn})*, defined as the energy average of the A-weighted sound levels occurring during a 24-hour period, with a 10-dBA "penalty" added to sound levels occurring between 10:00 p.m. and 7:00 a.m.

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.

People generally perceive a 10-dB increase in a noise source as a doubling of loudness. Most people cannot detect differences of 1–2 dB between noise levels of a similar nature (for example, a 1-dB increase in traffic noise compared to existing traffic noise). However, under ideal listening conditions, some people can detect differences of 2 or 3 dB, and most people under normal listening conditions would probably perceive a 5-dB change in sounds of a similar nature. When a new, intruding sound is of a different nature than the background sound (for example, a car alarm compared to quiet residential sounds), most people can detect changes as small as 1 dBA.

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

In addition to generating noise, heavy construction equipment can generate groundborne vibration. Pile driving and similar activities, because they result in blows or impacts on the ground surface, produce vibrational waves that radiate along the surface of the earth and downward into the earth, potentially resulting in effects that range from annoyance to structural damage. As vibrations travel outward 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 will result in different vibration levels characterized by different frequencies and intensities. In all cases, vibration amplitudes will decrease with increasing 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.

Human response to vibration is difficult to quantify. Vibration can be felt or heard well below the levels that produce any damage to structures. The duration

of the event has an effect on human response, as does frequency. Generally, as the duration and vibration frequency increase, the potential for adverse human response increases.

Table 12-2 summarizes the average human response to vibration that may be anticipated when a person is at rest in quiet surroundings. If the person is engaged in any type of physical activity, vibration tolerance increases considerably.

It is important to understand that Table 12-2 describes the responses of average individuals. Individual responses can fall anywhere within the full range of the human response spectrum. At one extreme are those people who receive some tangible benefit from the pile driving operation (for example) and probably would not be disturbed by any level of vibration, as long as it does not damage their property. At the opposite extreme are people who would be disturbed by even barely detectable vibration. Individuals at either of these two extremes are not represented in the summary of average human response presented in Table 12-2 or in the impact analyses presented later in this chapter; both focus on average or typical responses.

Table 12-2. Human Response to Ground Vibration

Response	Ground Vibration (ppv, inches/second)
Barely to distinctly perceptible	0.02–0.10
Distinctly perceptible to strongly perceptible	0.10–0.50
Strongly perceptible to mildly unpleasant	0.50–1.00
Mildly unpleasant to distinctly unpleasant	1.00–2.00
Distinctly unpleasant to intolerable	2.00–10.00

Source: Bender 1996.

Affected Environment

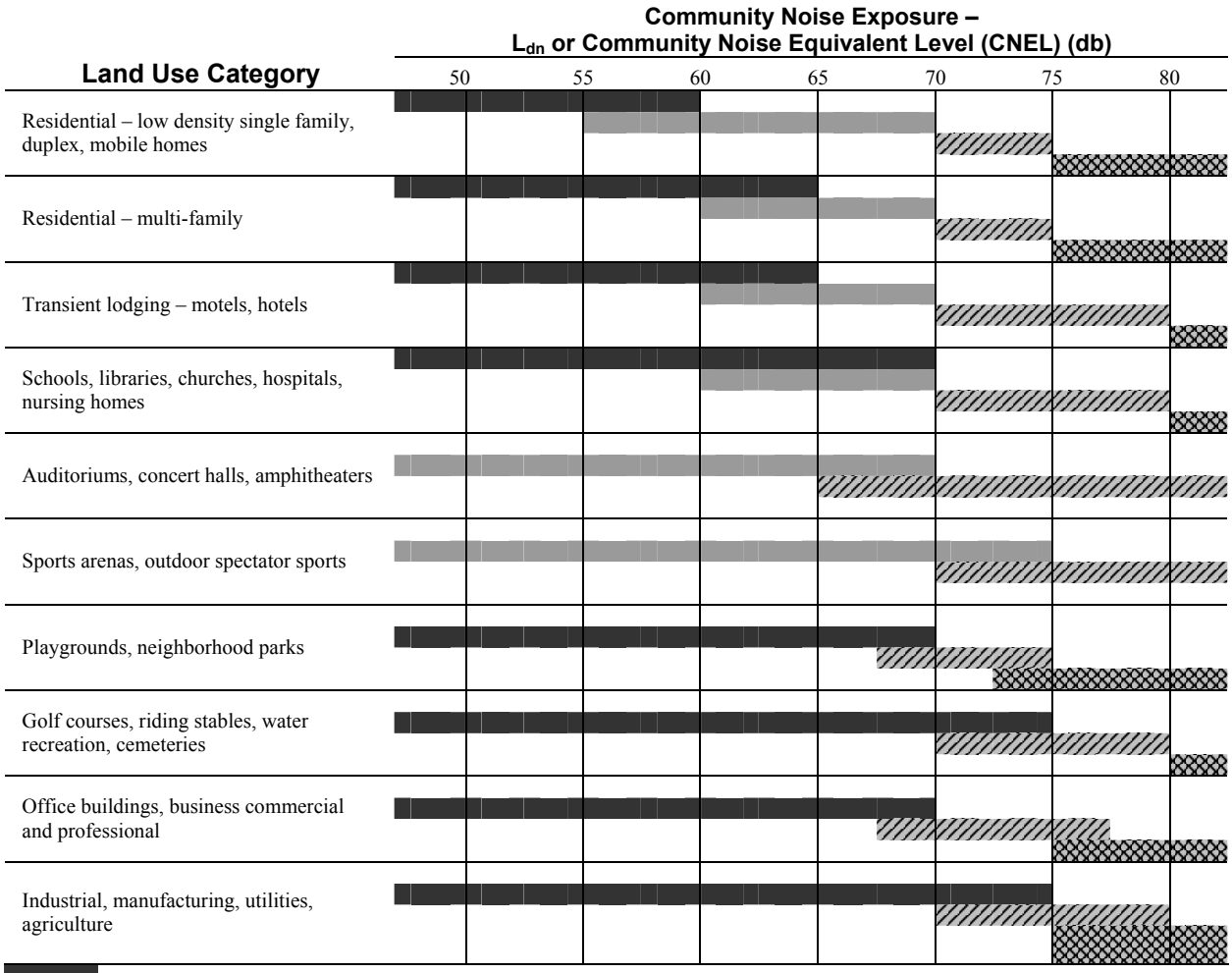
Regulatory Framework

Noise Regulations

Noise is regulated at the state and local level.

The State of California requires each local government entity to include a noise element as part of its general plan. To support appropriate land use planning at the local level, Title 4 of the California Administrative Code presents guidelines that identify the noise levels that are compatible with various types of land uses. The state land use compatibility guidelines are shown in Table 12-3.

Table 12-3. State Land Use Compatibility Standards for Community Noise Environment



Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
Normally Unacceptable	New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
Clearly Unacceptable	New construction or development generally should not be undertaken.

Source: California Governor's Office of Planning and Research 2003.

Consistent with the Title 4 guidance summarized in Table 12-3, each city and county in California develops planning guidelines that are implemented through its general plan. More specifically, the noise element of the general plan contains goals and policies to support land use planning that will allow the jurisdiction to ensure that the Title 4 standards are met for various land uses.

Many local jurisdictions also have noise ordinances and/or municipal code statutes that are intended to protect citizens from exposure to noise levels that could result in disturbance or adverse effects. Such ordinances and codes permit noise limitations to be enforced through legal mechanisms as well as land use planning. City and county noise ordinances and municipal codes are used primarily to limit noise from stationary sources. In many cases, they also regulate noise generated by construction. To assist local jurisdictions in developing noise ordinances, the State of California has developed a Model Noise Ordinance that serves as a template.

The requirement that PG&E comply with local noise ordinances is preempted by the exclusive jurisdiction of the CPUC. However, CPUC requires that PG&E consult with local agencies and jurisdictions regarding land use matters, and make every feasible effort to meet local noise standards. If for some reason, PG&E cannot meet local standards, its project managers and construction leads are responsible for implementing a variety of BMPs, depending on the nature of the activity (see *PG&E's Existing Environmental Programs and Practices* in Chapter 2).

Groundborne Vibration Regulations

There are no widely adopted standards for acceptable levels of ground vibration generated by construction activities. However, the U.S. Department of Transportation has identified a "vibration damage threshold" of 0.20 inch per second (0.51 centimeter per second) for fragile buildings and 0.12 inch per second (0.31 centimeter per second) for extremely fragile historic buildings (Federal Transit Administration 1995). In addition, the Transportation Research Board suggests maximum allowable peak particle velocities from pile driving for various structure types and conditions (Transportation Research Board 1997), as summarized in Table 12-4 on the following page.

Table 12-4. Transportation Research Board Building Maximum Structure Vibration Criteria

Structure and Condition	Limiting Peak Particle Velocity	
	Inches per Second	Centimeters per Second
Historic buildings; certain other old buildings	0.5	~1.3
Residential structures	0.5	~1.3
New residential structures	1.0	~2.5
Industrial buildings	2.0	~5.1
Bridges	2.0	~5.1

Source: Transportation Research Board 1997.

Some jurisdictions elect to adopt vibration standards, which may be based on the guidelines summarized in Table 12-4.

As identified above for noise, the requirement that PG&E comply with local vibration ordinances is preempted by the exclusive jurisdiction of the CPUC, although CPUC requires compliance to the extent feasible. To that end, PG&E's standard BMPs include measures that address some common sources of vibration.

Existing Conditions

Ambient Noise Environment

The action area is located within portions of San Joaquin, Stanislaus, Merced, Mariposa, Madera, Fresno, Kings, Tulare, and Kern Counties, and includes a diversity of land uses ranging from urban to agricultural and rural, as discussed in Chapter 3 (*Land Use and Planning*). Based on experience with similar settings, it is assumed that existing noise levels in the action area's rural and agricultural regions are in the range of 40–50 dB L_{dn}. In developed areas, ambient noise levels could be as high as 65 dB L_{dn}. Table 12-5 summarizes typical ambient noise levels based on population density.

Table 12-5. Population Density and Ambient Noise Levels

Population Density	dBA L_{dn}
Rural	40–50
Suburban	
Quiet suburban residential or small town	45–50
Normal suburban residential	50–55

Population Density	dBA L_{dn}
Urban	
Normal urban residential	60
Noisy urban residential	65
Very noisy urban residential	70
Downtown, major metropolis	75–80
Under flight path at major airport, 0.5–1 mile from runway	78–85
Adjoining freeway or near a major airport	80–90

Sources: Cowan 1984, Hoover and Keith 1996.

Noise-Sensitive Land Uses

Noise-sensitive land uses are generally defined as locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Noise-sensitive land uses typically include residences, hospitals, schools, guest lodging, libraries, and certain types of recreational uses. Noise-sensitive receptors are found throughout the action area. Receptors such as residential areas, schools, and hospitals are typically most concentrated in developed areas, but residences and other sensitive uses also occur in sparser distribution in rural/agricultural areas.

Environmental Consequences and Mitigation Strategies

Methodology for Impact Analysis

Analysis focused on generation of noise during O&M and minor construction activities, and assumed a continuing commitment on PG&E's part to satisfy the CPUC requirement to conform to local standards where feasible, while still meeting the company's legal responsibility to provide safe, reliable electricity and natural gas service. Because O&M and minor construction activities—as well as CPUC requirements for noise control—would be the same under the proposed action and all alternatives, analysis assumed that noise generation would be similar for all alternatives. Actual noise generation would vary depending on site-specific constraints, so potential noise impacts are of necessity discussed qualitatively, at a program level of detail.

The proposed action and alternatives would each result in a slightly different balance of impact avoidance versus compensation for unavoidable impacts, so there could be some in-practice difference in long-term noise generation related to increases/decreases in the extent of compensation lands, and the noise-generating activities (notably, earthwork) needed to manage them. However, it is impossible to predict the extent and type of management- or restoration-related

earthwork needed under each alternative, because the location and condition of compensation lands cannot be identified at this time. Consequently, although differences in noise generation among the proposed action and alternatives are expected to be minor, detailed analysis of potential differences would be speculative at this time, and this topic is not addressed further in this EIS/EIR.

Significance Criteria

For the purposes of this analysis, an impact was considered to be significant and to require mitigation if it would result in any of the following.

- Exposure of persons to or generation of noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies.
- Exposure persons to or generation of excessive groundborne vibration or groundborne noise levels.
- Substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
- Substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

Impacts and Mitigation Measures—All Alternatives

Impact N1—Potential for temporary or permanent exposure of noise-sensitive land uses to elevated noise levels. As discussed above, PG&E's ongoing O&M and minor construction activities are expected to be the only substantial source of noise associated with the proposed action, and they would be similar across all alternatives. Noise associated with O&M and minor construction would be generated primarily by the following sources.

- Vehicles (e.g., trucks, helicopters and fixed-wing light aircraft, and ATVs) used for inspection patrols and employee access trips.
- Heavy machinery (e.g., cranes, excavators, and scrapers) used for maintenance and construction of PG&E facilities and infrastructure.
- Smaller equipment (e.g., chainsaws and generators) used for a variety of O&M activities.

Table 12-6 presents typical noise levels generated by equipment that may be used in O&M and/or minor construction activities.

Table 12-6. Typical Noise Generation for Commonly Used Construction Equipment

Equipment	Typical Noise Level (dBA) 50 Feet from Source	Equipment	Typical Noise Level (dBA) 50 Feet from Source
Air Compressor	81	Jackhammer	88
Backhoe	80	Loader	85
Bulldozer	85	Paver	89
Chainsaw	86	Pile driver (impact)	101
Compactor	82	Pile driver (sonic)	96
Concrete mixer	85	Pneumatic tool	85
Concrete pump	82	Pump	76
Concrete vibrator	76	Rock drill	98
Crane, derrick	88	Roller, sheep's foot	74
Crane, mobile	83	Saw	76
Excavator/ shovel	82	Scraper	89
Generator	81	Truck	88
Grader	85	Wood chipper	89
Helicopter (single rotor)	79[1]		

[1] At 500 feet under level flight conditions.

Source: Cowan 1984, Federal Transit Administration 1995, Nelson 1987, USDA Forest Service 1980.

The noise impacts associated with a specific activity would depend on the type of activity, the types and number of pieces of equipment in use, the noise level generated by the various pieces of equipment, the duration of the activity, the distance between the activity and any noise-sensitive receivers, and possible shielding effects that might result from local topography, vegetation, or buildings. Because the proposed project is a 30-year operating conservation program, information regarding the range of covered activities is known, but site-specific information is not. For individual O&M and minor construction activities that may occur during the 30-year permit term, the specific types and number of vehicles and equipment at a given site, and their duration and frequency of use, are not available. The same is true for activity-specific noise levels. Noise levels for these activities are expected to be similar, however, to levels for existing O&M and minor construction currently implemented by

PG&E. In most instances, existing O&M activities are temporary and sporadic; although some, such as patrols, are regularly scheduled, others, such as emergency maintenance, occur on an "as-needed" basis. With the exception of larger maintenance activities and minor construction projects, O&M and construction noise generation would thus be intermittent and very short-term in nature. In addition, PG&E would continue to employ its current slate of BMPs under all alternatives. As discussed in Chapter 2, typical measures include

- conducting work during daytime hours;
- using standard equipment with noise control devices (e.g., mufflers) that meet manufacturers' specifications;
- using "quiet" equipment (i.e., equipment designed with noise control elements);
- installing portable barriers to shield compressors and other small stationary equipment where necessary;
- installing sound barriers for pile-driving activity, where practicable, by using an acoustic curtain or blanket around the point of impact;
- directing equipment exhaust stacks and vents away from buildings, when feasible;
- routing truck traffic away from noise-sensitive areas, where feasible;
- following a common-sense approach to vehicle use; and encouraging workers to shut off vehicle engines whenever possible;
- limiting pick-up trucks and other small equipment to an idling time of five minutes;
- identifying "sensitive receptors" who might be disturbed by construction noise and notifying them in advance of upcoming work; and
- responding immediately to complaints raised by adjacent residents.

In light of the CPUC requirement to conform to local standards where feasible, and with PG&E's existing noise BMPs in place, most activities enabled under the proposed action are not expected to substantially expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards; result in a substantial permanent increase in ambient noise levels in the work vicinity; or result in a substantial temporary or periodic increase in ambient noise levels in the work vicinity. Thus, **in the majority of cases, impacts of O&M and minor construction noise are expected to be less than significant.**

Some O&M and minor construction activities (in particular, those that require multiple pieces of heavy equipment; and those that occur in close proximity to sensitive residential, school, hospital, or recreational land uses) would have the potential to generate noise in excess of local general plan or noise ordinance standards. For example, a bulldozer (85 dB at 50 feet) and grader (85 dB at 50 feet) operating concurrently would result in a combined noise level of 88 dB at

50 feet, exceeding the noise standards of many jurisdictions. This is a potentially significant impact. The significance of that impact would be reduced through implementation of PG&E's standard business practices and BMPs, which will be incorporated in all O&M and minor construction activities enabled under the proposed action. Typical practices include consulting and coordinating with local jurisdictions to minimize and lessen noise effects; implementing a range of noise reduction BMPs, as appropriate; and responding quickly to public complaints or concerns about noise effects. The business practices and BMPs PG&E brings forward as part of the proposed action reflect PG&E's obligations under CPUC regulations. PG&E's obligations under the CPUC, including its commitment to implement regular business practices and the BMPs described in Chapter 2, would substantially lessen the potential for significant intermittent occurrences of higher levels of construction noise. **Related noise impacts are expected to be less than significant as a result.**

Once constructed, new minor facilities would generate noise related to the operation of power transformers, switchyards, and other equipment. Additional fairly minor noise would be generated by vehicles used for inspection and maintenance visits to new facilities. In most instances, the types of facilities that would be constructed under the proposed action operate well within local standards. Likewise, in designing, constructing, and operating new minor facilities, PG&E carries forward its obligations under the CPUC, including its regular business practices and BMPs. Typical practices include consulting and coordinating with local jurisdictions to minimize and lessen noise effects; implementing a range of noise reduction BMPs, as appropriate; and responding quickly to public complaints or concerns about noise effects. **Noise impacts related to operation of new facilities are expected to be less than significant as a result.**

Mitigation Measure—No mitigation is required.

Impact N2—Potential for temporary or permanent exposure of noise-sensitive land uses to elevated vibration levels. O&M activities may generate minor groundborne vibration. Vibration from typical construction and earthmoving activity is generally below the threshold of perception at distances of more than about 50 feet; adverse effects related to vibration are most often associated with "high impact" activities such as pile driving. Most O&M activities are thus unlikely to expose persons to or generate excessive groundborne vibration or groundborne noise levels even at nearby sensitive land uses, so **in the majority of cases, impacts are expected to be less than significant.**

There may be some instances where "high impact" activities would occur in close proximity to sensitive land uses, potentially resulting in temporarily elevated vibration levels. In rare cases, vibration levels could temporarily exceed applicable standards, representing a potentially significant impact. However, the significance of any impact would be reduced through implementation of PG&E's standard business practices and BMPs, which will be incorporated in all O&M and minor construction activities enabled under the proposed action, as discussed above. As described in Chapter 2, typical practices include consulting and

coordinating with local jurisdictions to minimize and lessen effects on nearby land uses, including effects of construction-generated vibration; implementing vibration reduction BMPs, as appropriate; and responding quickly to public complaints or concerns about vibration. The business practices and BMPs PG&E brings forward as part of the proposed action reflect PG&E's obligations under CPUC regulations. PG&E's obligations under the CPUC, including its commitment to implement regular business practices and the BMPs described in Chapter 2, would substantially lessen the potential for significant intermittent occurrences of higher levels of construction vibration. **Related vibration impacts are expected to be less than significant as a result.**

Vibration levels associated with operation of new facilities would typically be very low, and **no significant long-term impact is anticipated.**

Mitigation Measure— No mitigation is required.

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Chapter 13
Air Quality

Chapter 13
Air Quality

This chapter analyzes the proposed action's potential impacts on air quality. Key sources of data used in the preparation of this chapter include the following.

- The California Air Resources Board's (ARB's) 2001–2004 almanacs of emissions and air quality conditions within the State of California (California Air Resources Board 2001, 2002, 2003a, and 2004).
- The ARB website for air quality monitoring data (California Air Resources Board 2003b).
- The San Joaquin Valley Unified Air Pollution Control District's (SJVUAPCD's) guidelines for the assessment of air quality impacts within the district (San Joaquin Valley Unified Air Pollution Control District 2002).
- The U.S. Environmental Protection Agency (EPA) website for air quality monitoring data (U.S. Environmental Protection Agency 2004).

Affected Environment

Regulatory Framework

The action area is located within California's San Joaquin Valley Air Basin (SJVAB) and Mountain Counties Air Basin (MCAB). Air quality conditions within the SJVAB portion of the action area are regulated by SJVUAPCD, while air quality conditions within the MCAB portion of the action area are regulated by the Mariposa County Air Pollution Control District (MCAPCD). The following sections provide additional information on the federal, state, and local regulations and processes governing air quality.

Federal Regulations

Clean Air Act and Amendments

The federal Clean Air Act, originally passed in 1970 and amended twice thereafter, established the framework for modern air pollution control. This act directed the EPA to establish ambient air standards for six "criteria pollutants":

ozone, carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), particulate matter, and sulfur dioxide (SO_2). The standards are divided into primary and secondary standards; the former are set to protect human health within an adequate margin of safety and the latter to protect environmental values, such as plant and animal life. Table 13-1 shows EPA's National Ambient Air Quality Standards (NAAQS) for the six criteria pollutants.

The primary legislation that governs federal air quality regulations is presented in the Clean Air Act Amendments of 1990. These amendments assign primary responsibility for clean air to the EPA. Pursuant to this mandate, the EPA develops rules and regulations to preserve and improve air quality, and it delegates specific responsibilities to state and local agencies.

The federal Clean Air Act also requires states to submit a state implementation plan (SIP) for areas in nonattainment of federal air quality standards. The SIP, which is reviewed and approved by EPA, must demonstrate how the federal standards will be achieved. Failing to submit a plan or secure approval could lead to denial of federal funding and permits. In cases where the SIP is submitted by the state but fails to demonstrate achievement of the standards, EPA is directed to prepare a federal implementation plan.

Federal Conformity Requirements

Federal projects are subject to either the Transportation Conformity Rule (40 CFR 51[T]), which applies to federal highway or transit projects, or the General Conformity Rule (40 CFR 51[W]), which applies to all other federal projects. Because the proposed action is not a federal highway or transit project, it is subject to the General Conformity Rule.

The purpose of the General Conformity Rule is to ensure that federal projects conform to applicable SIPs so that they do not interfere with strategies employed to attain the NAAQS. The rule applies to federal projects in areas designated as nonattainment areas for any of the six criteria pollutants, and in some areas designated as maintenance areas. The rule applies to all federal projects except the following.

- Programs specifically included in a transportation plan or program that is found to conform under the federal Transportation Conformity Rule,
- Projects with associated emissions below specified *de minimis* threshold levels, and
- Certain other projects that are exempt or presumed to conform.

If a proposed project would result in total direct and indirect emissions in excess of the *de minimis* emission rates, it must be demonstrated that the emissions conform to the applicable SIP for each affected pollutant. If emissions would not exceed the *de minimis* levels, and are not regionally significant, then the project is presumed to conform, and no further analysis or determination is required.

Table 13-1. Ambient Air Quality Standards Applicable in California

Pollutant	Symbol	Average Time	Standard (parts per million)		Standard (micrograms per cubic meter)		Violation Criteria	
			California	National	California	National	California	National
Ozone	O_3	1 hour	0.09	0.12	180	235	If exceeded	If exceeded on more than 1 day per year
		8 hours	NA	0.08	NA	157	NA	If fourth highest 8-hour concentration in a year, averaged over 3 years, is exceeded at each monitor within an area
Carbon monoxide	CO	8 hours	9	9	10,000	10,000	If exceeded	If exceeded on more than 1 day per year
		1 hour	20	35	23,000	40,000	If exceeded	If exceeded on more than 1 day per year
(Lake Tahoe only)		8 hours	6	NA	7,000	NA	If equaled or exceeded	NA
Nitrogen dioxide	NO_2	Annual average	NA	0.053	NA	100	NA	If exceeded on more than 1 day per year
		1 hour	0.25	NA	470	NA	If exceeded	NA
Sulfur dioxide	SO_2	Annual average	NA	0.03	NA	80	NA	If exceeded
		24 hours	0.04	0.14	105	365	If exceeded	If exceeded on more than 1 day per year
		1 hour	0.25	NA	655	NA	If exceeded	NA
Hydrogen sulfide	H_2S	1 hour	0.03	NA	42	NA	If equaled or exceeded	NA
Vinyl chloride	C_2H_3Cl	24 hours	0.01	NA	26	NA	If equaled or exceeded	NA
Inhalable particulate matter	PM10	Annual geometric mean	NA	NA	20	NA	If exceeded	NA
		Annual arithmetic mean	NA	NA	NA	50	NA	If exceeded at each monitor within area
		24 hours	NA	NA	50	150	If exceeded	If exceeded on more than 1 day per year
	PM2.5	Annual geometric mean	NA	NA	NA	NA	If exceeded	NA
		Annual arithmetic mean	NA	NA	12	15	NA	If 3-year average from single or multiple community-oriented monitors is exceeded
		24 hours	NA	NA	NA	65	NA	If 3-year average of 98th percentile at each population-oriented monitor within an area is exceeded
Sulfate particles	SO_4	24 hours	NA	NA	25	NA	If equaled or exceeded	NA
Lead particles	Pb	Calendar quarter	NA	NA	NA	1.5	NA	If exceeded no more than 1 day per year
		30-day average	NA	NA	1.5	NA	If equaled or exceeded	NA

Notes: All standards are based on measurements at 25ºC and 1 atmosphere pressure.
National standards shown are the primary (health effects) standards.
NA = not applicable.

Source: California Air Resources Board 2003c.

State Regulations

Responsibility for achieving California's standards, which are more stringent than federal standards, is placed on the ARB and local air pollution control districts. Standards are achieved through district-level air quality management plans that are incorporated into the SIP. In California, the EPA has delegated authority to prepare SIPs to ARB, which, in turn, has delegated that authority to individual air districts.

Traditionally, ARB has established state air quality standards (Table 13-1), maintained oversight authority in air quality planning, developed programs for reducing emissions from motor vehicles, developed air emission inventories, collected air quality and meteorological data, and approved SIPs. Air districts have overseen stationary source emissions, approved permits, maintained emissions inventories, maintained air quality monitoring stations, overseen agricultural burn permits, and reviewed air quality–related sections of environmental documents required by CEQA.

The California Clean Air Act of 1988 added substantially to the authority and responsibilities of air districts, designating them as lead air quality planning agencies, requiring that they prepare air quality plans, and granting them the authority to regulate indirect sources of air pollution and to implement transportation control measures (TCM). The California Clean Air Act focuses on attainment of the California Ambient Air Quality Standards (CAAQS). It emphasizes the control of "indirect and area-wide sources" of air pollutant emissions. It does not specifically define *indirect and area-wide sources*; however, Section 110 of the federal Clean Air Act provides the following definition:

> a facility, building, structure, installation, real property, road, or highway which attracts, or may attract, mobile sources of pollution. Such term includes parking lots, parking garages, and other facilities subject to any measure for management of parking supply….

The California Clean Air Act requires designation of "attainment" and "nonattainment" areas with respect to CAAQS. It also requires that local and regional air districts adopt and prepare an air quality attainment plan if the district violates state air quality standards for CO, SO_2, NO_2, or ozone.[1] These clean air plans are specifically designed to attain the applicable standards and must be designed to achieve an annual 5% reduction in district-wide emissions of each nonattainment pollutant or its precursors.

[1] Locally prepared attainment plans are not required for areas that violate the state PM10 standards.

Local Regulations

At the local level, air quality is managed through land use and development planning practices. These practices are implemented in the action area through the general plan development process. The SJVUAPCD is responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws within the SJVAB, while the MCAB portions of the action area are regulated by the MCAPCD.

Overview of Criteria Pollutants

The following sections describe the criteria pollutants of greatest concern in the action area: ozone, CO, and inhalable particulate matter.

Ozone

Ozone is a severe eye, nose, and throat irritant and increases susceptibility to respiratory infections. It is an oxidant, and can cause substantial damage to synthetic rubber, textiles, and other materials. Ozone also produces leaf discoloration and cell damage in plants.

Ozone is not emitted directly, but is formed by a photochemical reaction in the atmosphere. Ozone precursors, which include reactive organic gases (ROG) and oxides of nitrogen (NO_x), react in the presence of sunlight to form ozone. Because photochemical reaction rates depend on air temperature and the intensity of ultraviolet light, ozone is primarily a summer air pollution problem. The ozone precursors ROG and NO_x are emitted by mobile sources as well as by stationary combustion equipment. In the action area, specific sources include vehicle traffic on area roads and highways, as well as agricultural equipment.

Carbon Monoxide

CO has little effect on plants and materials, but it can have significant effects on human health. CO is a public health concern because it combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream. Effects on humans range from slight headaches to nausea to death.

Motor vehicles are the primary source of CO emissions in most areas. In the Central Valley region, high CO levels are of greatest concern during the winter, when periods of light winds combine with the formation of ground-level temperature inversions from evening through early morning. These conditions trap pollutants near the ground, reducing the dispersion of vehicle emissions. Moreover, motor vehicles exhibit increased CO emission rates at low air temperatures.

Inhalable Particulate Matter

Particulates can damage human health and retard plant growth. They also reduce visibility, soil buildings and materials, and cause corrosion. Health concerns associated with suspended particulate matter focus on particles small enough to be drawn into the lungs when inhaled: those with a diameter of 10 microns or less (PM10), and those with a diameter of 2.5 microns or less (PM2.5).

Particulate emissions are generated by a wide variety of sources in the action area, including agricultural and industrial activities. In addition, dust is suspended by vehicular traffic, and secondary aerosols are formed by reactions in the atmosphere.

Toxic Air Contaminants

Toxic air contaminants (TACs) are pollutants that have the potential to result in an increase in mortality or serious illness or that may pose a present or potential hazard to human health. Health effects of TACs range from cancer and other fatal diseases to birth defects, neurological damage, and damage to the body's natural defense system. Although ambient air quality standards exist for criteria pollutants, no ambient standards exist for TACs. Many pollutants are identified as TACs because of their potential to increase the risk of developing cancer or because of their acute or chronic health risks. For TACs that are known or suspected carcinogens, ARB has consistently found that there are no levels or thresholds below which exposure is risk-free. However, individual TACs vary greatly in the risk they present. At a given level of exposure, one TAC may pose a hazard that is many times greater than another. For certain TACs, a *unit risk factor* can be developed to evaluate cancer risk. For acute and chronic health risks, a similar factor called a *hazard index* is used to evaluate risk. Of particular concern in the action area, ARB recently identified diesel exhaust particulate matter as a TAC.

In the early 1980s, ARB established a statewide comprehensive air toxics program to reduce exposure to air toxics. The Toxic Air Contaminant Identification and Control Act (Assembly Bill [AB] 1807) created California's program to reduce exposure to air toxics. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588) supplements the AB 1807 program by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

Existing Conditions

Regional Climate and Meteorological Conditions

Within the SJVAB, the action area's climate is characterized by hot, dry summers and mild winters. Wind speed and direction data indicate that summer winds usually originate at the north end of the SJVAB and flow in a south-southeasterly direction through the SJVAB and Tehachapi Pass into the Mojave Desert Air Basin. During the winter, winds occasionally originate from the south end of the SJVAB and flow in a north-northwesterly direction. The SJVAB has light, variable winds (less than 10 miles per hour [mph]) during the winter months. Those low wind speeds, combined with low inversion layers in the winter, create a climate conducive to high concentrations of CO and PM10. The SJVAB's hot summers contribute to high concentrations of ozone.

Within the MCAB, the general climate of the region varies based upon elevation and proximity to the Sierra Nevada. Due to the complexity of the basin's terrain, temperature, rainfall, and localized wind patterns vary widely.

Areas near the Sierra Nevada are generally subject to storms moving westerly from the Pacific Ocean in the winter, which results in abundant precipitation. During the summer, precipitation is much lighter and more intermittent, and generally moves in from the south. In general, the mountainous areas receive more precipitation, and the lowlands less. Rain shadow effects can produce wide variation in precipitation levels between areas in close proximity to one another.

During the winter, mountain temperatures can drop below freezing for extended periods of time, resulting in thick snowpack. Winter temperatures in the western foothill regions usually fall below freezing at night, and precipitation is often a mixture of rain and light snow. During the summer months, mountain temperatures are often mild, with daytime highs in the 70s to low 80s F, while lower elevations, including the valley floor, may experience highs in the upper 90s F or above.

Within the MCAB, meteorology and topography combine so that local conditions predominate in determining the effect of emissions within the basin. Air quality is affected by regional flow patterns, which direct pollutants downwind of polluting sources. In addition, topographic features, such as surrounding mountain ranges, and localized meteorological conditions, such as shallow vertical mixing and light winds, create areas of high pollutant concentrations by hindering their dispersal. The nearby mountains and hills affect airflow within the region by causing shallow vertical mixing, directing surface airflows, and creating areas of high pollutant concentrations by hindering dispersion. Inversion layers frequently occur in small valley areas and trap pollutants close to the ground. This can lead to increased CO levels (hotspots) along heavily traveled roads and at busy intersections during winter months. During the summer, longer daylight hours, high temperatures, and stagnant air provide conditions suitable for the formation of ozone.

Existing Air Quality Conditions in the Action Area

The existing air quality conditions in the action area can be characterized by monitoring data collected in the region. Table 13-2 presents air quality monitoring data for the last 3 years for which data are available for the San Joaquin Air Basin area (1999–2001). Table 13-3 presents monitoring data for the last 3 years for which data are available for the Mariposa County area (2001–2003).

Table 13-2. Ambient Air Quality Monitoring Data in the San Joaquin Air Basin

Pollutant Standards	2000	2001	2002
Ozone (O_3)			
Maximum 1-hour concentration (ppm)	0.16	0.15	0.15
Number of Days Standard Exceeded[a]			
CAAQS 1-hour (>0.09 ppm)	114	123	127
NAAQS 1-hour (>0.12 ppm)	30	32	31
Carbon Monoxide (CO)			
Maximum 8-hour concentration (ppm)	8.3	6.4	5.3
Number of Days Standard Exceeded[a]			
CAAQS 8-hour (≥9.0 ppm)	0	0	0
NAAQS 8-hour (≥9.0 ppm)	0	0	0
Particulate Matter (PM10)			
Maximum 24-hour concentration ($\mu g/m^3$)	NA	152	194
Maximum Annual geometric mean concentration ($\mu g/m^3$)	45.4	44.4	59.9
Particulate Matter (PM2.5)			
Maximum 24-hour concentration ($\mu g/m^3$)	160.0	154.7	104.3
Average of Quarterly Means for State Data ($\mu g/m^3$)	25.5	37.9	30.5

Notes: CAAQS = California Ambient Air Quality Standards.
NAAQS = National Ambient Air Quality Standards.

[a] The number of days above the standard is not necessarily the number of violations of the standard for the year.

Sources: California Air Resources Board 2002, 2003a, 2004.

Table 13-3. Ambient Air Quality Monitoring Data within Mariposa County

Pollutant Standards	2001	2002	2003
Ozone—Jerseydale Station			
Maximum 1-hour concentration (ppm)	0.116	0.105	0.126
Number of days standard exceeded[a]			
NAAQS 1-hour (>0.12 ppm)	0	0	1
CAAQS 1-hour (>0.09 ppm)	3	12	13
Ozone—Yosemite National Park, Turtleback Dome			
Maximum 1-hour concentration (ppm)	0.114	0.106	0.135
Number of days standard exceeded[a]			
NAAQS 1-hour (>0.12 ppm)	0	0	1
CAAQS 1-hour (>0.09 ppm)	3	15	6
Ozone—Yosemite National Park, Merced River			
Maximum 1-hour concentration (ppm)	NA	0.081	0.080
Number of days standard exceeded[a]			
NAAQS 1-hour (>0.12 ppm)	NA	0	0
CAAQS 1-hour (>0.09 ppm)	NA	0	0
Ozone—Jerseydale Station			
Maximum 8-hour concentration (ppm)	0.097	0.097	0.103
Number of days standard exceeded[a]			
NAAQS 1-hour (>0.08 ppm)	7	19	27
Ozone—Yosemite National Park, Turtleback Dome			
Maximum 8-hour concentration (ppm)	0.098	0.095	0.102
Number of days standard exceeded[a]			
NAAQS 1-hour (>0.08 ppm)	4	24	10
Ozone—Yosemite National Park, Merced River			
Maximum 8-hour concentration (ppm)	NA	0.076	0.070
Number of days standard exceeded[a]			
NAAQS 1-hour (>0.08 ppm)	NA	0	0
Carbon Monoxide (CO)			
Maximum 8-hour concentration (ppm)	NA	NA	1.48
Maximum 1-hour concentration (ppm)	NA	NA	2.5
Number of days standard exceeded[a]			
NAAQS 8-hour ($\geq$9.0 ppm)	0	0	0
CAAQS 8-hour ($\geq$9.0 ppm)	0	0	0
NAAQS 1-hour ($\geq$35 ppm)	0	0	0
CAAQS 1-hour ($\geq$20 ppm)	0	0	0

Pollutant Standards	2001	2002	2003
Particulate Matter (PM10)[b]—Yosemite Village Visitor Center			
National[c] maximum 24-hour concentration ($\mu g/m^3$)	312	76	66
National[c] second-highest 24-hour concentration ($\mu g/m^3$)	154.0	58	50
State[d] maximum 24-hour concentration ($\mu g/m^3$)	277	72	58
State[d] second-highest 24-hour concentration ($\mu g/m^3$)	135	52	44
National[c] annual average concentration ($\mu g/m^3$)	333	28.5	23.1
State[d] annual average concentration ($\mu g/m^3$)	29.6	25.9	21.0
Number of days standard exceeded[a]			
NAAQS 24-hour (>150 $\mu g/m^3$)[e]	1	0	0
CAAQS 24-hour (>50 $\mu g/m^3$)[e]	6	3	1

Notes: CAAQS = California ambient air quality standards.
NAAQS = national ambient air quality standards.
NA = insufficient data available to determine the value.

[a] An exceedance is not necessarily a violation.

[b] Measurements usually are collected every 6 days.

[c] National statistics are based on standard conditions data.

[d] State statistics are based on local conditions data, except in the South Coast Air Basin, for which statistics are based on standard conditions data.

[e] Mathematical estimate of how many days concentrations would have been measured as higher than the level of the standard had each day been monitored.

Sources: California Air Resources Board 2004, U.S. Environmental Protection Agency 2004.

If a pollutant concentration is lower than the state or federal standard, the area is classified as being *in attainment* for that pollutant. If a pollutant violates the standard, the area is considered a *nonattainment* area. If data are insufficient to determine whether a pollutant is violating the standard, the area is designated as *unclassified*.

Table 13-4 on the following page summarizes the attainment status for the action area, as designated by ARB and EPA.

Table 13-4. 2004 Attainment Status for State and Federal Standards for the PG&E San Joaquin Valley Action Area

	SJVUAPCD		MCAPCD	
Pollutant	**State**	**Federal**	**State**	**Federal**
1-hour ozone (O_3)	Severe nonattainment	Extreme nonattainment	Nonattainment	Unclassified/ attainment
8-hour ozone (O_3)	NA	Serious nonattainment	NA	Nonattainment
PM10	Nonattainment	Serious nonattainment	Yosemite National Park is classified as being a nonattainment area, while the rest of the County is classified as unclassified	Unclassified/ attainment
PM2.5	Nonattainment	NA	Unclassified	NA
CO	Attainment	Moderate (≤ 12.7 ppm) maintenance area for the Stockton Urbanized Area (3/29/85, 50 FR 12540); and Moderate (> 12.7 ppm) maintenance area for the Fresno Urbanized Area (11/20/85, 50 FR 47735)	Unclassified	Unclassified/ attainment

Source: California Air Resources Board 2004.

Sensitive Land Uses

Populations considered sensitive to poor air quality (*sensitive receptors*) include residents, school children, hospital patients, and the elderly. For the purposes of this analysis, *sensitive land uses* are defined as locations where people, particularly sensitive receptors, are concentrated or where the presence of pollutant emissions could adversely affect the use of the land.

Sensitive land uses are found throughout the action area. Sensitive land uses such as residential areas, schools, and hospitals are typically most concentrated in developed areas, but residences and other sensitive land uses also occur in sparser distribution in rural/agricultural areas.

Environmental Consequences and Mitigation Strategies

Methodology for Impact Analysis

O&M and minor construction activities would be the principal source of pollutant emissions associated with the proposed action, so analysis of the proposed action's effects on air quality focused on O&M and minor construction activities. Because the O&M and minor construction program would be the same under all alternatives, this analysis assumed that air pollutant emissions would be the same for all alternatives. As discussed in Chapter 2, PG&E has committed to complying with the SJVUAPCD's Regulation VIII PM10 control measures, including implementation of all feasible control measures specified in its Guide for Assessing Air Quality Impacts (San Joaquin Valley Unified Air Pollution Control District 2002). Regulation VIII compliance was thus assumed for all O&M and minor construction activities enabled under the proposed action and alternatives, in the SJVUAPCD and in Mariposa County. For the federal General Conformity determination, emissions from construction activities were assessed qualitatively, based on the type of equipment used in typical construction activities.

The proposed action and alternatives would each result in a slightly different balance of impact avoidance versus compensation for unavoidable impacts, so there could be some in-practice difference in long-term pollutant generation related to variation in the extent of compensation lands and the equipment and ground disturbance needed to manage them. However, it is impossible to predict the extent and type of management activities needed under each alternative, or the exact equipment required, because the location and condition of compensation lands cannot be identified at this time. Consequently, analysis of the—probably minor—differences in air pollutant emissions among the proposed action and alternatives would be speculative at this time, and this topic is not addressed further in this EIS/EIR.

Significance Criteria

General Criteria

For the purposes of this analysis, an impact was considered to be significant and to require mitigation if it would result in any of the following.

- Conflict or interference with the applicable air quality management plan;
- Violation of any federal or state air quality standard, or substantial contribution to an existing or projected air quality violation; or
- Exposure of sensitive receptors to substantial pollutant concentrations.

The state's CEQA Guidelines direct that the significance criteria established by the local air quality management or air pollution control district with jurisdiction may be used to make the determinations above. This analysis used the SJVUAPCD's criteria because they are the more stringent of the two districts' thresholds.

Emission thresholds for the SJVUAPCD are contained in the SJVUAPCD's Guide for Assessing and Mitigating Air Quality Impacts (San Joaquin Valley Unified Air Pollution Control District 2002). According to the SJVUAPCD's thresholds of significance, an impact would be considered significant and would require mitigation if it would result in any of the following[2].

- Exposure of sensitive receptors to substantial pollutant concentrations,
- Production or more than 10 tons/year of ROG,
- Production of more than 10 tons/year NO_x,
- Exceedance of NAAQS or CAAQS for CO (9 ppm 8-hour average; 20 ppm 1-hour average), or
- Failure to comply with the SJVUAPCD's Regulation VIII regarding particulate matter emissions from construction activities.

Federal General Conformity Thresholds

As identified in *Regulatory Framework* above, the proposed action is subject to the federal General Conformity Rule. Because the portion of the action area located is classified as being an extreme nonattainment area for ozone within the SJVUAPCD, a serious nonattainment area for PM10 within the SJVUAPCD, and a nonattainment area for ozone within Mariposa County (Table 13-4), conformity for ozone and PM10 must be completed. For the purposes of this analysis, yearly project emissions in excess of the *de minimis* thresholds indicated in Table 13-5 would be considered an adverse air quality impact.

Table 13-5. *De Minimis* Emission Rate Thresholds for Criteria Pollutants in Nonattainment Areas

Pollutant	Emission Rate
Ozone (Volatile Organic Compounds [VOCs] or NO_x)	
Serious nonattainment areas	50 tons/year
Severe nonattainment areas	25 tons/year
Extreme nonattainment areas	10 tons/year

[2] For comparison, the MCAPCD has established CEQA analysis thresholds of 100 tons per year for PM10, CO, ROG, and NO_x.

Pollutant	Emission Rate
Other ozone nonattainment areas outside an ozone transport region	100 tons/year
Marginal and moderate nonattainment areas inside an ozone transport region	
VOC	50 tons/year
NO_x	100 tons/year
CO: All nonattainment areas	100 tons/year
SO_2 or NO_2: All nonattainment areas	100 tons/year
PM10	
Moderate nonattainment areas	100 tons/year
Serious nonattainment areas	70 tons/year
Pb: All nonattainment areas	25 tons/year

Source: 40 CFR 51.853

Impacts and Mitigation Measures—All Alternatives

Impact AIR1—Potential to generate increased pollutant emissions during O&M activities. As discussed in *Methodology for Impact Analysis* above, PG&E's ongoing O&M and minor construction activities are expected to be the principal source of air pollutant emissions associated with the proposed action, and these activities would be the same under the proposed action, the three action alternatives, and the No Action Alternative. All of these activities entail some potential to generate vehicle- and equipment-related pollutants and fugitive dust, as summarized below.

- Vehicles (e.g., trucks, helicopters and fixed-wing light aircraft, and all-terrain vehicles) used for employee access to sites and for inspection patrols would generate emissions of CO, ozone precursors, and particulate matter.
- Heavy machinery (e.g., cranes, excavators, and scrapers) for construction and maintenance of PG&E facilities and infrastructure would generate emissions of CO, ozone precursors, and particulate matter.
- Smaller equipment (e.g., chainsaws and generators) would generate emissions of CO, ozone precursors, and particulate matter.
- Painting and asphalt paving would generate ROG emissions.
- Ground-disturbing activities (e.g., grading, excavation, and construction of roadways) would generate emissions of fugitive dust (PM10 and PM2.5).
- Vehicles and equipment traveling on unpaved roads and offroad would generate emissions of fugitive dust (PM10 and PM2.5).

Specifics regarding the types and number of vehicles/equipment, duration of use, and frequency of use are impossible to predict at this time, but it is anticipated that PG&E's activities would continue in their current manner. These activities are temporary and sporadic; although some, such as patrols, are regularly scheduled in compliance with California Public Utilities Commission (CPUC) requirements, others occur on an as-needed basis. Further, while most of these activities require very little equipment, equipment used in the future would become cleaner and emit fewer pollutants, compared to current emissions, as older, more polluting equipment is replaced with newer, less polluting equipment.

Because individual O&M activities are expected to be relatively short-term, would not use much equipment, and would use progressively "cleaner" equipment as older engines are replaced by newer engines, it is not anticipated that emissions from O&M activities would exceed the SJVUAPCD thresholds levels of 10 tons per year for ROG and NO_x. **Consequently, this impact is expected to be less than significant for ROG and NO_x.**

This impact is also expected to be less than significant for CO because both the SJVUAPCD and Mariposa County portions of the action area are in attainment for federal and state CO standards, and activities enabled by the proposed action and alternatives would generate comparatively small increases in CO levels, substantially insufficient to result in exceedance of any applicable standard.

Implementation of the SJVUAPCD's Regulation VIII PM10 controls would address emissions of PM10. As discussed in Chapter 2, the Regulation VIII controls provide a comprehensive palette of measures, including[3]

- stabilizing all inactive disturbed areas using water, a chemical stabilizer/suppressant, tarps or other suitable cover, or vegetative ground cover;
- stabilizing spoils areas and stockpiles using water or a chemical suppressant;
- stabilizing unpaved roads using water or a chemical stabilizer/suppressant;
- using water application or presoaking to control dust generation during site clearing, grubbing, scraping, excavation, grading, fill placement, and demolition;
- covering loads of material to be hauled offsite, or wetting them to limit visible dust emissions, and providing at least 6 inches of freeboard; and
- preventing, limiting, or removing the accumulation of mud or dirt in adjacent public streets at the end of each workday;

When additional precautions are needed to adequately control fugitive dust, speeds on unpaved roads must be limited to 15 mph, and sandbags or other

[3] For the complete text of the SJVUAPCD's Regulation VIII PM10 controls, see Chapter 2.

erosion control measures must be installed to prevent silt runoff to public roadways from sites with a slope greater than 1%. Further measures are encouraged at large construction sites and sites that are located near sensitive receptors or where additional care is required for any reason. With these measures in place, PM10 generation is considered adequately mitigated. **PM10-related impacts on air quality are thus evaluated as less than significant for activities subject to SJVUAPCD's Regulation VIII measures (minor construction and some O&M activities).**

As discussed in Chapter 2, the SJVUAPCD's Regulation VIII measures were developed to address PM10 generation during construction. Although they cover a broad range of ground-disturbing activities, they do not apply to emergency procedures that (1) are necessary to ensure public health and safety or restore service during outages, and (2) have a duration less than 30 days. Some types of O&M work are also exempt because they do not qualify as construction *per se*. However, emergency work sites must be brought into compliance following the completion of work, and the types of O&M activities exempted because they do not qualify as construction are unlikely to generate substantial volumes of PM10. Thus, **PM10 impacts are also expected to be less than significant for activities specifically exempted by SJVUAPCD from compliance with the Regulation VIII measures.**

In summary, the potential for increased pollutant emissions during O&M activities is evaluated as less than significant.

Mitigation Measure—No mitigation is required.

Impact AIR2—Potential to exceed federal General Conformity thresholds. As discussed for Impact AIR1 above, individual O&M activities are expected to be relatively short-term, and the equipment used would be progressively "cleaner" as older engines are replaced by newer engines. Consequently, emissions from individual O&M and minor construction activities are not expected to exceed the federal *de minimis* levels of 10 tons per year for ROG and NO_x, and 70 tons per year for PM10. There is no need to address conformity for CO, because both the SJVUAPCD and Mariposa County portions of the action area are in attainment for federal CO standards.

There would be no impact related to federal general conformity; conformity determination is not warranted, and no further analysis of federal general conformity issues is needed for any of the alternatives.

Mitigation Measure—No mitigation is required.

Impact AIR3—Air quality enhancement as a result of habitat compensation. The proposed action and all three action alternatives provide for the preservation and enhancement of offsite habitat as a means of compensating for the biological effects of PG&E's O&M and minor construction activities. The specific compensation ratios differ between the proposed action and the action alternative (specifically, Alternative 2, which would entail "enhanced" compensation at

increased ratios, as described in Chapter 2). However, the general mechanism for identifying compensation needs and obtaining appropriate mitigation lands would be the same.

Under the proposed action and all three action alternatives, the acreage required for compensation is expected to consistently exceed the actual acreage impacted, and the mitigation lands would consist of high quality open space that meets specific biological parameters. Consequently, the proposed action and the three action alternatives all offer a potential benefit for air quality, deriving from the preservation and enhancement of vegetated open space. This benefit would be greatest under Alternative 2, which would require greater mitigation acreages to satisfy its enhanced compensation ratios. Benefits would be somewhat less under the proposed action and Alternatives 1 and 3, which would all use the same, slightly lower, compensation ratios. Some benefit is possible under the No Action Alternative because activity-by-activity permitting and consultation with U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (DFG) would likely result in some level of habitat preservation and/or enhancement, but it is difficult to assess outcomes in a substantive way at this time.

In summary, **this impact would be beneficial.**

Mitigation Measure—No mitigation is required.

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Chapter 14

Public Health and Environmental Hazards

Chapter 14

Public Health and Environmental Hazards

This chapter examines the proposed action's potential effects related to public health and safety and environmental hazards. It focuses on issues related to the handling and use of hazardous materials, and the potential for inadvertent spills or releases of hazardous materials. Public health and safety analyses commonly also address a proposed undertaking's potential to increase public exposure to disease or risk of contracting disease, and potential effects on drinking water quality. However, the proposed action would not alter the potential for exposure to any infectious disease, nor would it affect drinking water quality or treatment, so these topics were not addressed. Effects related to flood hazards and flood safety are discussed in Chapter 8 (*Water Resources*).

Key sources of information used in the preparation of this chapter include the following.

- The California Department of Toxic Substances' "Cortese List" inventory of potentially contaminated sites.
- The U.S. Environmental Protection Agency's National Priorities List of hazardous waste sites identified for remediation under the federal Superfund program.

Affected Environment

Regulatory Framework

The California Department of Toxic Substances Control (DTSC) defines a *hazardous material* as one that poses a significant present or potential hazard to human health and safety or the environment if released because of its quantity, concentration, or physical or chemical characteristics (26 California Code of Regulations [CCR] 25501). Common hazardous materials include petroleum hydrocarbons, pesticides, volatile organic chemicals (VOCs), and certain metals.

Various federal and state agencies exercise regulatory authority over the use, generation, transport, and disposal of hazardous substances. The primary federal regulatory agency is the EPA. The primary California state agency is the California Environmental Protection Agency (Cal-EPA), which may delegate

enforcement authority to local agencies with which it has agreements. Federal regulations applicable to hazardous substances are contained primarily in the Code of Federal Regulations (CFR) Titles 29 (*Labor*), 40 (*Protection of Environment*), and 49 (*Transportation*). State regulations are contained in CCR Title 13 (*Motor Vehicles*), Title 19 (*Public Safety*), Title 22 (*Social Security*), and Title 26 (*Toxics*).

The following sections contain additional information on specific laws and regulations pertaining to hazardous materials management.

Federal Regulations

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also called the Superfund Act) (42 U.S. Government Code [USC] Sec. 9601 *et seq*.) is intended to protect the public and the environment from the effects of prior hazardous waste disposal and new hazardous material spills. Under CERCLA, EPA has the authority to seek the parties responsible for hazardous materials releases and to assure their cooperation in site remediation. CERCLA also provides federal funding (the "Superfund") for the remediation of hazardous materials contamination. The Superfund Amendments and Reauthorization Act (SARA) of 1986 (Public Law 99-499) amends some provisions of CERCLA and provides for a Community Right-to-Know program.

EPA has the authority to implement CERCLA in all 50 states and all United States territories, using a variety of enforcement tools, including orders, consent decrees, and other small party settlements. The identification, monitoring, and remediation of Superfund sites are usually coordinated by state environmental protection and/or waste management agencies. When potentially responsible parties cannot be identified or located, or when responsible parties fail to act, EPA has the authority to remediate abandoned and/or historical sites where hazardous materials contamination is known to exist and to pose a human health hazard.

Pursuant to CERCLA, EPA maintains a National Priority List (NPL) of uncontrolled or abandoned hazardous waste sites identified for priority remediation under the Superfund program. Sites are identified for listing on the basis of the EPA's hazard ranking system. Sites may also be placed on the NPL if they meet the following requirements.

- The Agency for Toxic Substances and Disease Registry (ATSDR) of the U.S. Public Health Service has issued a health advisory that recommends removing people from the site.
- EPA has determined that the site poses a significant threat to public health.

- It will be more cost-effective for EPA to use its remedial authority than its emergency removal authority to respond to the hazard posed by the site.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) (42 USC Sec. 6901 *et seq*.) was enacted in 1976 as an amendment to the Solid Waste Disposal Act to address the nationwide generation of municipal and industrial solid waste. RCRA gives EPA authority to control the generation, transportation, treatment, storage and disposal of hazardous waste, including underground storage tanks storing hazardous substances. RCRA also establishes a framework for the management of nonhazardous wastes. RCRA addresses only active and future facilities; it does not address abandoned or historical sites, which are covered by CERCLA (see preceding section).

RCRA was updated in 1984 by the passage of the federal Hazardous and Solid Waste Amendments (HSWA), which require the gradual phasing out of land disposal of wastes. HSWA also increased the EPA's enforcement authority and established more stringent hazardous waste management standards, including a comprehensive underground storage tank program.

Federal Insecticide, Fungicide, and Rodenticide Act

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (7 USC 136 *et seq*.) was originally passed in 1947. It has been amended several times, most extensively in 1972, and most recently by the Food Quality Protection Act of 1996. The purpose of FIFRA is to establish federal jurisdiction over the distribution, sale, and use of pesticides[1]. It also gives EPA the authority to study the effects of pesticide use. Other key provisions of FIFRA require pesticide applicators to pass a licensing examination for status as "qualified applicators"; create a review and registration process for new pesticide products; and ensure thorough and understandable labeling that includes instructions for use (ChemAlliance 2004, U.S. Environmental Protection Agency 2004a).

State Regulations

EPA has granted the states primary oversight responsibility to administer and enforce hazardous waste management programs. In addition, California state regulations, which are equal to or more stringent than federal regulations, require planning and management to ensure that hazardous wastes are handled, stored,

[1] As defined by the EPA, *pesticide* is a broad, encompassing term referring to any substance used to kill, repel, control, or prevent infestation by any type of pest, including insects, animals, nuisance plants (weeds), fungi, molds, bacteria, and viruses. Consequently, FIFRA governs herbicides as well as insecticides, rodenticides, and other types of common poisons.

and disposed of properly to reduce risks to human health and the environment. Several key state laws pertaining to hazardous wastes are discussed below.

Hazardous Materials Release Response Plans and Inventory Act of 1985

The Hazardous Materials Release Response Plans and Inventory Act, also known as the Business Plan Act, requires businesses using hazardous materials to prepare a hazardous materials business plan that describes their facilities, inventories, emergency response plans, and training programs. Under the Business Plan Act, *hazardous materials* are defined as raw or unused materials that are part of a process or manufacturing step. They are not considered hazardous waste, although the health concerns pertaining to the release or inappropriate disposal of these materials are similar to those for hazardous waste. The Business Plan Act also defines *acutely hazardous materials* as referring to certain chemicals specifically listed in CFR Title 40; about 400 chemicals that are of special concern to emergency response planners are included in this inventory.

Hazardous Waste Control Act

The Hazardous Waste Control Act created the state hazardous waste management program, which is similar to, but more stringent than, the federal program under RCRA. The Hazardous Waste Control Act is implemented by regulations contained in 26 CCR, which describes the key aspects of hazardous waste management, including: identification and classification; sources; transport; design and permitting of recycling, treatment, storage, and disposal facilities; treatment standards; operation of facilities, including staff training; closure of facilities; and liability issues.

Regulations in 26 CCR list more than 800 materials that may be hazardous and establish criteria for their identification, packaging, and disposal. Under the Hazardous Waste Control Act and 26 CCR, hazardous waste generators must complete a manifest that accompanies the waste from the generator to the transporter to the ultimate disposal location. Copies of the manifest must be filed with the state's DTSC.

Emergency Services Act

Under the Emergency Services Act, the State of California developed an emergency response plan to coordinate emergency services provided by federal, state, and local agencies. Rapid response to incidents involving hazardous materials or hazardous waste is an important part of the plan, which is administered by the California Office of Emergency Services (OES). This office coordinates the responses of other agencies, including the EPA, the California

Highway Patrol, the nine RWQCBs, the various air quality management districts, and county disaster response offices.

Other State Laws and Regulations

Additional state regulations that affect hazardous waste management include

- the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65), which requires labeling of substances known or suspected by the state to cause cancer; and
- California Government Code Section 65962.5, which requires the Office of Permit Assistance to compile a list of potentially contaminated sites in the state. DTSC maintains this list, which is called the Cortese List. The public can access this list online at <http://www.dtsc.ca.gov/database/Calsites/Cortese_List.cfm>.

Local Regulations

The regulation of hazardous materials at the local level is limited to standards, procedures, and policies that relate to siting, construction, and use or operation of businesses, farms, and residences within the jurisdiction. Establishment of standards, and transport of hazardous materials and wastes from one location to another is regulated by the federal and state governments (see *Hazardous Waste Control Act* above). However, Counties are commonly responsible for implementing state standards authorized under Section 6.11 of the California Health and Safety Code. This may be accomplished by a combination of general plan policies and local ordinances and regulations. In addition, each County's Office of Emergency Services is responsible for planning emergency response actions to hazardous material incidents. Area response plans incorporate hazardous materials inventory data, training for emergency responses, and evacuation planning information.

Existing Conditions

As discussed in Chapter 3 (*Land Use and Planning*), the action area has supported, and continues to support, a broad range of land uses that require the use of hazardous or potentially hazardous materials, including agriculture; industry and manufacturing; defense-related activities; rail and highway corridors; highway alignments; and urban, suburban, and rural development. All of these uses carry some potential for spills and releases of hazardous substances. Contaminants associated with these uses include a variety of fuels and other petroleum distillates; pesticides, fertilizers, and other agricultural chemicals; lead; radioactivity; and volatile and semivolatile organic chemicals (VOCs and SVOCs).

As of the date of preparation of this EIS/EIR, more than 7,000 sites with confirmed subsurface releases of hazardous substances have been identified (Central Valley Regional Water Quality Control Board 1998), and additional contamination associated with surface use or spillage of hazardous substances is also likely present. Table 14-1 presents an inventory of sites in the nine action area counties that have sufficient contamination to qualify them for inclusion in the state's Cortese database and/or the federal NPL. Depending on local land use histories, other sites may also have some degree of unrecognized or unlisted contamination.

Environmental Consequences and Mitigation Strategies

Methodology for Impact Analysis

Effects related to public health and safety and environmental hazards were analyzed qualitatively, based on professional judgment in light of current best practices and the nature of the activities that would be enabled by the proposed action.

Analysis focused on the potential for public and environmental exposure to hazardous materials as a result of PG&E's O&M and minor construction activities. Three primary mechanisms for exposure were considered: improper handling or transport; reasonably foreseeable but inadvertent spills or releases; and ground disturbance on sites with known and unknown contamination. Analysis considered potential effects on workers, the general public, and the environment.

Significance Criteria

For the purposes of this analysis, an impact was considered to be significant and to require mitigation if it would result in

- a substantial hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials,
- a substantial hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials to the environment,
- new construction or substantial ground disturbance on a site included on a list of hazardous materials sites compiled pursuant to California Government Code 65962.5 or CERCLA,
- interference with or impedance of an adopted emergency response plan, or
- interference with emergency vehicle access or increased response times.

Table 14-1. Known Hazardous Materials Sites in Action Area Counties

City	Address	ZIP	Site Name	Listing
Fresno County				
COALINGA	20 MILES NW OF COALINGA-LOS GATOS CK RD	93210	ATLAS ASBESTOS MINE	Cortese, NPL
COALINGA	AREA SE OF LUCILLE AVENUE & HWY 198	93210	CITY OF COALINGA ASBESTOS SITE	Cortese, NPL
DEL REY	5404 SOUTH DEL REY AVENUE	93616	H S MANN METAL WASTE COMPANY	Cortese
FIREBAUGH	915 TENTH STREET	93622	TRI-AIR, INCORPORATED	Cortese
FIVE POINTS	21817 SOUTH COALINGA ROAD	93624	BRITZ FERTILIZERS, INC - FIVE POINTS	Cortese
FRESNO	1131 G STREET	93706	PG&E G STREET SUBSTATION	Cortese
FRESNO	1403 EAST JENSEN AVENUE	93706	FRESNO BATTERY EXCHANGE	Cortese
FRESNO	2494 SOUTH RAILROAD AVENUE, P.O. BOX 164	93707	WEIR FLOWAY INC.	Cortese
FRESNO	2501 SOUTH SUNLAND AVENUE	93725	FMC CORPORATION - FRESNO	Cortese
FRESNO	2510 SOUTH EAST AVENUE	93717	FORMER VALLEY FOUNDRY AND MACHINE WORKS,	Cortese
FRESNO	2940 SOUTH ELM AVENUE	93706	COMMERCIAL ELECTROPLATERS	Cortese
FRESNO	3090 E CHURCH AVE	93721	FORMER BURLINGTON NORTHERN SANTA FE ICE	Cortese
FRESNO	4627 NORTH BENDEL AVENUE	93722	FRESNO CHROME PLATING, INC	Cortese
FRESNO	7183 EAST MCKINLEY AVENUE	93727	T H AGRICULTURE & NUTRITION, L.L.C.	Cortese, NPL
FRESNO	CHURCH & FRUIT AVENUES	93706	CHURCH AND FRUIT JUNKYARD	Cortese
FRESNO	MCKINLEY AND CLOVIS AVENUES	93727	FRESNO AIR TERMINAL/OLD HAMMER FIELD	Cortese
FRESNO	NORTH OF CHURCH AVENUE AT SOUTH EAST AVE	93721	SOUTH FRESNO REGIONAL GROUNDWATER PLUME	Cortese
FRESNO	PINEDALE/N. FRESNO AREA	93650	PINEDALE AREA GROUNDWATER	Cortese
FRESNO	SW CORNER OF JENSEN & WEST AVENUES	93706	FRESNO SANITARY LANDFILL	Cortese, NPL
MALAGA	3265 SOUTH MAPLE AVENUE	93726	PURITY OIL SALES, INC	Cortese, NPL
PINEDALE	7209 NORTH INGRAM AVENUE	93650	VENDO COMPANY, THE	Cortese
PINEDALE	EPA ID#CAD980736284	93650	INDUSTRIAL WASTE PROCESSING	NPL
SELMA	1735 DOCKERY AVE & ADJOINING	93662	SELMA TREATING COMPANY	Cortese, NPL
SELMA	2336 CHANDLER STREET	93662	SELMA ELECTROPLATING	Cortese
SELMA	BLOCK: NORTH, SHERMAN, SYLVIA, YOUNG STREET	93662	PG&E MANUFACTURED GAS PLANT SQ-FK-SEL	Cortese
Kern County				
ARVIN	600 S DERBY ST	93203	BROWN AND BRYANT INC ARVIN FACILITY	Cortese, NPL
BAKERSFIELD	3228 GIBSON ST	93308	ASSURED TRANSPORTATION SITE	Cortese
BAKERSFIELD	340 DANIELS LN	93307	BENHAM AND JOHNSON	Cortese
BAKERSFIELD	3930 GILMORE AVENUE	93308	SAN JOAQUIN DRUM COMPANY	Cortese
BAKERSFIELD	600 SOUTH UNION AVENUE	93307	K & D SALVAGE	Cortese
BAKERSFIELD	GOLDEN STATE HWY & SEVENTH STANDARD RD	93312	BAKERSFIELD AG-CHEM	Cortese
BAKERSFIELD	ROUND MOUNTAIN ROAD	93301	ENVIRONMENTAL PROTECTION CORP-EASTSIDE D	Cortese
EDISON	430 PEPPER DRIVE	93220	J R SIMPLOT, EDISON (POND AREA)	Cortese
EDISON	430 PEPPER DRIVE	93220	J R SIMPLOT, EDISON (CANOPY AREA)	Cortese

City	Address	ZIP	Site Name	Listing
EDWARDS	470 SQ MI; 60 MI NE OF LOS ANGELES, CA	93523	EDWARDS AIR FORCE BASE	Cortese, NPL
MOJAVE	11601 UNITED STREET	93501	PRODUCTS RESEARCH & CHEMICAL CORP	Cortese
MOJAVE	11847 UNITED STREET	93501	COMMODITY REFINING EXCHANGE	Cortese
MOJAVE	12403 UNITED STREET	93501	UNITED METAL RECOVERY	Cortese
MOJAVE	12901 UNITED ROAD	93501	PURDY COMPANY	Cortese
MOJAVE	BACK LOT AT 11847 UNITED STREET	93501	SILVER QUEEN JUNKYARD	Cortese
MOJAVE	UNITED STREET & REED ROAD	93501	MOBILE SMELTING	Cortese
RIDGECREST	950 SQ MI; 120 MI NE OF LOS ANGELES, CA	93555	CHINA LAKE NAVAL AIR WEAPONS STATION	Cortese
ROSAMOND	1753 SIERRA HIGHWAY	93560	JOHN ALEXANDER RESEARCH INC	Cortese
ROSAMOND	2001 15TH STREET, WEST	93560	OSAGE INDUSTRIES, 15TH STREET	Cortese
ROSAMOND	2021 WEST 15TH STREET	93560	S R KILBY PROPERTY	Cortese
ROSAMOND	3103 50TH STREET WEST	93560	3103 50TH STREET WEST	Cortese
ROSAMOND	60TH STREET WEST T9N,R13W,S10 SE CORNER	93560	OSAGE INDUSTRIES, 60TH STREET WEST	Cortese
ROSAMOND	AVENUE A 1-1/2 MILE EAST HIGHWAY 14	93560	AVENUE A UNAUTHORIZED DISPOSAL SITE	Cortese
ROSAMOND	INTERSECTION OF MARIE AVE & W 15TH ST	93560	GROSSI/CALANDRI PROPERTY	Cortese
SHAFTER	135 COMMERCIAL DRIVE	93263	BROWN AND BRYANT - SHAFTER FACILITY	Cortese
SHAFTER	LERDO HIGHWAY AT HIGHWAY 99	93263	SHAFTER AIRPORT	Cortese
Kings County				
CORCORAN	6991 NEVADA AVENUE	93212	PUREGRO-CORCORAN	Cortese
LEMOORE	39,823 ACRES; 35 MI SOUTH OF FRESNO, CA	93245	LEMOORE NAS	Cortese
Madera County				
MADERA	11272 ROAD 32	93639	MACGILLIS AND GIBBS	Cortese
MADERA	BLOCK OF: 9TH, CLINTON, E STREET & ALLEY	93637	PG&E MANUFACTURED GAS PLANT SQ-YO-MAD	Cortese
Merced County				
ATWATER	2,777 ACRES; 5 MI NW OF MERCED, CA	95342	CASTLE AIR FORCE BASE	Cortese, NPL
DOS PALOS	7657 AZUSA AVE	93620	CENTRAL VALLEY FERTILIZER CO, INC (2)	Cortese
MERCED	BLOCK OF: 14TH, 15TH, L AND M STREETS	95340	PG&E MANUFACTURED GAS PLANT SQ-VO-MER	Cortese
San Joaquin County				
LATHROP	2715 E LOUISE AVE	95330	OXYCHEM-LATHROP	Cortese
LATHROP	724 ACRES; 60 MI EA OF SAN FRANCISCO, CA	95331	SHARPE DEFENSE DEPOT SAN JOAQUIN	Cortese, NPL
LODI	110 E. TURNER ROAD	95240	LUSTRE-CAL NAMEPLATE CORP	Cortese
LODI	17 S CHURCH ST	95240	GUILD CLEANERS	Cortese
LODI	40 NORTH MAIN STREET	95240	BUSY BEE LAUNDRY	Cortese
LODI	APPROX 70 ACRES OF CHURCH AND WALNUT STR	95240	LODI CENTRAL PLUME AREA	Cortese
STOCKTON	1,459 ACRE ISLAND; 40MI SE OF SACRAMENTO	95203	STOCKTON NAVAL COMMUNICATION STATION	Cortese
STOCKTON	1214 W. WASHINGTON STREET	95203	MCCORMICK & BAXTER CREOSOTING CO	Cortese, NPL

City	Address	ZIP	Site Name	Listing
STOCKTON	150 N SINCLAIR AVE	95215	MARLEY COOLING TOWER COMPANY	Cortese
STOCKTON	2201 W. WASHINGTON STREET	95201	STOCKTON, ROUGH AND READY ISLAND	Cortese
STOCKTON	540 WEST SCOTTS AVENUE	95203	ACME-STOCKTON GALVANIZING WORKS	Cortese
TRACY	25600 S CHRISMAN RD	95304	TRACY DEFENSE DEPOT SAN JOAQUIN	Cortese, NPL
TRACY	29425 S MACARTHUR DR	95377	TRACY TIRE FIRE	Cortese
TRACY	CORNER OF TRACY BLVD AND BEECHNUT AVE	95376	RENOWN HOMES	Cortese
TRACY	CORRAL HOLLOW ROAD	94550	LAWRENCE LIVERMORE NAT LAB 300(USDOE)	Cortese, NPL
TRACY	FRANKLIN AND ACACIA STREETS	95376	PG&E MANUFACTURED GAS PLANT SQ-SK-TRA	Cortese
Stanislaus County				
CROWS LANDING	1.5 MI NW OF CROWS LANDING; (T6S R8E)	95313	CROWS LANDING NAVAL AUXILIARY FIELD	Cortese
MODESTO	10TH AND L STREETS	95354	MODESTO CONVENTION CENTER	Cortese
MODESTO	3666 W SERVICE RD	95358	GALLO GLASS - SISK RANCH	Cortese
MODESTO	N OF HWY 132 & ADJ E BANK OF DRY CREEK	95353	GALLO GLASS-RAFFLE SITE	Cortese
MODESTO	NEAR MODESTO	95351	MODESTO GROUNDWATER CONTAMINATION	Cortese, NPL
OAKDALE	SOUTH OF J AND BRYAN, N OF RR TRACKS	95361	PG&E MANUFACTURED GAS PLANT SQ-ST-OKD	Cortese
RIVERBANK	5300 CLAUS ROAD	95367	RIVERBANK ARMY AMMUNITION DEPOT	Cortese, NPL
TURLOCK	2237 SOUTH GOLDEN STATE BLVD	95380	VALLEY WOOD PRESERVING, INC.	Cortese, NPL
WESTLEY	1/4 MILE WEST OF I-5	95387	WESTLEY TIRE FIRE	Cortese
Tulare County				
DINUBA	216 S O ST	93618	SO CAL GAS/DINUBA MGP	Cortese
OROSI	13133 AVENUE 416	93647	PARMENTER AND BRYAN	Cortese
PIXLEY	1494 SOUTH AIRPORT DRIVE	93256	HARMON FIELD	Cortese
PORTERVILLE	167 WEST POPLAR AVENUE	93257	BECKMAN INSTRUMENTS, PORTERVILLE PLANT	Cortese, NPL
TULARE	21636 RD 152	93274	CAM CHEMICALS	Cortese
VISALIA	2530 WEST GOSHEN	93219	KAWEAH CROP DUSTER-GREEN ACRES AIRPORT	Cortese
VISALIA	300 NORTH TIPTON STREET	93277	SO CAL GAS/VISALIA MGP	Cortese, NPL
VISALIA	432 BEN MADDOX WAY	93277	EDISON/VISALIA POLE YARD	Cortese
VISALIA	6941 AND 6707 WEST GOSHEN AVENUE	93291	GOSHEN AVENUE AND SHIRK ROAD SITE	Cortese

Impacts and Mitigation Measures

Proposed Action

Impact PH1—Potential to create a hazard to the public or the environment through routine transport, use, or disposal of hazardous materials other than herbicides; potential for inadvertent spills or releases of hazardous materials other than herbicides. Many of the routine O&M activities enabled by the proposed action would entail the use of hazardous substances such as fuels and lubricants for vehicles and equipment; paints; solvents; and epoxies. Construction could require additional substances such as paving media.

Hazardous materials could be released in a variety of ways during O&M and minor 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, with the potential to contaminate soil and surface- or groundwater, potentially resulting in toxic effects on vegetation, wildlife, workers, and the general public. Substances such as solvents, paints, and epoxy could pose similar concerns if accidentally released or improperly handled or disposed. Depending on the substance released and the magnitude of the release, this could represent a significant impact.

As described in Chapter 2 (see *Hazardous Materials Program* under *PG&E's Existing Environmental Programs and Practices*), PG&E complies with all applicable state and federal laws, regulations, and requirements pertaining to hazardous materials and hazardous wastes, and has an ongoing hazardous materials safety program that requires staff and contractors to follow BMPs such as

- fueling and servicing all vehicles offsite;
- to the extent practicable, avoiding or minimizing storage of hazardous substances such as paints, solvents, epoxies, etc., at the work site and in the staging area;
- storing any hazardous materials that must be kept on the work site in securely stored in closed containers located away from drainage courses, storm drains, and areas of stormwater infiltration;
- ensuring that maintenance and construction personnel have been trained in current procedures and best available technology (BAT) for spill prevention and cleanup of accidental spills;
- keeping a spill kit or kits at the work site at all times when hazardous materials are in use, and ensuring that all personnel know how to access and use the kit(s); and
- stopping work immediately in the event of a hazardous materials spill or release, and implementing appropriate cleanup and remediation measures to

protect terrestrial ecosystems, surface water quality and aquatic ecosystems, groundwater quality, and human health.

In addition, for activities with the potential to disturb an area in excess of 1 acre, the federal Clean Water Act requires the preparation of a Storm Water Pollution Prevention Plan (SWPPP) that includes a Spill Prevention and Response Plan (see Chapter 8, *Water Resources*). As described in Chapter 2 (see *Water Quality Protection Program* under *PG&E's Existing Environmental Programs and Practices*), the Spill Prevention and Response Plan must identify the hazardous materials to be used during construction; describe measures to prevent, control, and minimize the spillage of hazardous substances; describe transport, storage, and disposal procedures for these substances; and outline procedures to be followed in case of a spill. SWPPP components, including the Spill Prevention and Response Plan, are under the regulatory oversight of the Regional Water Quality Control Board with jurisdiction over the work site.

In light of PG&E's existing program of training and BMPs, and the additional protection provided by the SWPPP requirement, both of which would carry forward under the proposed action, **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, are expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact PH2—Potential to create a hazard to the public or the environment through routine transport, use, or disposal of herbicides; potential for inadvertent spills or releases of herbicides.[2] As discussed in Chapter 2, the California Public Utilities Commission (CPUC) requires stringent control of vegetation along electric transmission and distribution corridors to minimize the risk of fire, and PG&E—like many other entities with land management responsibility—routinely uses herbicides as part of their vegetation management program. If herbicides are improperly transported, handled, or disposed, or if they are spilled or released into the environment, they have the potential to result in substantial damage to local native vegetation, and could be toxic to wildlife and humans as well.

However, as discussed in Chapter 2 (see *Herbicide Use* under *Hazardous Materials Program* in *PG&E's Existing Environmental Programs and Practices*; also Table 2-5) PG&E has committed to ensure that herbicides are handled and applied only by state-licensed personnel—that is, persons holding a current QAL (Qualified Applicator Licensee) or QAC (Qualified Applicator Certificate Holder) registration from the California Department of Pesticide Regulation—and to ensure that all use of herbicides complies with FIFRA label requirements. These commitments are expected to greatly reduce the potential for improper

[2] Note that although herbicide use would not be covered under the proposed HCP, herbicides could be used in some of the activities enabled under the proposed action. Because herbicide use could represent an indirect outcome of the proposed action, it is analyzed in this document for completeness.

handling of herbicides. In addition, as described above and in Chapter 2, PG&E complies with all applicable state and federal laws, regulations, and requirements pertaining to hazardous materials and hazardous wastes, and has an ongoing hazardous materials safety program that requires staff and contractors to follow a comprehensive program of BMPs. For example, spill kits are to be kept at the project site whenever hazardous materials are in use and all personnel must know how to access and use the kit. Also, maintenance and construction personnel must be trained in current procedures, including best available technology (BAT), for spill prevention and cleanup of accidental spills. **With these measures in place, impacts related to the potential for improper transport, handling, or use of herbicides, and impacts related to the potential for inadvertent spills or releases of herbicides, are expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact PH3—Potential for human or environmental exposure to hazardous materials as a result of ground disturbance on sites with known hazardous materials contamination. It is unlikely that PG&E would plan to construct new facilities on a site with known hazardous materials contamination, unless the site had already been fully remediated prior to construction. Because of the diversity and distribution of sites with known hazardous materials contamination in the action area, it is possible that O&M activities enabled by the proposed action would take place on contaminated sites, although PG&E minimizes such activities to the extent possible. PG&E policies and regulatory requirements dictate that only appropriately trained and qualified personnel work on sites with known contamination. Consequently, **human health and environmental effects related to ground disturbance on sites with known hazardous materials contamination are expected to be less that significant.**

Mitigation Measure—No mitigation is required.

Impact PH4—Potential to interfere with or impede the implementation of adopted emergency response plans; potential to interfere with emergency vehicle access or increase emergency services' response times. As discussed in Chapter 2 (see *Land Use and Planning Practices* under *PG&E's Existing Environmental Programs and Practices*), PG&E consults with local jurisdictions to ensure that their needs and concerns are considered as a part of the planning process. On the public safety front, this includes a commitment to ensure that PG&E's activities (many of which are essential for the provision of emergency response services) do not impede adopted emergency response plans. For instance, if lane closures must occur during the course of O&M or construction, local fire and police departments are notified in advance to allow the design of alternative emergency access and evacuation routes (see related discussion in Chapter 11, *Transportation and Circulation*). PG&E makes every effort to allow emergency service providers adequate lead time to ensure that emergency access and response times can be maintained during work periods. With this commitment in place, activities enabled by the proposed action are not expected result in measurable interference with or impedance of any adopted emergency response plan or emergency evacuation plan, to interfere with emergency vehicle

access, or to increase emergency services' response times substantially. **This impact is expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact HC5—Potential handling of hazardous materials within 0.25 mile of an existing or planned school. PG&E's facilities are located throughout the action area, and include infrastructure that directly serves schools and their surrounding communities, so O&M activities must take place within 0.25 mile of existing schools in some cases. However, as discussed above and in Chapter 2 (see *Hazardous Materials Program* under *PG&E's Existing Environmental Programs and Practices*), PG&E complies with federal, state, and local hazardous material and pesticide handling regulations and requires its employees to implement a comprehensive program of hazardous materials BMPs. **Impacts related to use of hazardous materials in proximity to existing schools and planned school sites are thus expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Alternative 1—HCP with Reduced Take

Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Alternative 1 would be subject to the same regulatory requirements and would incorporate the same program of training and BMPs for hazardous materials handling identified in this EIS/EIR for the proposed action. Consequently, impacts related to hazardous materials and public health and safety would be essentially the same under Alternative 1 as those described for the proposed action.

Alternative 2—HCP with Enhanced Compensation

Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action. Differences between Alternative 2 and the proposed action would center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). Alternative 2 would be subject to the same regulatory requirements and would incorporate the same program of training and BMPs for hazardous materials handling identified in this EIS/EIR for the proposed action. As with Alternative 1, impacts related to hazardous materials and public health and safety would be essentially the same under Alternative 2 as those described for the proposed action.

Alternative 3—HCP with Reduced Number of Covered Species

Alternative 3 would enable the same program of O&M and minor construction activities as that described for the proposed action. The key difference between Alternative 3 and the proposed action would relate to the number of species covered under the Alternative 3 (reduced by comparison with the proposed HCP, as described in Chapter 2). Alternative 3 would be subject to the same regulatory requirements and would incorporate the same program of training and BMPs for hazardous materials handling identified in this EIS/EIR for the proposed action. As with Alternatives 1 and 2, impacts related to hazardous materials and public health and safety would be essentially the same under Alternative 3 as those described for the proposed action.

Alternative 4—No Action

Under the No Action Alternative, PG&E would continue its existing program of O&M and minor construction activities unchanged. No HCP would be implemented, and any habitat compensation needed would occur on a case-by-case, piecemeal basis. However, PG&E would still implement their standard methods and techniques for carrying out O&M activities, including the existing program of training and BMPs for hazardous materials handling. Therefore, impacts related to hazardous materials and public health and safety would be essentially the same under Alternative 4 as those described for the proposed action.

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Chapter 15

Recreation

Chapter 15
Recreation

This chapter analyzes the proposed action's potential effects on recreation. Related discussions are found in Chapter 3 (*Land Use and Planning*).

Key sources of data used in the preparation of this chapter include the following.

- The proposed Habitat Conservation Plan (Appendix B).
- GIS information for the action area (Appendix B).
- Websites for the National Park Service (NPS), U.S. Fish and Wildlife (USFWS), U.S. Department of Agriculture Forest Service (USFS), Bureau of Land Management (BLM), California Department of Parks and Recreation (DPR), and the California Department of Fish and Game (DFG) listed among references cited at the end of this section.

Affected Environment

Regulatory Framework

Federal, state, and local agencies maintain various types of public recreation facilities, including national parks and forests, state parks and recreation areas, community parks and recreation facilities, and numerous types of reserve lands. The following sections provide a brief description of the major federal and state agencies that oversee recreational facilities in the action area as well as a description of the approach to recreation planning by local agencies. As identified elsewhere in this document, PG&E's land use planning is under the sole jurisdiction of the California Public Utilities Commission (CPUC). However, as described under *Environmental Commitments* in Chapter 2, PG&E strives to work with local jurisdictions and other agencies to ensure that their concerns are considered in project planning, construction, and operation.

Federal Agencies

National Park Service

The NPS administers the 385 areas contained in the National Park System. The mission of NPS is to preserve unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of present and future generations. NPS cooperates with various partnering agencies in the U.S. and throughout the world to achieve its mission (National Park Service 2004).

U.S. Fish and Wildlife Service

The USFWS manages the 93-million-acre National Wildlife Refuge System and the Fisheries program. The mission of USFWS is to work with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. To this end, USFWS enforces federal wildlife laws, protects endangered species, manages migratory birds, restores nationally significant fisheries, and conserves and restores wildlife habitat, including wetlands. USFWS also oversees federal aid programs providing hundreds of millions of dollars derived from excise taxes on fishing and hunting equipment to support state fish and wildlife agencies (U.S. Fish and Wildlife Service 2004).

USDA Forest Service

The USFS manages public lands in national forests and grasslands. As the largest forestry research organization in the world, USFS is charged with sustaining the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations. This mission includes providing technical and financial assistance to state and private forestry agencies as needs are identified (U.S. Forest Service 2004).

Bureau of Land Management

The BLM, an agency of the U.S. Department of the Interior, is responsible for managing some 261 million acres of public land, primarily in the 11 contiguous western states and Alaska. The BLM also manages subsurface mineral resources on National Park lands and lands of the National Wildlife Refuge system (most of which are withdrawn from active mineral leasing and development), and oversees operations on 56 million acres of Native American tribal lands where mineral recovery is taking place.

BLM's public lands offer a wide variety of recreational opportunities, including hunting, fishing, camping, hiking, boating, hang-gliding, off-highway vehicle use, mountain biking, and birdwatching. BLM lands also include important

natural and cultural heritage sites (U.S. Department of the Interior, Bureau of Land Management).

State Agencies

State Parks

DPR manages more than 270 park units that support a diverse assortment of natural, cultural, and recreational resources. DPR is responsible for almost one-third of California's scenic coastline and manages coastal wetlands, estuaries, beaches, and dune systems. DPR's mission is to provide for the health, inspiration and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation (California Department of Parks and Recreation 2004).

California Department of Fish and Game

The DFG maintains native fish, wildlife, plants, and natural communities for their intrinsic and ecological value and their benefits to people. DFG's responsibilities encompass habitat protection and maintenance in a sufficient amount and quality to ensure the survival of all species and natural communities. DFG is also responsible for the diversified use of fish and wildlife, including recreational, commercial, scientific, and educational uses. DFG's mission is to manage California's diverse fish, wildlife, and plant resources and the habitats on which they depend for their ecological values and for their use and enjoyment by the public (California Department of Fish and Game 2004).

Local Planning

Public recreation facilities are provided by cities, counties, and special districts. Lands owned and/or managed by private organizations may also provide recreational opportunities to the public, although these lands are not typically located within an institutionally recognized recreational facility. Local general plans lay out the pattern of future development within a community, including open-space and recreational land uses. For more information about general plans and local land use planning, see Chapter 3 *(Land Use and Planning*). The planning process for recreational facilities typically includes

- establishing per-capita standards for providing parks and recreational facilities (these standards vary from jurisdiction to jurisdiction depending on identified local needs);
- assessing present and future demands for parks and recreational facilities;

- conducting an inventory of areas identified as suitable for parks and recreational purposes, including areas of outstanding scenic beauty;
- reviewing federal, state, and local plans for the acquisition and improvement of public parks; and
- developing and implementing programs for the protection, conservation, and acquisition of open space lands.

To facilitate implementation of planned growth patterns, general plans typically include goals and/or policies addressing the coordination of land use patterns with the development and maintenance of utilities and other infrastructure. Local planning documents and zoning ordinances typically provide for the installation, operation, and maintenance of utilities in most land use designation types, as necessary to facilitate and support planned growth patterns. Such accommodations are made either as a permitted use (automatically allowed under the zoning designation) or through issuance of a Conditional Use Permit (CUP).

Existing Conditions

The action area encompasses part or all of nine San Joaquin Valley counties: San Joaquin, Stanislaus, Merced, Fresno, Kings, Kern, Mariposa, Madera, and Tulare (Figure 1-1). The recreational context for the proposed action includes all federal, state, and local recreational facilities within the action area.

Recreational opportunities vary from county to county. Table 15-1 contains a listing of principal federal and state recreational facilities in the action area, including the managing agency and the county in which the facility is located. In addition to these federal and state recreational facilities, various additional recreational facilities in the action area fall under the jurisdiction of local agencies. The Department of Defense is the single largest landholder/land manager in the action area. Areas under their auspices generally are not open to public recreational purposes, although federal and state agencies may retain jurisdiction over certain recreational facilities. Thus, the list provided in Table 15-1 is not exhaustive; instead, it includes those agencies that oversee the vast majority (by acreage) of the action area's institutionally recognized recreational facilities.

In some areas, PG&E's electricity and/or natural gas infrastructure may be located within or adjacent to local recreation facilities. The types and uses of these facilities vary greatly. In urban areas, typical recreation facilities may include parks consisting of playgrounds, picnic areas, sports fields, and bike and pedestrian pathways. In less developed areas, typical recreational facilities may include open space areas and trails for hiking, equestrian use, and off-road vehicles.

Table 15-1. Recreational Facilities in the Action Area[1]

County	Owner/Manager	Property
Fresno	California Department of Fish and Game	Alkali Sink ER
		Avocado Lake
		Big Table Mountain
		Coalinga Mineral Springs PA
		Curry Mountain PA
		Fairfax FA
		Huron FA
		Kerman ER
		Little Panoche Reservoir WA
		Lost Lake FA
		Mendota WA
		Panoche Hills ER
		Pilobos
		Pleasant Valley ER
		San Joaquin FH
		San Joaquin River ER
		Three Rocks FA
	California Department of Parks and Recreation	Millerton Lake SRA
	California State University	CSU Fresno
Kern	U.S. Fish and Wildlife Service	Bitter Creek NWR
		Kern NWR
	California Department of Fish and Game	Allensworth ER
		Bakersfield
		Buttonwillow ER
		California Aqueduct—Region 4
		Lokern ER
		Northern Semitropic Ridge
	California Department of Parks and Recreation	Tule Elk SR
Madera	U.S. Department of Defense	Eastman Lake Recreation Area
		Hensley Lake Recreation Area
	California Department of Fish and Game	San Joaquin River ER
	California Department of Parks and Recreation	Wassama Round House SHP

County	Owner/Manager	Property
Mariposa	U.S. Department of Defense	Eastman Lake Recreation Area
	California Department of Fish and Game	Limestone Salamander ER
Merced	Federal Bureau of Land Management	Panoche Hills
	U.S. Fish and Wildlife Service	Grasslands WMA
		Merced NWR
		San Luis NWR
	California Department of Fish and Game	Cottonwood Creek WA
		Dos Amigos
		Jasper Sears Mitigation Parcel
		Le Grand
		Los Banos WA
		Merced River Spawning Habitat
		North Grasslands WA
		O'Neill Forebay WA
		San Luis Reservoir WA
		Volta WA
		West Hilmar WA
	California Department of Parks and Recreation	George J. Hatfield SRA
		Great Valley Grasslands SP
		McConnell SRA
		Pacheco SP
	The Nature Conservancy	Cyril Smith Trust
		Simon Neuman
San Joaquin	U.S. Fish and Wildlife Service	San Joaquin River NWR
	California Department of Fish and Game	Acker Island
		Clifton Court Forebay
		Corral Hollow ER
		Dos Reis FA
		Mokelumne River
		Vernalis Riparian Habitat
		White Slough WA
		Woodbridge ER

County	Owner/Manager	Property
	California Department of Parks and Recreation	Carnegie SVRA
		Caswell Memorial SP
	City of Lodi	City of Lodi Treatment Plant
	City of Sacramento	Sacramento County
	City of Stockton	Louis Park
	The Nature Conservancy	Cowell
		McCormack-Williamson (Bean Ranch)
		Staten Island
Stanislaus	California Department of Fish and Game	Basso Bridge
		Fox Grove FA
		Gomes Lake
		North Grasslands WA
		Orestimba FA
		Tuolumne River Restoration Center
		West Hilmar WA
	California Department of Parks and Recreation	Caswell Memorial SP
		Henry W. Coe SP
		Turlock Lake SRA
	California State University	Stanislaus State University
	The Nature Conservancy	Simon Neuman
	U.S. Fish and Wildlife Service	San Joaquin River NWR
Tulare	U.S. Fish and Wildlife Service	Blue Ridge NWR
		Pixley NWR
	California Department of Fish and Game	Allensworth ER
		Blue Ridge ER
		Kaweah ER
		Springville ER
		Stone Corral ER
		Yaudanchi ER
	California Department of Parks and Recreation	Colonel Allensworth SHP

Source: State of California 2004.

[1] Note that this table lists facilities within the action area only. Additional facilities outside the boundary of the action area are located in some action area counties.

Environmental Consequences and Mitigation Strategies

Methodology for Impact Analysis

Analysis of impacts related to recreation addressed the potential for implementation of the proposed action and each alternative to result in adverse effects on existing recreational opportunities in the action area. Impacts were evaluated qualitatively, based on professional judgment in light of the activities, methods, and techniques entailed by PG&E's San Joaquin Valley O&M program, and the additional avoidance and minimization measures (AMMs) that would be enacted under the proposed HCP (see Chapter 2, *Proposed Action and Alternatives*). More detailed information regarding impacts related to land use and land use planning is presented in Chapter 3.

Significance Criteria

For the purposes of this analysis, an impact was considered to be significant and to require mitigation if it would

- include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment,
- increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated, or
- result in long-term disruption of any institutionally recognized recreational facility or activity.

Impacts and Mitigation Measures

Proposed Action

Impact REC1—Potential to result in, construct, or expand recreational facilities that might have an adverse physical effect on the environment. The proposed action would not directly or indirectly entail construction or expansion of recreational facilities. Some mitigation lands might accommodate very limited passive recreational uses, but infrastructure needs would be minimal, consistent with the primary purpose of these lands for habitat compensation. **There would be no impact related to construction or expansion of recreational facilities.** Where available at all, recreational uses would be strictly limited, and would be managed adaptively to ensure that mitigation lands successfully achieve their designated biological purpose; this

could include further restriction or elimination of recreational use, if needed. Consequently, **impacts associated with recreational use of mitigation lands would be less than significant.**

Mitigation Measure—No mitigation is required.

Impact REC2—Potential to increase the use of recreational facilities, accelerating or causing physical deterioration. The proposed action focuses on enabling PG&E's existing O&M and minor construction programs to continue in compliance with the federal and state ESAs. It has no recreational goal or objective, and although there is potential for some habitat mitigation lands to support passive recreational uses in the future, any such use would be very strictly limited because of the need to manage mitigation lands toward achievement of biological objectives. For the same reason, the types of recreation potentially available on mitigation lands would differ from the uses typical for developed neighborhood and regional park facilities, which generally support community gatherings, youth sports, picnicking, and other facilities-dependent recreation. Thus, the proposed action would not alter patterns of recreational use in any portion of the action area, and would not increase the use or cause or accelerate the physical deterioration of any existing neighborhood or regional park facility. **There would be no impact.**

Mitigation Measure—No mitigation is required.

Impact REC3—Potential for reduced recreational opportunities due to O&M and short-term construction activities. Existing rights-of-way (ROWs) for gas and electric transmission or distribution infrastructure may be located within or adjacent to existing recreational facilities. Such facilities may include improved or unimproved open space as well as trails for pedestrian, bicycle, and equestrian use. Therefore, maintenance of existing facilities could occur within or adjacent to recreational facilities, temporarily disrupting recreational use. Construction required for preserve enhancements on ROWs located in existing recreational facilities could also result in temporary disruption of recreational opportunities.

To identify preferred timeframes for O&M and enhancement construction activities and minimize disruption of recreational activities, PG&E will continue to implement its land use planning process as described in Chapter 2 (see under *PG&E's Existing Environmental Programs and Practices*). Windows for certain construction activities may be constrained by operational restrictions or by BMP restrictions, such as the need to avoid certain types of activities during the migratory bird nesting season. Emergency repairs must typically be completed as quickly as possible to ensure safety and continuity of service; they typically cannot be deferred. Thus, although PG&E makes an effort to minimize impacts on recreation, temporary closure or limitation of access to existing recreational facilities could occur at any time during the year. However, recreational uses are restored as quickly as possible following the completion of maintenance, repair, or construction activities, and no substantial long-term disruption of recreation is expected due to these activities. **This impact is thus considered less than significant.**

Mitigation Measure—No mitigation is required.

Impact REC4—Potential for reduced recreational opportunities due to installation of new, improved, or expanded aboveground facilities or structures. Some O&M and possibly also minor construction activities enabled by the proposed action would take place where PG&E owns land or leases ROW within an existing recreational facility. O&M activities are not expected to affect existing recreational facilities to the extent that access would be significantly reduced or the facility would be permanently closed. Minor construction is unlikely to result in new facilities of sufficient area to permanently alter recreational use; however, minor changes could occur depending on the nature of the facility and surrounding recreational uses. To ensure that any effect on recreational uses is minimized, PG&E will continue its current land use planning process as described in Chapter 2 (see under *PG&E's Existing Environmental Programs and Practices*). This entails consulting with local agencies and city and county jurisdictions to avoid or minimize conflicts with existing and planned land uses, including but not limited to recreation. In light of the consultative planning process that PG&E will carry forward under the proposed action, **impacts related to reduction of recreational opportunities or access due to new construction are expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact REC5—Potential for reduced recreational opportunities due to implementation of compensation options. Most of the compensation options identified in the proposed HCP would not affect recreational uses in recognized recreation areas—for instance, contributions to existing mitigation banks and donations to conservation organizations would support only existing or already planned uses and thus would not result in new adverse (or beneficial) changes in recreational use. However, there is some potential for the *Enhancement as Compensation* option to reduce existing recreational opportunities if the ROW segments selected for enhancement are located within recreation areas.

Enhancement actions may involve reducing or eliminating human presence to prevent the trampling of plants, displacement of breeding birds or wildlife, or introduction of invasive nonnative species. Thus, habitat enhancement could preclude access to or through new compensation lands within existing ROWs located in recreational areas. Exclusion from recreation areas could reduce recreational opportunities, depending on the size and location of the enhancement area, the size and nature of the recreation area, and the accessibility of the enhancement area before and after enhancement begins.

The evaluation process for identifying suitable and appropriate conservation lands would likely screen out some potential enhancement sites within recreational areas based on the biological goals and objectives of the proposed HCP. For example, suitable habitat for most special-status species is unlikely to be present in heavily used recreational areas, where heavy foot traffic, mountain bike use, off-road vehicle traffic, on-road traffic, and/or elevated noise levels could directly or indirectly disturb wildlife and degrade habitat. It is more likely

to be located in lightly used recreational areas or in recreational areas where use is limited to certain activities or portions of the area, so these types of areas are more likely to be targeted for enhancement use. Situations may occur, however, in which options to enhance specific habitat types are limited. In such cases, a portion of an ROW in a recreational facility could be selected as a compensation site, and in some locations, there may be some potential to reduce or eliminate recreational access or certain recreational uses as a result.

The HCP stresses—and provides measures to achieve—avoidance and minimization of impacts. Compensation is invoked only in cases where impacts cannot be satisfactorily avoided or reduced, and even where compensation is identified as necessary, several other compensation strategies are preferred over enhancement. Thus, the *Enhancement as Compensation* option would probably be implemented only in a limited number of cases where preferable options are not available. Moreover, as discussed in Chapter 2, PG&E will continue its current land use planning process under the proposed action. In siting new facilities, the company consults with local agencies and city and county jurisdictions to avoid or minimize conflicts with existing and planned land uses. Under the proposed action this would apply not only to siting of new facilities but also to location of proposed compensation lands. As a result, **impacts related to reduction of recreational opportunities or access as a result of habitat compensation are expected to be less than significant.**

Mitigation Measure—No mitigation is required.

Impact REC6—Potential to provide new or enhanced recreational opportunities due to establishment of preserves or other compensation lands. Although it would be speculative to identify the location or extent of potential future preserve lands, some preserves established as compensation under the proposed action may permit limited and very strictly regulated passive recreational uses such as birdwatching or nature photography. If so, establishment of preserves could provide new or enhanced recreational opportunities in the action area. **This outcome would represent a beneficial impact.**

Mitigation Measure—Because this impact would be beneficial, no mitigation is required.

Alternative 1—HCP with Reduced Take

Alternative 1 would enable the same program of O&M and minor construction activities described for the proposed action, with minor differences specific to commitments for the protection of biological resources.

Compensation ratios for loss or disturbance of habitat would be the same as under the proposed action; the key difference between the proposed action and Alternative 1 is an additional level of stringency associated with the implementation of AMMs at a lower level of effect than under the proposed

action, with the intent of reducing take. As discussed in Chapter 2 (*Proposed Action and Alternatives*), the AMMs implemented under Alternative 1 would be the same as those described above for the proposed HCP. However, under Alternative 1, AMMs for certain activities would be implemented at a lower level of disturbance (for more detailed information about AMMs under the proposed action and the alternatives, see Chapter 2). Although the level of take would be reduced because of the increased stringency in implementing the HCP's AMMs, compensation is expected to be similar under both alternatives because compensation acreages would be calculated based on acreage affected, not level of take. Consequently, under Alternative 1, impacts related to recreational resources would be similar to those described for the proposed action.

Alternative 2—HCP with Enhanced Compensation

Alternative 2 would enable the same program of O&M and minor construction activities described for the proposed action. Differences between Alternative 2 and the proposed action center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). As identified in Chapter 3 (*Land Use and Planning*), increased compensation ratios could result in the establishment of a greater number of preserves or preserves that encompass larger geographic areas as compared to those established under the proposed action.

Under Alternative 2, assuming the same level of habitat disturbance, overall compensation requirements could be greater than under the proposed action, possibly resulting in greater potential to disturb recreational facilities and opportunities. Criteria for identifying suitable compensation lands would remain the same under Alternative 2 (see Chapter 4 of the proposed HCP in Appendix B), and selection of appropriate compensation lands would be subject to USFWS and DFG approval. Nonetheless, as the demand for compensation lands increases, availability of lands that support the appropriate habitat types can be expected to decrease, both within and outside of PG&E ROWs.

Where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options are available (e.g., purchase of mitigation credits, donations, and enhancement). Implementation of compensation options other than acquisition by purchase or easement may offset some of the difference in compensation ratios. However, Alternative 2 would still have the potential to permanently reduce recreational opportunities in the action area. Further, the enhanced compensation requirements under Alternative 2 could result in greater overall compensation requirements and as a result, a greater number and/or larger acreage of preserves. Consequently, impacts related to recreation would likely be slightly greater under Alternative 2 than those described for the proposed action.

Alternative 3—HCP with Reduced Number of Covered Species

Alternative 3 would enable the same program of O&M and minor construction activities described for the proposed action, and would enact the same additional environmental commitments for other resource areas identified in this EIS/EIR. The key difference between Alternative 3 and the proposed action relates to the number of species covered under Alternative 3 (reduced by comparison with the proposed action, as described in Chapter 2). Depending on their status at the time, other species might be subject to state, and possibly also federal, requirements for impact assessment and compensation, which would need to be addressed on a case-by-case basis.

Reducing the number of HCP covered species could result in the establishment of a lesser number of preserves or preserves that encompass smaller geographic areas (as compared to those established under the proposed action) as a result of activities enabled under Alternative 3. At the same time, additional, case-by-case assessment of compensation needs might be required for any individual activities identified as having the potential to affect noncovered special-status species. It is difficult to determine the precise effect that this approach would have on recreation since the species potentially involved, their listing status, and detailed compensation needs cannot be identified at this time. However, because Alternative 3 could require the assessment of at least some compensation needs on a case-by-case basis, it could result in the identification of smaller parcels of land (including ROW areas) for enhancement use, compared to the proposed action. Also, while Alternative 3 could result in smaller contiguous areas where access may be limited or closed, more numerous occurrences of closures or access limitations could occur under Alternative 3. Depending on availability of appropriate habitat, multiple restricted access areas could potentially be scattered within the same recreational facility or distributed among several facilities throughout the action area.

As the demand for compensation lands increases, availability of lands that support the appropriate habitat types can be expected to decrease, including areas within PG&E ROWs. Where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options are available (e.g., purchase of mitigation credits, donations, and enhancement); reliance on compensation options other than acquisition by purchase or easement could offset some of the difference in compensation needs. However, criteria for identifying suitable compensation lands would remain the same, and selection of appropriate compensation lands would be subject to DFG and possibly also USFWS approval, depending on the species involved. Alternative 3 would thus have some potential to permanently reduce recreational opportunities in the action area. Impacts would be similar under Alternative 3 to those described for the proposed action, but the case-by-case approach to compensation determination for impacts on noncovered species under Alternative 3 could result in a greater number of preserves, and could also result in greater restrictions on existing recreational opportunities.

In summary, impacts related to recreation could be slightly greater under Alternative 3 compared to those described for the proposed action, but might also be slightly less, depending on the need for, and the outcomes of, case-by-case assessment outside the HCP process. Depending on the need for, and the outcomes of, separate case-by-case assessment outside the HCP process, impacts could also be slightly less than those identified for the proposed action.

Alternative 4—No Action

Under the No Action Alternative, PG&E would continue its existing program of O&M activities unchanged. No HCP would be implemented, and no other new environmental commitments would be put in place. The following paragraphs describe the range of possible outcomes for recreation under the No Action Alternative.

Individual actions affecting suitable habitat for listed species would be assessed through case-by-case consultation with USFWS and DFG for level of effect and associated compensation needs. Because the compensation requirements for habitat disturbance would be evaluated on a case-by-case basis, smaller parcels of land (including portions of ROW areas) would likely be identified for enhancement at any given time, but case-by-case consultation could also result in more numerous occurrences of closures or access limitations. This is similar to but more extreme than the case described above for Alternative 3, where most compensation would be expected to occur under the auspices of an HCP process.

The availability of desirable compensation lands is expected to decrease over time, as lands are used for compensation or other purposes. However, as described for the action alternatives, where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options would likely still be available (e.g., purchase of mitigation credits, donations, and enhancement).

Potential adverse effects on existing recreational opportunities could be reduced under the No Action Alternative compared to the proposed action since suitable compensation lands might become more difficult to acquire on a case-by-case basis and payment-type compensation options might be used to a greater degree. It is difficult to assess the precise effect that this approach would have on recreation because locations and other details about specific habitat enhancement sites are unknown at this time, as are the actual compensation acreages that would be required.

If payment-type compensation options were not emphasized, the case-by-case approach to compensation determination under the No Action Alternative could result in a greater number of preserves, and/or greater restrictions on existing recreational uses than the proposed action. Consequently, impacts related to recreation could also be greater under the No Action Alternative than those described for the proposed action.

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Chapter 16

Socioeconomics

Chapter 16
Socioeconomics

This chapter provides a brief discussion of socioeconomic factors as they relate to the proposed action. Additional analysis relevant to this topic is provided in Chapter 17 (*Environmental Justice*), which addresses the potential for disproportionate effects on minority and low-income communities, as well as Chapter 3 (*Land Use and Planning*), Chapter 4 (*Agricultural Resources*), Chapter 15 (*Recreation*), and Chapter 19 (*Growth Inducement and Related Effects*).

NEPA and CEQA requirements for the analysis of social and economic impacts differ somewhat. NEPA requires that an EIS consider social and economic effects if they are related to effects on the natural or physical environment, and the NEPA definition of *effects* includes social and economic factors (40 CFR 1508.8, 1508.14). However, the intent of NEPA is that social and economic effects alone should not trigger preparation of an EIS (40 CFR 1508.14). CEQA requires analysis of a proposed project's potential impacts on population growth and housing supply, but social and economic changes are not considered environmental impacts in and of themselves under CEQA, although they may be used to determine whether a physical change is significant or not. CEQA also permits discussion of social and economic changes that would result from a change in the physical environment and could in turn lead to additional changes in the physical environment (CEQA Guidelines Sec. 15064[f]).

As discussed in Chapter 4 (*Agricultural Resources*) and Chapter 15 (*Recreation*), the proposed action and action alternatives have some potential to result in conversion of agricultural lands to nonagricultural uses, and in loss or reduction of recreational opportunities. Although these impacts are identified as less than significant, with no mitigation required, this EIS/EIR is nonetheless required under NEPA and the policies of the California State Resources Agency to evaluate any potential socioeconomic effects of these changes in use.

Mitigation for socioeconomic effects is typically identified when a proposed action would directly or indirectly result in

- substantial changes in the availability of employment, housing, or services;
- substantial effects on the economic base of the region or state; or
- displacement of a substantial number of people or existing housing units, such that replacement housing in another location would be needed.

However, the socioeconomic effects of the proposed action and action alternatives are expected to be minimal. Neither the proposed action nor the action alternatives would reduce the availability of housing or services[1], nor are they expected to substantially reduce the availability of employment opportunities in any of the action area counties. There is some (minor) potential for new construction to result in the loss of a small number of agricultural jobs if agricultural lands are converted to HCP compensation use or if line extensions or substation expansion activities covered by the HCP occur. However, because the acreage involved would be very limited, the number of jobs potentially lost, if any, would also be very small, and the overall direct effect on local and regional job availability would be minimal. The indirect effect on the local and countywide economic base would also be minimal. Finally, even if HCP compensation requirements required acquisition of privately owned lands for mitigation, the overwhelming preference would be for lands that do not support residential uses, and PG&E would not exercise eminent domain to acquire mitigation lands; lands would only be purchased from willing sellers under terms agreeable to all parties. Thus, mitigation needs could conceivably result in the displacement of a small number of rural residences over the 30-year permit term, but the effect relative to the need for relocation housing would be minor, any displacement would involve willing sellers and would be fully compensated, and no need for additional mitigation is anticipated.

Under the No Action Alternative, no HCP would be implemented, and ESA compliance would continue to be accomplished on a case-by-case basis. Consequently, any changes by comparison to existing conditions would be negligible.

In summary, the proposed action's socioeconomic effects would be less than significant, and no mitigation is required.

[1] The potential to *increase* the availability of housing and utility services is addressed as a growth-related effect in Chapter 19.

Chapter 17

Environmental Justice

Chapter 17
Environmental Justice

This chapter analyzes the proposed action's potential effects related to environmental justice. *Environmental justice* embodies the concept that disadvantaged populations must not experience disproportionate adverse impacts as a result of any federal action. Disproportionate adverse impacts on minority and/or low-income populations are generally referred to as *environmental justice impacts* in this EIS/EIR

The principal source of information used in the preparation of this chapter was

- current federal census data on demographics and income in the nine action area counties (U.S. Bureau of the Census 2000a, 2000b).

Related information is presented in Chapter 16 (*Socioeconomics*).

Affected Environment

Regulatory Framework

The concept of environmental justice is rooted in the Civil Rights Act of 1964, which prohibited discrimination in federally assisted programs, and in Executive Order 12898 (*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*), issued February 11, 1994. Executive Order 12898 was intended to ensure that federal actions and policies do not result in disproportionately high adverse effects on minority or low-income populations. It requires each federal agency to take "appropriate and necessary" steps to identify and address any such disproportionate effects resulting from its programs, policies, or activities, including those it implements directly, and those for which it provides permitting or funding. Additional guidance from the President's Council on Environmental Quality (1997) clarifies that environmental justice concerns may arise from effects on the natural or physical environment that produce human health or ecological outcomes, or from adverse social or economic changes.

Environmental justice issues are mandated and regulated at the federal level, and compliance with NEPA requires analysis of environmental justice effects.

California does not require environmental justice analysis in documents prepared for CEQA compliance.

Existing Conditions

The U.S. Environmental Protection Agency's (EPA's) guidelines for incorporating environmental justice concerns into NEPA analyses identify an area with a *minority population* as one where the minority population constitutes more than 50% of the area's total population, or is "meaningfully greater" than the percentage in the surrounding region (e.g., census tract compared to city, city compared to county). A *minority* is defined as referring to the following population groups: American Indian/Alaskan Native, Asian or Pacific Islander, Black (non-Hispanic), and Hispanic (U.S. Environmental Protection Agency 1998). The federal government considers race and Hispanic or Latino origin to be separate, distinct concepts (U.S. Bureau of the Census 2001).

As shown in Tables 17-1a and 17-1b, Tulare County (50.8% Hispanic or Latino) is the only one of the nine counties where the population of an individual minority group makes up more than 50% of the county's total population. However, Fresno, Kern, Kings, Madera, and Merced Counties all have Hispanic or Latino percentages more than 18% larger than that of the state as a whole. All of the counties except Kings (8.3%) have a lower Black or African-American percentage than the state (6.7%), and all except San Joaquin (11.4%) have a lower Asian percentage than the state (10.9%). The counties all have a higher percentage of American Indians or Alaska Natives than the state (1.0%), particularly Mariposa (3.5%) and Madera (2.6%).

Table 17-1a. 2000 Census Data on Race in Action Area

		Race (Number of Individuals)							
County	Total Population	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Two or More Races	Hispanic or Latino
California	33,871,648	20,170,059	2,263,882	333,346	3,697,513	116,961	5,682,241	1,607,646	10,966,556
Fresno	799,407	434,045	42,337	12,790	64,362	1,000	207,061	37,812	351,636
Kern	661,645	407,581	39,798	9,999	22,268	972	153,610	27,417	254,036
Kings	129,461	69,492	10,747	2,178	3,980	250	36,611	6,203	56,461
Madera	123,109	76,612	5,072	3,212	1,566	210	29,979	6,458	54,515
Mariposa	17,130	15,234	114	602	122	22	457	579	1,329
Merced	210,554	118,350	8,064	2,510	14,321	396	55,013	11,900	95,466
San Joaquin	563,598	327,607	37,689	6,377	64,283	1,955	91,613	34,074	172,073
Stanislaus	446,997	309,901	11,521	5,676	18,848	1,529	75,187	24,335	141,871
Tulare	368,021	213,751	5,852	5,737	12,018	408	113,317	16,938	186,846

Source: U.S. Bureau of the Census 2000a.

Table 17-1b. 2000 Census Data on Race in Action Area (Percentage)

	Race (Percent)							
County	White	Black or African-American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Two or More Races	Hispanic or Latino
California	59.5	6.7	1.0	10.9	0.3	16.8	4.7	32.4
Fresno	54.3	5.3	1.6	8.1	0.1	25.9	4.7	44.0
Kern	61.6	6.0	1.5	3.4	0.1	23.2	4.1	38.4
Kings	53.7	8.3	1.7	3.1	0.2	28.3	4.8	43.6
Madera	62.2	4.1	2.6	1.3	0.2	24.4	5.2	44.3
Mariposa	88.9	0.7	3.5	0.7	0.1	2.7	3.4	7.8
Merced	56.2	3.8	1.2	6.8	0.2	26.1	5.7	45.3
San Joaquin	58.1	6.7	1.1	11.4	0.3	16.3	6.0	30.5
Stanislaus	69.3	2.6	1.3	4.2	0.3	16.8	5.4	31.7
Tulare	58.1	1.6	1.6	3.3	0.1	30.8	4.6	50.8

Source: U.S. Bureau of the Census 2000a.

The EPA identifies an area as *low-income* if the low-income population is more than 50% of the area's total population, or is "meaningfully greater" than the percentage of low-income residents in the surrounding region. *Low-income* refers to households with an income below the federal poverty level (U.S. Environmental Protection Agency 1998).

As shown in Table 17-2, the nine counties all have lower median household incomes ($33,983–41,282) and incomes per capita ($14,006–18,190) than the state as a whole ($47,793 and $22,711, respectively). Also, except Mariposa County, by far the smallest county in the action area, the counties have higher percentages of families below the poverty line (12.3–18.8%) than the state as a whole (10.6%).

Table 17-2. 2000 Census Data on Income and Poverty Status in Study Area

County	Median Household Income, 1999 (Dollars)	Income Per Capita, 1999 (Dollars)	Families Below Poverty Level, 1999 (Percent)
California	47,793	22,711	10.6
Fresno	34,725	15,495	17.6
Kern	35,446	15,760	16.8
Kings	35,749	15,848	15.8
Madera	36,286	14,682	15.9
Mariposa	34,626	18,190	10.5
Merced	35,532	14,257	16.9
San Joaquin	41,282	17,365	13.5
Stanislaus	40,101	16,913	12.3

County	Median Household Income, 1999 (Dollars)	Income Per Capita, 1999 (Dollars)	Families Below Poverty Level, 1999 (Percent)
Tulare	33,983	14,006	18.8

Source: U.S. Bureau of the Census 2000b.

Environmental Consequences

Methodology for Analysis

Assessing whether the effects of resource impacts would be disproportionately high and adverse for minority or low-income populations involves

1. evaluating populations in the affected area to identify loci where minority and/or low income populations are concentrated, and then
2. assessing whether impacts on biological, physical, or social resources would affect these areas to a greater degree than neighboring regions.

Consistent with EPA guidance (U.S. Environmental Protection Agency 1998), this analysis addressed only adverse effects. For the purposes of this analysis, an environmental change was considered to represent an environmental justice concern if it would

- predominantly result in an adverse effect on a minority or low-income area as defined by the EPA; or
- result in an adverse effect on a minority or low-income area that is appreciably more severe or of greater magnitude than the adverse effect experienced by nonminority and/or non–low-income areas.

Because the proposed action and all of the action alternatives would be very similar from an environmental justice perspective, they are discussed together for brevity. The No Action Alternative is analyzed separately.

Environmental Justice Outcomes

Proposed Action and Action Alternatives

As discussed in *Existing Conditions* above, the population of Tulare County is slightly more than 50% Hispanic or Latino, so Tulare County as a whole qualifies as a minority area as defined by the EPA. In addition, all of the action area counties have a higher percentage of Native American residents than the state as a whole; Fresno, Kern, Kings, Madera, and Merced Counties have substantially greater percentages of Hispanic/Latino residents than the state; Kings County has a slightly higher percentage of Black or African-American residents than the state; and San Joaquin County has a slightly higher percentage of Asian residents

than the state. Most of these differences are small enough that they are unlikely to meet EPA's subjective criterion describing a population that is "meaningfully greater" than that of the surrounding region; thus, none of the other eight counties is considered to qualify as a minority area on a countywide scale. However, portions of each action area county are considered to meet the EPA criteria. In addition, all of the action area counties have median household and per capita incomes substantially below statewide figures, and all but Mariposa County have higher percentages of families below the poverty line. Thus, all nine of the action area counties qualify as low-income areas as defined by the EPA.

Because of these economic and demographic factors, almost any adverse effect associated with the proposed action or an action alternative has the potential to represent an environmental justice concern. The precise locations that would be affected by activities enabled under the proposed action and alternatives cannot be identified at this time, because O&M and minor construction are implemented on an as-needed basis over a broad geographic region. Thus, it would be speculative to identify the location, nature, or severity of specific environmental justice concerns. However, as discussed in Chapters 3 through 16 of this EIS/EIR, the lead agencies have concluded that potentially significant effects would be avoided or effectively mitigated by PG&E's existing environmental commitments (discussed in Chapter 2) and/or mitigation identified for individual resources in this EIS/EIR. Any residual effects, and hence any environmental justice concerns, are expected to be minor. Moreover, as described in Chapter 2, PG&E has an established companywide policy in place that requires the company to identify and address potential environmental justice concerns. This program would carry forward for all activities implemented under the proposed action.

In light of the analyses and mitigation measures presented in Chapters 3 through 16, and with PG&E's environmental justice program in place, effects related to environmental justice are expected to be minimal under the proposed action. The same would be true of the action alternatives, because impacts would be broadly similar in nature and severity under all action alternatives and the same mitigation strategies would apply; and PG&E's existing environmental justice program would remain in place under all action alternatives.

Alternative 4—No Action

As identified in the preceding section, all of the nine action area counties qualify as low-income areas under EPA criteria, Tulare County as a whole qualifies as a minority area, and portions of the other eight action area counties also qualify as minority areas. Consequently, as with the proposed action and action alternatives, any adverse effect incurred under the No Action Alternative has the potential to represent an environmental justice concern. However, PG&E's existing environmental justice program would remain in force under the No Action Alternative. Environmental justice impacts under the No Action Alternative, if any, are thus expected to be minimal, and would not require mitigation.

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Chapter 18

Cumulative Effects

Chapter 18
Cumulative Effects

NEPA and CEQA Requirements

NEPA and CEQA both require lead agencies to evaluate a proposed undertaking's potential to contribute to cumulative effects or cumulative impacts in the project or program area. *Cumulative impact* refers to the combined effect of "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (CEQA Guidelines Sec. 15355). As defined by the State of California, cumulative impacts reflect

> the change in the environment which 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 (CEQA Guidelines Sec. 15355[b]).

This is consistent with NEPA's use of the term. The President's Council on Environmental Quality (CEQ) further recognizes two categories of cumulative impacts: those that represent the additive effect of repeated activities taking place as part of a single proposed undertaking, and those that represent the combined effect of activities taking place under more than one proposed undertaking.

CEQA requires that an EIR analyze a proposed undertaking'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 (CEQA Guidelines Sec. 15130[a], 15065[c]). This ensures that EIRs fully analyze any project effects that are less than significant on an incremental (project-specific) scale, but may be considerable in combination with the related effects of other projects. It also serves to focus EIR analysis only on those cumulative impacts to which a proposed undertaking has the potential to make an important contribution. CEQ similarly guides lead agencies to restrict analysis of cumulative impacts to those that are meaningful.

In practice, this typically means that the lead agency 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" (CEQA Guidelines Sec. 15130[b]). Under CEQA, lead agencies may use a "list" approach to identify related projects for analysis, or may base the identification of cumulative impacts on a summary of projections in an adopted general plan or related planning document. CEQ's guidance for cumulative impact analysis offers additional strategies to identify cumulative impacts requiring analysis, such as input from questionnaires, interviews, and panels; use of analytical tools such as checklists, matrices, and system diagrams; modeling and trends analysis; and, for resources where spatial relationships are important, GIS analysis.

Approach and Scope

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 action area (see Figure 18-1 for extent of action area). Analysis addressed both types of cumulative effects identified by CEQ: those that represent the combined effect of activities occurring under more than one action, and those resulting solely from the additive effect of repeated activities under the proposed action. Both types of effects were analyzed based on professional judgment in light of current standards of care specific to each resource topic. Consistent with the State's CEQA Guidelines and CEQ's cumulative impacts guidance, analysis focused on aspects of regional cumulative effects to which the proposed action has the potential to contribute; cumulative effects to which the proposed action would not contribute are not discussed or analyzed in detail.

For **resources known to be subject to a regional cumulative impact** independent of the proposed action, the effects of the proposed action were analyzed as they would combine with the effects of other projects to contribute to the larger cumulative effect ("multi-project analysis"). For most resources, separate analysis of the proposed action's additive effects was not necessary in these cases, because identifying the proposed action's contribution to the larger, multi-project cumulative effect included consideration of the additive effects of repeated activities it would entail.

For **resources not believed to be subject to an existing regional cumulative effect**, separate analysis of the proposed action's additive effects was necessary to meet the requirement to evaluate whether repeated activities under the same program would result in a cumulative effect. This requirement is particularly important because the proposed action would have a 30-year lifespan and would entail numerous repeated activities over that period.

The first step in analyzing cumulative effects for the proposed action was to identify, for each resource analyzed in this EIS/EIR, whether a regional

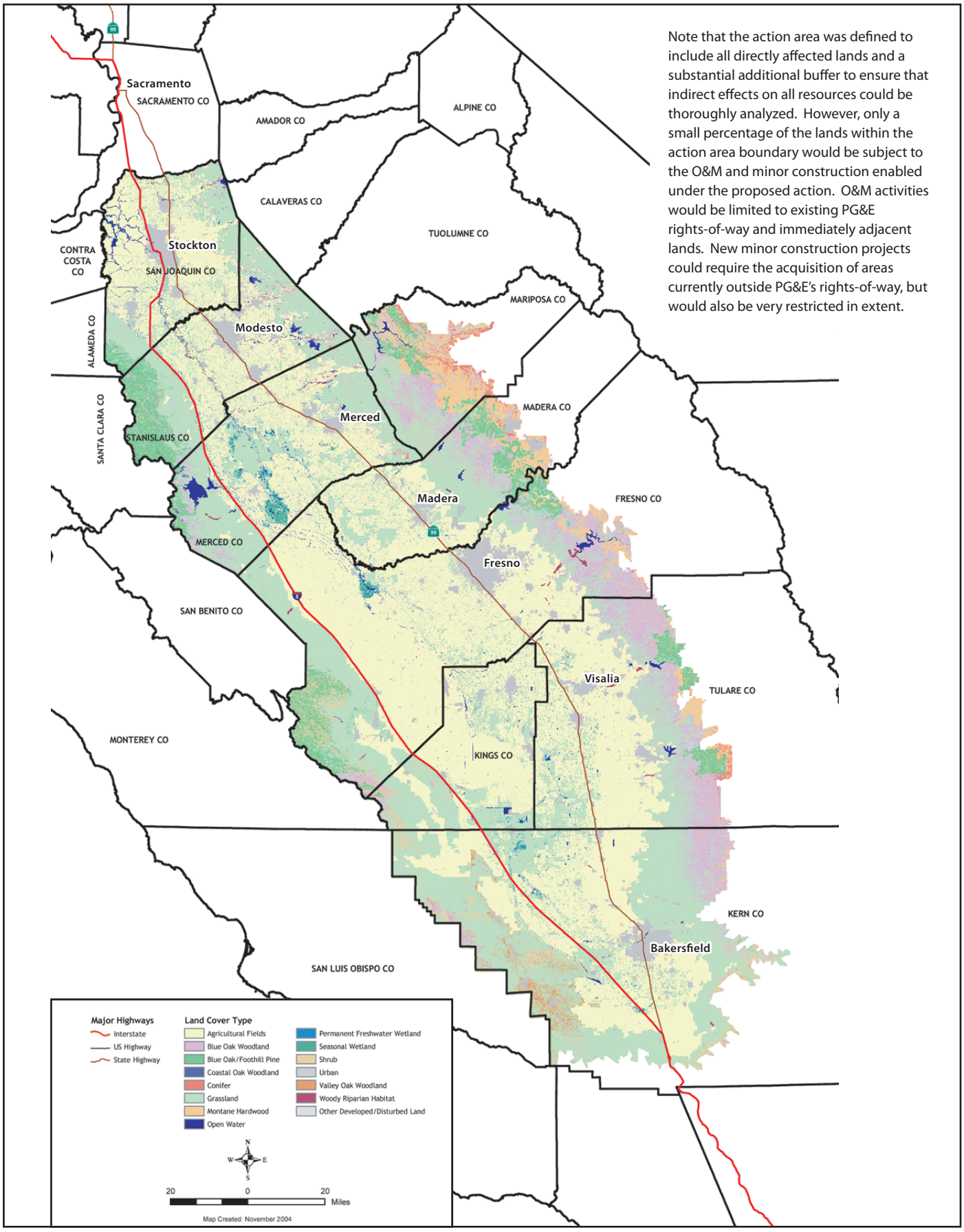

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Figure 18-1
Extent of Action Area—Area of Cumulative Effects Analysis

cumulative effect exists independent of the proposed project. The need to analyze additive effects under the proposed action was then assessed. Table 18-1 summarizes this process and shows the types of analyses needed for the proposed action's potential contribution to cumulative effects, by resource topic.

Table 18-1. Summary of Cumulative Effects Analyses Needed for the Proposed Action

Resource Topic	Is There a Regional Cumulative Impact?	Analyze Proposed Action's Additive Effects Separately?
Land Use and Planning	None identified. Land use in the action area is evolving as San Joaquin Valley urban centers expand, but because growth centers on existing developed areas, it is primarily if not exclusively taking place as planned growth guided by General and Specific Plans.	The areas affected by repeated O&M activities enabled under the proposed action would be limited to ROWs and immediately adjacent lands. Because O&M is inherently focused on use and maintenance of these existing facilities, it would not result in any additive cumulative effect on land use. Minor construction projects and establishment of new preserves could both affect land use planning, but new facilities and compensation lands would be distributed throughout the action area and thus would not result in additive cumulative effects on any one location or vicinity. Because the size of new facilities would be comparatively small, additive effects would be less than significant over the action area as a whole. No further analysis is warranted.
Agricultural Resources	Yes; multi-project analysis required.	No.
Biological Resources	Yes; multi-project analysis required.	No.
Aesthetics	The action area includes undeveloped lands, agricultural areas, small communities, and rapidly growing urban centers such as Stockton, Modesto, Bakersfield, and Fresno. Because of its geographic diversity, the action area is extremely heterogeneous in terms of the character and quality of views it offers. Localized cumulative impacts on aesthetic resources are considered to exist in areas where agricultural or open space is undergoing progressive urbanization, and along transit corridors where multiple unrelated built elements disrupt or intrude on rural or agricultural views. However, much of the action area offers high quality views of open rural and agricultural land, minimally affected if at all by cumulative effects of urbanization. The overall visual character and quality of action area views does not constitute a regionwide cumulative impact. No multi-project analysis is needed.	The areas affected by repeated O&M activities enabled under the proposed action would be limited to ROWs and immediately adjacent lands. Because O&M would focus on use and maintenance of existing facilities, repeated activities would not substantially alter the existing visual character of these alignments over the long term. No significant additive cumulative effect is anticipated, and further analysis is not warranted. Minor construction projects could alter visual character and/or quality in their vicinity. However, these projects would be located throughout the action area and thus would not result in additive effects on any one location or vicinity. Because it is not possible to predict the exact siting or nature of minor construction projects at this time, analysis of their additive effect, if any, on regionwide visual character would be speculative. No further analysis is required.
Geology and Soils	Although many projects within the action area are subject to a similar range of geologic hazards and constraints, these factors are typically addressed through a combination of engineering design and geotechnical mitigation specific to	No.

Resource Topic	Is There a Regional Cumulative Impact?	Analyze Proposed Action's Additive Effects Separately?
	each project's needs, as required by applicable state and local codes. Geologic factors are not typically considered to create a cumulative impact except in the case of multiple similar projects within a restricted geologic area where hazards cannot be mitigated with confidence. However, accelerating development in the San Joaquin Valley has contributed to progressive loss and unavailability of topsoil resources, representing a significant cumulative impact in parts of the action area. Focused analysis of this topic is required.	
Water Resources	Yes; multi-project analysis required.	No.
Cultural Resources	Yes; multi-project analysis required.	No.
Paleontological Resources	None identified.	Yes.
Transportation and Circulation	Cumulative traffic concerns have been identified in parts of the action area, particularly in urban areas and along heavily traveled corridors such as parts of I-5. However, other parts of the action area, including rural areas and recently developed areas where roadway infrastructure is adequate for current and projected demand, are not subject to cumulative traffic impacts. Because traffic conditions are so diverse, a regional (action area–wide) cumulative impact is not considered to exist. No multi-project analysis is needed.	Both O&M and minor construction activities would be distributed across the nine action area counties. Because of their wide geographic distribution and short-term, intermittent nature, neither O&M nor minor construction is expected to result in a significant additive cumulative effect on vehicular traffic or other transportation. No further analysis is warranted.
Noise and Vibration	The action area includes a diversity of land uses ranging from urban to agricultural and rural. Urban and rapidly developing areas are typically subject to cumulative noise impacts, while agricultural and rural areas are much less likely to be so impacted. Because of the diversity of noise environments in the action area, a regional (action area–wide) cumulative impact is not considered to exist. No multi-project analysis is needed.	As identified above, both O&M and minor construction activities would be distributed across the nine action area counties. Because of their wide geographic distribution and short-term, intermittent nature, neither O&M nor minor construction is expected to result in a significant additive cumulative effect on noise conditions. No further analysis is warranted.
Air Quality	Yes; multi-project analysis required.	No.
Public Health and Environmental Hazards	The action area has supported a broad range of land uses that employ hazardous materials; as of 2004, more than 7,000 sites with confirmed hazardous materials contamination have been identified in the nine action area counties. Contaminated sites are typically concentrated in areas with a history of specific land uses (e.g., industry and manufacturing, defense-related activities, rail and highway uses). Such areas are considered to be subject to localized cumulative impacts, while other parts of the action area are comparatively unimpacted. Thus, it is difficult to generalize appropriately across the entire action area, and no regional (action area–wide) cumulative impact is considered to exist. No	Yes.

Resource Topic	Is There a Regional Cumulative Impact?	Analyze Proposed Action's Additive Effects Separately?
	multi-project analysis is needed.	
Recreation	None identified.	The most likely avenues through which the proposed action would affect recreational uses or opportunities in the action area are construction of new facilities, and establishment of new preserves for habitat compensation. Both of these types of effects are expected to occur in discrete, widely separated locations throughout the action areas, and the extent of effects would be small, so no significant additive cumulative effect on recreation is anticipated. No further analysis is warranted.
Socioeconomics	None identified.	No. As discussed in Chapter 16, the socioeconomic effects of the proposed action and action alternatives are expected to be minimal. The analysis presented in Chapter 16 considered effects over the entire action area throughout the 30-year permit term; no further analysis of additive effects is warranted.
Environmental Justice	None identified.	No. As discussed in Chapter 17, the proposed action's incremental effects related to environmental justice are expected to be minimal. The analysis presented in Chapter 17 considered effects over the entire action area throughout the 30-year permit term; no further analysis of additive effects is warranted.

Based on the assessment summarized in Table 18-1, regional multi-project analyses were prepared for the following topics.

- Agricultural resources.
- Biological resources.
- Topsoil resources.
- Water resources.
- Cultural resources.
- Air quality.

A separate analysis of the proposed action's additive effects was prepared for

- paleontological resources, and
- hazardous materials.

Proposed Action's Contribution to Cumulative Effects

Effects in Context of Multiple Undertakings

Agricultural Resources

The principal cumulative effects concern relative to agricultural resources is conversion of agricultural land to nonagricultural uses. As discussed in Chapter 4 (*Agricultural Resources*), California is the nation's most populous and fastest-growing state. With that population growth has come an increasing pressure toward development of previously rural and agricultural areas, resulting in conversion of agricultural lands to residential, commercial, and industrial uses—over the period 1998–2000 alone, more than 21,000 acres of agricultural land in the action area was converted to nonagricultural use, representing about half of the statewide total for agricultural land conversions during that period (California Department of Conservation 2002). Agricultural land conversion thus represents a significant cumulative impact in the action area.

The proposed action would result in conversion of small areas of agricultural land to nonagricultural use to support installation of new facilities, expansion of existing facilities, and acquisition of new ROWs. PG&E estimates the total permanent conversion loss of agricultural fields at a maximum of 2 acres per year, and the total permanent loss of grassland, including but not limited to grassland that supports grazing use and is thus considered agricultural land, at a maximum of 1 acre per year. This translates to a total maximum conversion of 3 acres per year, or a maximum of 90 acres over the lifespan of the proposed action. Regionwide, agricultural conversion is expected to continue over the lifespan of the proposed action, and the rate of conversion could accelerate somewhat as development proceeds. However, **the maximum 90-acre loss as a result of the proposed action represents a small area and would not constitute a cumulatively considerable contribution to the conversion of agricultural land to nonagricultural use, either in the action area, or in the state as a whole.**

Some additional land could be acquired to support habitat mitigation under the proposed HCP, although, as discussed in the incremental analysis in Chapter 4 (*Agricultural Resources*), this would affect only grazing lands; lands would only be acquired from willing sellers; and most lands identified for compensation use would likely continue to be grazed after acquisition, and thus would not undergo a change in uses. Moreover, in contrast to a residential development or other similar project, the proposed action would not result in the loss or conversion of agricultural land to urban or other developed use; under the proposed action, any grasslands 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 grassland that may be acquired under the

proposed action 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.**

Biological Resources

Like much of the rest of California, the action 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 action area's native grassland, scrub, and riparian/wetland habitats. Additional losses have resulted from accelerating urbanization in recent decades. The action area's aquatic habitats have been impacted by various types of pollutants, including agricultural and petrochemicals; pollutants delivered via urban runoff; and increased sediment delivery resulting from ground disturbance for construction.

In addition, significant cumulative impacts on individual plant and wildlife species are considered to exist where species have been identified as qualifying for federal or state special status. This applies to a number of plant and wildlife species that are known to occur or may occur in the action area, listed in Tables 5-1, 5-2, 5-3, and 5-4.

As discussed in Chapter 2 (*Proposed Action and Alternatives*) and Chapter 5 (*Biological Resources*), O&M activities and minor construction are expected to result in the permanent loss of up to 1 acre and temporary disturbance of up to 196 acres of natural vegetation and the permanent loss of approximately 0.1 acre and temporary disturbance of approximately 0.5 acre of vernal pool habitat annually over the 30-year life of the proposed action. The habitat type subject to the greatest disruption is expected to be grassland, with a net disturbance of up to 105 acres per year. Through the HCP, PG&E proposes to avoid and minimize effects on these natural habitats to the extent practicable. As Chapter 2 identifies, some permanent loss is nonetheless likely to result from O&M and minor construction. Aquatic habitats could also be further degraded as a result of inchannel construction activities.

Accordingly, the proposed HCP further provides for acquisition and management of habitat to compensate for any unavoidable disturbance or loss. Compensation would be arranged in advance, based on a 5-year planning cycle, and PG&E would track actual impact acreages versus compensation acreages acquired as O&M activities proceed. If potential compensation deficits are identified during any planning cycle, they would be addressed by adjusting requirements for the following cycle and/or by implementing "early" compensation purchases; note that compensation for impacts on extremely rare plant species would be required within 2 years of impact. Thus, with the exception of very rare plant species, overall terrestrial habitat compensation is anticipated to outpace actual loss and disturbance over the long term. Potential impacts on aquatic habitat as a result of

inchannel work would be avoided or minimized through provisions of the master streambed agreement included as a component of the proposed action, as discussed in Impact BIO7 in Chapter 5. **With these protections and compensation mechanisms in place, O&M and minor construction under the proposed action are not expected to make a cumulatively considerable contribution to regional loss of natural habitats, and the proposed HCP is expected to result in a net long-term benefit with regard to cumulative regional habitat loss. It would also result in corollary benefits to common and special-status wildlife using the habitats preserved and protected.**

In addition, the HCP provides species-specific measures that augment PG&E's biological resources programs to reduce and compensate for disturbance, injury, and mortality of 65 special-status plant and wildlife species (see Tables 5-1 and 5-3). **With PG&E's existing programs and the HCP's additional measures and compensation requirements in place, O&M and minor construction under the proposed action are not expected to make a cumulatively considerable contribution to cumulative impacts on the HCP-covered species, and the proposed HCP is expected to result in a net long-term benefit for these species.**

As discussed in Chapter 5 (*Biological Resources*), the action area may support a number of additional plant and wildlife species that are not now state- or federally listed and are not expected to be listed within the proposed 30-year HCP term and thus are not covered in the proposed HCP, but nonetheless qualify for some form of special status (see Tables 5-2 and 5-4). O&M and minor construction have some potential to result in injury, mortality, and/or loss of habitat to special-status species other than those covered by the HCP. However, based on these species' distribution and the nature of the activities that would take place under the proposed action the lead agencies have concluded that significant impacts are unlikely (see Impact BIO6 in Chapter 5), and that the proposed action would not make a cumulatively considerable contribution to impacts on these species. The following paragraphs explain this conclusion in greater detail.

Four species—the Merced Canyon shoulderband, Ciervo aegialian scarab, Dry Creek cliff strider bug, and Merced kangaroo rat—have very narrow known home ranges. As discussed in Chapter 2, PG&E's current practice is to avoid small, localized populations of special-status species where they are known to occur. Where biological screening indicates that it is warranted, species' experts are consulted to assist the company's in-house biological staff in areas where species- or site-specific avoidance measures are necessary. In addition, PG&E implements its O&M activities in a manner that avoids or minimizes effects on small, localized populations where this can be accomplished while continuing to meet CPUC's safety and other regulations; if O&M activities are required in an area used by any of these species in the future, company biologists would evaluate the potential for impact and identify appropriate site- and activity-specific avoidance or minimization measures. In light of these provisions, O&M– and minor construction–related impacts on these four highly localized species were evaluated as incrementally less than significant (see Impact BIO6 in

Chapter 5), **and the contribution, if any, to regional impacts on these species would not be cumulatively considerable.**

Nine species—foothill yellow-legged frog, silvery legless lizard, two-striped garter snake, snowy egret (rookeries), great blue heron (rookeries), yellow rail, western snowy plover, LeConte's thrasher, and gray vireo—are known to occupy a small portion of the action area and have a broader distribution outside the action area. All nine of these species would be substantially protected during both new minor construction and ongoing O&M by PG&E's biological resources program, described under *PG&E's Existing Environmental Programs and Practices* in Chapter 2; impacts on birds would also be reduced by measures included in the company's Bird Protection Program (included as an appendix to the HCP; see Appendix B of this EIS/EIR). Additional protection would be afforded by the HCP's AMMs for species with similar habitat requirements. For example, foothill yellow-legged frog would benefit from AMM 17 (general protection for amphibian and reptile habitat) and possibly also from AMM 16 (protection for giant garter snake and California red-legged frog; two-striped garter snake would benefit from AMM 16, yellow rail would likely benefit to some extent from measures protecting wetland and grassland habitats; and the great blue heron and snowy egret would derive some benefit from protection of riparian habitat under AMM 26 (for riparian brush rabbit) and AMM 27 (for riparian woodrat). Impacts on heron and egret rookeries would be further minimized by PG&E's continuing compliance with protections for nesting birds embodied in Section 3503 of the California Fish and Game Code. In light of these PG&E's existing biological resources program and Bird Protection Program, measures included in the proposed HCP, and continued compliance with Section 3503 of the Fish and Game Code, **the proposed action is not expected to make a cumulatively considerable contribution to regional impacts on these species.**

The remaining 18 species listed in Table 5-4 have wide distributions that encompass much or all of the action area and in many cases extend outside the action area as well. These species include California linderiella, Hopping's blister beetle, Moestan blister beetle, Molestan blister beetle, Morrison's blister beetle, western spadefoot, western pond turtle, California horned lizard, San Joaquin whipsnake, northern harrier, Cooper's hawk, long-eared owl, California horned lark, pale Townsend's big-eared bat, San Joaquin pocket mouse, short-nosed kangaroo rat, Tulare grasshopper mouse, and American badger. Impacts of O&M activities on these species' habitat would be localized and temporary; minor construction, although it would result in permanent effects, would be even more areally restricted. Population-level impacts on any of these species are unlikely in light of the small area of habitat affected annually and over the permit term. With the existing biological resources program continuing in force under the proposed action, impacts would be effectively addressed on an activity by activity basis. Some species would also benefit by implementation of the HCP's AMMs for covered species with similar habitat requirements. For instance, linderiella would be protected by AMM 15 (vernal pool protection); western spadefoot and western pond turtle would benefit from protection of wetland and riparian habitat under AMMs 6 and 7, from protection of covered amphibian and reptile habitat under AMM 17, and from protection of California red-legged frog

and giant garter snake habitat under AMM 16; and northern harrier, San Joaquin pocket mouse, short-nosed kangaroo rat, Tulare grasshopper mouse, and probably also American badger would benefit from grassland protection and compensation. Consequently, the proposed action's impacts on these 18 species are also expected to be **less than cumulatively considerable.**

In summary, with PG&E's existing biological resources program and the HCP's additional measures and compensation requirements in place, O&M and minor construction under the proposed action are not expected to make a cumulatively considerable contribution to cumulative impacts on "other" special status species in the action area—those not covered in the HCP. Moreover, the HCP would result in a net long-term benefits to noncovered special-status species that use the habitats protected and conserved under the HCP.

Geology and Soils

Analysis of the proposed action's contribution to cumulative impacts related to geology and soils focuses on topsoil resources, as discussed in Table 18-1 above.

Accelerating development in the San Joaquin Valley over recent decades has contributed to progressive unavailability and loss of topsoil resources, representing a significant cumulative impact in parts of the action area. Areas where topsoil loss has been particularly important include the fringes and suburbs of rapidly expanding communities such as Fresno, Clovis, Bakersfield, Modesto, and the greater Sacramento area.

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 still largely agricultural San Joaquin Valley. 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 Chapter 7 (*Geology and Soils*), O&M activities enabled by the proposed action would be conducted in or immediately adjacent to existing PG&E ROWs, which have undergone varying degrees of disturbance and thus do not represent an important topsoil resource. As a result, O&M activities are not expected to make a cumulatively considerable contribution to loss of topsoil resources in the action area.

Minor construction projects could be sited outside existing ROWs, and could have footprints of as much as several acres, so topsoil would likely be lost as a result of at least some of these activities. Most if not all new facilities would be constructed near 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 are evaluated as less than significant on an activity-by-activity basis (see *Impact GEO7* in Chapter 7), **and they are likewise expected to fall short of the cumulatively considerable threshold.**

Water Resources

Water resources in the action area are subject to several cumulative effects: progressive modification of natural drainage patterns in much of the nine-county region; groundwater overdraft, particularly in the southern and western San Joaquin Valley and Delta region; degradation of surface water quality in a number of drainage systems throughout the action area; and localized degradation of groundwater quality. The proposed action would not result in substantial drainage modifications and thus is 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.

Existing Surface Water Quality Concerns in Action Area

As shown discussed in Chapter 8 (*Water Resources*) and shown in Table 18-2, the quality of surface waters in the action area varies widely. The quality of many water bodies is adequate for all designated beneficial uses, while others have been identified by the SWRCB as impaired as a result of various types of contamination. Identified impairments are considered to constitute significant cumulative impacts on water quality; they are indicated by gray shading on Table 18-2.

Table 18-2. Water Quality in Action Area's Principal Surface Water Bodies

Surface Water Body	Identified Impairment(s)	Source(s)
Sacramento River Basin		
Sacramento River	Unknown toxicity	Unknown
	Diazinon	Agriculture
	Mercury	Former resource extraction activities
Pit River	Nutrients; organic impairments/low dissolved oxygen content; elevated temperature	All from agricultural/grazing uses
Feather River	Diazinon	Agriculture, urban runoff
	Group A pesticides	Agriculture
	Mercury	Former resource extraction activities

Surface Water Body	Identified Impairment(s)	Source(s)
	Unknown toxicity	Unknown
Yuba River	*None identified as of 2002–2003*	—
Bear River	Diazinon	Agriculture
	Mercury	Resource extraction
American River, Lower	Mercury	Resource extraction
	Unknown toxicity	Unknown
Cottonwood Creek	*None identified as of 2002–2003*	—
Stony Creek	*None identified as of 2002–2003*	—
Cache Creek, Lower	Mercury	Resource extraction
	Unknown toxicity	Unknown
Putah Creek, Lower	Mercury	Resource extraction/unknown
Goose Lake	*None identified as of 2002–2003*	—
Shasta Lake	Cadmium, copper, zinc	Resource extraction
Lake Oroville	*None identified as of 2002–2003*	—
Folsom Lake	*None identified as of 2002–2003*	—
Clear Lake	Mercury	Resource extraction
	Nutrients	Unknown
Lake Berryessa	Mercury	Resource extraction
San Joaquin River Basin		
San Joaquin River	Boron, chlopyrifos, DDT, diazinon, electrical conductivity, Group A pesticides	Agriculture
	Mercury	Resource extraction
	Unknown toxicity	Unknown
Cosumnes River	*None identified as of 2002–2003*	—
Mokelumne River, Lower	Copper, zinc	Resource extraction
Calaveras River, Lower	Diazinon, organic enrichment/low dissolved oxygen content, pathogens	Urban runoff/storm sewers
Stanislaus River	Diazinon, Group A pesticides	Agriculture
	Mercury	Resource extraction
	Unknown toxicity	Unknown
Tuolumne River, Lower	Diazinon, Group A pesticides	Agriculture
	Unknown toxicity	Unknown
Merced River, Lower	Chlorpyrifos, diazinon, Group A pesticides	Agriculture

Surface Water Body	Identified Impairment(s)	Source(s)
Chowchilla River	*None identified as of 2002–2003*	—
Fresno River	*None identified as of 2002–2003*	—
Lake Pardee	*None identified as of 2002–2003*	—
New Hogan Reservoir	*None identified as of 2002–2003*	—
Millerton Lake	*None identified as of 2002–2003*	—
Don Pedro Lake	Mercury	Resource extraction
New Melones Reservoir	*None identified as of 2002–2003*	—

Note: Impairments may vary by reach; information in this table is summarized across all reaches except as noted. Gray highlight indicates water bodies with significant cumulative impact on water quality.

Source: State Water Resources Control Board 2004.

Groundwater Quality Concerns in Action Area

As discussed in Chapter 8 (*Water Resources*), groundwater quality in the Sacramento River hydrologic region[1] is generally excellent. In water quality tests performed between 1994 and 2000 on samples from some 1,300 public water supply wells representing more than half of the region's basins and subbasins, 95% of the samples tested met the state's primary MCLs for drinking water. However, areas of contamination in excess of MCLs or other applicable standards have been identified, and where applicable standards are exceeded, a significant cumulative impact is considered to exist. Contaminants include heavy metals, radioactivity, nitrates, pesticides, and volatile organic compounds (VOCs). Some of the heavy metals, salts, and radioactivity may be of natural (non-anthropogenic) origin; naturally high salinities and dissolved solids levels occur in groundwater at the north end of the Sacramento Valley, along the margins of the Valley, and in the Sutter Buttes area, and naturally occurring radioactivity and heavy metals are present in groundwater in parts of the Sierran foothills. Anthropogenic contaminants are most commonly related to leachate from improperly designed septic systems (California Department of Water Resources 2003); additional sources include agricultural and industrial activities.

Groundwater quality in most of the San Joaquin River hydrologic region is suitable for designated beneficial uses, although it is more impacted than in the northern portion of the action area. In water quality tests performed between 1994 and 2000 on samples from 689 public water supply wells representing 10 of the region's 11 basins and subbasins, 76% of the samples tested met the state's

[1] As discussed in Chapter 8 (*Water Resources*), the northern portion of the action area is within the Sacramento River and San Joaquin River Basins. The southern portion of the action area is within the Tulare Basin, the interior-drainage basin that occupies the southern San Joaquin Valley and is recognized as hydraulically and hydrologically separate from the San Joaquin River Basin proper. The aquifer system in the action area comprises the subsurface portion of four distinct hydrologic subregions: the Sacramento Valley (Sacramento River Basin), Sacramento–San Joaquin Delta region, San Joaquin River Basin, and Tulare Basin. See Chapter 8 (*Water Resources*) for additional background information.

primary MCLs for drinking water. Contamination in excess of applicable standards is more common in the San Joaquin River hydrologic region than in the Sacramento River region, and, as identified above, where applicable standards are exceeded, a significant cumulative impact exists. Contaminants include aluminum, arsenic, manganese, iron, dissolved solids, radioactivity, nitrate, pesticides, volatile and semivolatile organic compounds (VOCs and SVOCs), boron, chloride, and DBCP (California Department of Water Resources 2003).

Potential Contribution to Cumulative Impacts on Water Quality

Increased Sediment Delivery

Many if not all of the O&M activities enabled under the proposed action would result in some degree of ground disturbance, with the potential to increase sediment delivery via runoff to surface water bodies. Increased sediment delivery is a potential concern because it can increase water turbidity, degrade habitat quality for some native species, alter stream function, and increase infrastructure and channel maintenance costs.

As discussed in Chapter 2 (*Proposed Action and Alternatives*), PG&E intends to continue the company's existing program of erosion and sediment control measures, and will also continue to comply with requirements of the federal Clean Water Act, including preparation of a SWPPP for activities with the potential to disturb more than 1 acre. With these measures in place, sediment generated by individual activities should be effectively reduced; however, erosion and sediment movement would not be entirely eliminated, and sediment delivery could be locally and temporarily increased. The potential for increases would be greater with minor construction because of the increased extent and duration of disturbance.

Excess sediment load delivered to area waterways would primarily be confined to the fine sediment fraction. Fine sediments may be carried long distances in suspension but would eventually drop out of transport in backwaters or when river or stream drainage empties into standing water. Because the duration of increased delivery would be temporary, sediment from different sites would be delivered in discrete pulses, and one pulse would be expected to move through the local system and settle out of transport before the next arrived. **Thus, from a short-term water quality perspective, the effects of increased sediment loading as a result of onland work are not expected to be cumulatively considerable.**

Depending on the nature and location of O&M and minor construction, and the degree of success achieved by erosion control measures, the net contribution of sediment to area waterways over the 30-year permit term could vary from almost nil to more substantial. However, in light of the continuing protection that would be afforded by PG&E's water quality program and the requirements of the federal Clean Water Act, **sediment generated by O&M and minor construction 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.

Inchannel work could also increase sediment mobility and water turbidity, with some potential for adverse effects on water quality. However, sediment containment measures would continue to be used for all activities under the proposed action, as described in Chapter 2 (*Proposed Action and Alternatives*). With these measures in place, sediment generated by individual activities should be effectively reduced but would not be entirely eliminated; on some job sites, sediment mobility could be locally and temporarily increased.

Inchannel work is strictly regulated under Section 1602 of the California Fish and Game Code; as described in Chapter 2 and in Impact WR8 in Chapter 8 (*Water Resources*), the proposed action would entail development of a master streambed alteration agreement that would include specific commitments and measures to protect water quality during inchannel work. Moreover, as discussed in Chapter 8 (see *Impact WR8*), almost any construction below the ordinary high water mark of any stream or wetland would require PG&E either to obtain an individual permit from the USACE under CWA Section 404, or to qualify for an existing Section 404 Nationwide Permit. Compliance with CWA Section 404 could involve a further review of water quality issues. In light of existing BMPs and the additional protection provided by the master streambed alteration agreement and the CWA review processes, water quality impacts associated with individual activities are expected to be minor. The long-term additive effect of inchannel work, and the proposed action's contribution to regional water quality concerns, are also expected to be minor. **No cumulatively considerable contribution is expected as a result of inchannel work, nor is the likely level of increase expected to create a significant additive cumulative effect on systems not already identified as impaired.**

Spills and Releases

As discussed in Chapter 14 (*Public Health and Environmental Hazards*), various O&M and minor construction activities would entail handling and use of a wide variety of substances that could degrade surface- and/or groundwater quality in the event of a spill, including fuels, lubricants, epoxy and other adhesives, paints, waterproofing compounds, asphalt paving, and herbicides (see additional discussion in *Hazardous Materials* below). In light of PG&E's existing program of training and BMPs for water quality protection, hazardous materials handling, and herbicide use, and the additional protection provided by the SWPPP requirement, water quality impacts related to spills/releases of hazardous materials are expected to be incrementally less than significant, as discussed in Chapter 8. **The potential for a cumulatively considerable contribution to regional water quality degradation in impaired systems is also considered minor, and would be further reduced by regulatory requirements for cleanup and remediation of hazardous materials spills. The likely additive effect is not expected to represent a significant cumulative impact in systems not already identified as impaired.**

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 over the past century and a half. The nine counties of the action 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, O&M and, particularly, minor construction activities enabled under the proposed action would have some potential to contribute to this loss.

As discussed in Chapter 9 (*Cultural Resources*), the principal concern is that ground disturbance required for some O&M activities and for construction of new infrastructure would have the potential to damage or destroy buried 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. However, as Chapter 2 describes, PG&E intends to continue its existing program of cultural resources BMPs, and would also continue to comply with all federal and state regulations for the protection of cultural resources. These include specific procedures to minimize damage in the event that unknown buried resources are discovered during ground disturbing activities. With these regulatory safeguards and PG&E's additional measures in place, **O&M activities are not expected to result in a cumulatively considerable contribution to regional loss of cultural resources, nor are they considered likely to create an independent, additive cumulative effect in excess of that already existing on PG&E's ROWs.** New construction would require cultural resources studies in advance of ground disturbance. Any potential adverse impacts would be subject to avoidance and/or mitigation measures consistent with PG&E's existing cultural resources commitments. Consequently, although there is some potential that minor construction activities under the proposed action could contribute to cumulative loss of cultural resources in the action area, the contribution would be avoided, minimized, and mitigated to the extent practicable, and **the lead agencies have determined that any residual effect would not represent a cumulatively considerable contribution, nor would it result in a significant new additive cumulative effect.**

Air Quality

As discussed in Chapter 13 (*Air Quality*), most of the action area is located in the San Joaquin Air Basin and is under the jurisdiction of the SJVUAPCD. The remainder is in the Mariposa County Air Basin and is under the jurisdiction of the MCAPCD. Table 18-3 summarizes 2004 attainment status for both portions of the action area. Note that nonattainment status (highlighted in gray) represents a significant cumulative impact on air quality.

Table 18-3. Summary of 2004 Attainment Status for Action Area[2]

	SJVUACPD		MCAPCD	
Pollutant	**State**	**Federal**	**State**	**Federal**
1-hour O_3	Severe nonattainment	Extreme nonattainment	Nonattainment	Unclassified/attainment
8-hour O_3	NA	Serious nonattainment	NA	Nonattainment
PM10	Nonattainment	Serious nonattainment	Yosemite National Park—nonattainment	Unclassified/attainment
			Rest of County—unclassified	
CO	Attainment	Fresno and Stockton Urbanized Areas—moderate maintenance	Unclassified	Unclassified/attainment

Source: California Air Resources Board 2004.

As Table 18-3 shows, most of the action area is in nonattainment for federal and/or state ozone and PM10 standards. Significant cumulative impacts are thus considered to exist for the following.

- Ozone levels in all parts of the action area.
- PM10 levels in the San Joaquin Air Basin and Yosemite National Park.

Because existing cumulative impacts have been identified for only two of the regulated "criteria pollutants," analysis of cumulative impacts on air quality must address two independent but related issues:

1. the potential for emissions of ozone precursors and PM10 under the proposed action to constitute a cumulatively considerable contribution to existing impacts; and
2. the potential for emissions of other pollutants during repeated activities under the proposed action to create a new, additive cumulative impact for pollutants other than ozone precursors and PM10.

These questions are considered separately in the following sections. Analysis focuses on O&M and minor construction, which are expected to be the only substantial sources of pollutant emissions associated with the proposed action.

Contribution to Existing Cumulative Air Quality Impacts—Ozone and PM10

Several types of equipment routinely used in O&M and minor construction activities emit ozone precursors:

[2] For additional information on attainment status, please see Table 13-4.

- vehicles—including cars/trucks, light aircraft, and helicopters—used for site access and inspection patrols;
- heavy trucks used to deliver equipment and offhaul debris and excavated materials from work sites;
- heavy construction equipment, such as excavators, graders, backhoes, and compactors; and
- small power equipment such as chainsaws, walk-behind compactors, and generators.

In addition, painting and paving activities can emit ozone precursor gases. Particulate matter (fugitive dust) would be generated during ground-disturbing activities such as vegetation removal, excavation, grading, and fill placement, and by vehicles and equipment traveling on unpaved roads and offroad. Vehicle and equipment exhaust gases ("tailpipe emissions") would also contribute a small amount of particulate matter.

As discussed in Chapter 13 (*Air Quality*), it is not possible to predict the precise numbers and types of vehicles needed or the duration and frequency of their use at this time, but it is anticipated that PG&E's activities would continue in approximately their current manner, with the same environmental commitments and regulatory compliance protection in place. The overall activity level would likely increase somewhat over the 30-year permit term, as development proceeds and the demand for electricity and natural gas service increase. However, individual activities would continue to be short-term and intermittent. In addition, PG&E's internal combustion and diesel equipment fleet would become cleaner overall over the long term, as older equipment obsolesces and is replaced with newer equipment.

Because individual O&M activities would continue to be relatively small-scale and short in duration, and would use progressively "cleaner" equipment over the permit term, **the lead agencies have concluded that emissions of ozone precursor gases would not exceed the cumulatively considerable threshold.**

The transition to "cleaner" gasoline- and diesel-powered equipment discussed above would also reduce the contribution of tailpipe emissions to PM10 levels over time. In addition, PG&E has committed to implementing the SJVUAPCD's "Regulation VIII" control measures to reduce generation of fugitive dust, which would continue to reduce dust-related PM10 impacts to the extent feasible. It is not possible to eliminate PM10 generation entirely, but in light of the anticipated reduction in tailpipe particulate emissions, and particularly because PG&E has committed to implementing the SJVUAPCD's enhanced PM10 control measures (see Table 2-2, **the proposed action's contribution to regional particulate matter impacts is not considered to exceed the cumulatively considerable threshold, consistent with SJVUAPCD guidance.**

In summary, the proposed action is not considered likely to make a cumulatively considerable contribution to existing impacts on ozone or particulate matter levels in the action area.

Potential for New, Additive Cumulative Effects on Air Quality

In addition to ozone precursors and particulate matter, the other principal pollutant likely to be generated by activities under the proposed action is carbon monoxide.

O&M and minor construction activities would generate small increases in CO 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 down time than time in operation, **additive cumulative effects over the 30-year permit term are expected to be less than significant.**

Potential Cumulative Effects Due to Repeated Activities

Paleontological Resources

As discussed in Chapter 10 (*Paleontological Resources*), some of the action area's geologic units have the potential to contain significant paleontological resources. Many of the activities that would be enabled by the proposed action would result in some degree of ground disturbance, and thus could damage paleontological resources if any are present. This is most likely to occur where ground disturbance is greater and occurs in previously undisturbed or little-disturbed areas—that is, during minor construction.

In most cases, activities entailing substantial ground disturbance would require preparation of a site-specific geotechnical investigation. For all activities that require preparation of a site-specific geotechnical investigation, PG&E has committed to mitigation (Measure PAL1.1) that would entail site-specific evaluation of paleontological sensitivity by a state-registered professional geologist (PG) or qualified professional paleontologist, followed by implementation of appropriate measures to avoid or minimize damage to any resources present.

In addition, if substantial fossil remains are encountered during activities other than emergency repairs during which work cannot be feasibly stopped, PG&E will implement a stop work order and have the find evaluated by a state-registered geologist (PG) or qualified professional paleontologist (Measure PAL 1.2). This would be followed by appropriate treatment, possibly including preparation and recovery of fossil materials so that they can be housed in an appropriate museum or university collection, and/or preparation of a report for publication describing the finds.

Finally, recognizing that it may be infeasible to implement a stop work during emergency repairs, PG&E has committed that if paleontological resources are discovered during emergency repairs, the company will ensure that they are

evaluated by a state-registered professional geologist (PG) or qualified professional paleontologist as soon as practicable following the completion of all necessary and required repair work (Measure PAL1.3). If appropriate, a qualified professional paleontologist will then develop a remedial treatment plan consistent with the prevailing standard of care for paleontological resources, for implementation by the company. The treatment plan could include any or all of the following: measures to prevent additional damage; recovery excavations; museum curation; preparation of a report documenting the find; and/or development of public outreach or educational materials or displays.

With Mitigation Measures PAL 1.1, PAL1.2, and PAL1.3 in place, the additive effect of activities under the proposed action is not expected to constitute a significant new cumulative effect on paleontological resources.

Hazardous Materials

As discussed in Chapter 14 (*Public Health and Environmental Hazards*), various O&M and minor construction activities would entail handling and use of substances meeting the Title 22 definition of *hazardous materials*. For example, facilities inspections would require fuels, lubricants, and hydraulic fluid for the vehicles used to patrol PG&E infrastructure. Maintenance and repair activities would require vehicle fuels, lubricants, and hydraulic fluid for vehicles and equipment, and could also require concrete, epoxy, paints, and/or asphalt paving. Vegetation management would periodically require the use of herbicides. Minor construction activities could use any of the substances identified above for the O&M program, as well as additional paints, adhesives, waterproofing compounds, and other substances needed for specific projects. Spills or releases of any of these substances could result in localized contamination and could also contribute to degradation of surface- and groundwater quality (see related discussion in *Water Quality* above).

As described in Chapter 2 (*Proposed Action and Alternatives*), PG&E complies with all applicable state and federal laws, regulations, and requirements pertaining to hazardous materials and hazardous wastes, and has an ongoing hazardous materials safety program that requires staff and contractors to follow BMPs such as

- fueling and servicing all vehicles offsite;
- to the extent practicable, avoiding or minimizing storage of hazardous substances such as paints, solvents, epoxies, etc., at the work site and in the staging area;
- storing any hazardous materials that must be kept on the work site in securely stored in closed containers located away from drainage courses, storm drains, and areas of stormwater infiltration;
- ensuring that maintenance and construction personnel have been trained in current procedures and best available technology (BAT) for spill prevention and cleanup of accidental spills;

- keeping a spill kit or kits at the worksite at all times when hazardous materials are in use, and ensuring that all personnel know how to access and use the kit(s); and
- stopping work immediately in the event of a hazardous materials spill or release, and implementing appropriate cleanup and remediation measures to protect terrestrial ecosystems, surface water quality and aquatic ecosystems, groundwater quality, and human health.

PG&E also has comprehensive BMPs in place for herbicide use.

In addition, for activities with the potential to disturb an area >1 acre, the federal Clean Water Act requires the preparation of a Storm Water Pollution Prevention Plan (SWPPP) that includes a Spill Prevention and Response Plan (see Chapter 8, *Water Resources*). As described in Chapter 2, the Spill Prevention and Response Plan would identify the hazardous materials to be used during construction; describe measures to prevent, control, and minimize the spillage of hazardous substances; describe transport, storage, and disposal procedures for these substances; and outline procedures to be followed in case of a spill of a hazardous material. SWPPP components, including the Spill Prevention and Response Plan, are under the regulatory oversight of the Regional Water Quality Control Board with jurisdiction over the work site.

In light of PG&E's existing program of training and BMPs, and the additional protection provided by the SWPPP requirement, impacts related to spills/releases of hazardous materials are expected to be incrementally less than significant, as discussed in Chapter 14. To create an additive cumulative effect, multiple spills or releases would need to occur in the same area or in hydrologically connected areas. This is considered unlikely, but could occur because ROWs represent areas where similar activities are repeated over the long term. Thus there is some, probably minor, potential for additive cumulative impacts related hazardous materials use along PG&E's ROW corridors. **Because of regulatory clean-up and remediation requirements, the additive cumulative effect, if any, is not expected to be significant over the long-term.**

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Chapter 19

Growth Inducement and Related Effects

Chapter 19

Growth Inducement and Related Effects

As a community grows, the environment—natural and "built"—is affected in many ways. Expansion of developed areas can reduce available wildlife habitat, impair water quality as a result of urban contaminants in stormwater runoff, and permanently alter the visual character of the region. A growing population increases school enrollments; elevates demand for water supply, utilities, and waste management; and adds traffic to area roadways. Additional traffic in turn can increase the generation of noise and air pollution, while degrading the quality of roadway service as reflected in traffic flow, travel times, and driver stress levels. At a broader scale, population growth ultimately shifts the pattern of land use as open space and agricultural lands give way to expanding urban and suburban uses. Because of the potential for population growth to alter the human and natural environment, both NEPA and CEQA require environmental documents, including EIRs/EISs, to evaluate and discuss a proposed undertaking's potential to induce population growth (*growth inducing effects* or *growth inducement*), and assess the potential indirect effects of any growth induced by the project.

An action is considered *growth inducing* if it directly or indirectly fosters economic or population growth or the construction of additional housing; or encourages other activities that could result in significant environmental effects (CEQA Guidelines Sec. 15126.2[d]). A project may also be considered growth inducing if it removes an existing obstacle to growth, such as insufficient transportation or water supply infrastructure.

The purpose of this chapter is to examine the proposed action's potential for growth inducement and discuss the potential outcomes of such growth. Because all three action alternatives and the No Action Alternative would enable the same program of O&M and minor construction activities as the proposed action, this analysis also applies to the alternatives.

Planning for Growth—the General Plan Process

California law requires local jurisdictions to develop comprehensive, long-term general plans to guide their land use decision-making and physical development (Government Code Section 65300 *ff*.). The intent is to ensure that growth takes place in a controlled manner, with an appropriate balance of land uses maintained

and all necessary services provided. This goal is reflected in the general plan contents mandated under Government Code Section 65302—of the seven mandatory "elements" or chapters, three relate directly to growth: the land use element establishes the pattern of future land uses, the circulation element plans the road system that will serve approved land uses, and the housing element identifies the means by which the city or county will contribute its fair share to meeting projected regional housing needs for all income groups.

Recognizing that growth is inevitable in many, if not all, communities, a primary purpose of general plan development is to provide strategies and policies that will ensure orderly and "healthy" growth for the community. In many cases, this is reflected in a stipulation that development can proceed only when there is certainty that adequate and appropriately sized utilities and services will be available. Most general plans also establish the city's or county's desired ratios for services such as schools and fire and police protection, and set minimum standards for traffic flow on area transportation networks. They may also articulate goals for recreational and cultural facilities, preservation of natural and "heritage" resources, maintenance of aesthetic values, and development of alternative transportation modalities such bicycle and pedestrian paths.

Because general plans are conceived as long-term documents, with a typical planning horizon on the order of 20 years, most are intended to provide a framework to accommodate substantial population growth.

Growth-Related Effects of the Proposed Action

Direct Effects

As described in Chapter 2, the proposed action would enable several types of activities under the aegis of PG&E's San Joaquin Valley O&M program. These include minor construction such as replacing or upgrading facilities and extending electrical and natural gas service to supply new customers. Facilities upgrades and extension of service to additional customers would directly serve new growth. Although it is expected that new or extended infrastructure installed under the proposed action would be sited near existing infrastructure and development, their precise nature, number, and locations are uncertain at this time, and they could serve any combination of residential, commercial, and/or industrial uses. In addition, because of the way the electrical grid is operated, power provided by PG&E may also be routed to areas of California not directly served by PG&E, or to customers in other western states. Thus, the location, timing, and nature of growth served by the proposed action cannot be predicted with certainty at this time, but the overwhelming majority of such growth in California currently occurs as planned growth via the general plan process, and this is expected to continue to be the case in the future.

Provision of essential services without which growth cannot take place may be identified as "removing an obstacle to growth," which represents one type of growth inducement recognized by the state's CEQA guidelines (CEQA

Guidelines Sec. 15126.2[d]). If utility service were expanded or upgraded *in advance of* the requirements of currently planned growth, rather than *in response to* needs identified to support currently planned growth, this could be considered growth inducing because essential services would be provided without which additional future growth could not occur. However, as discussed in Chapter 1, 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, the O&M activities enabled by the proposed action are more properly considered growth accommodating rather than growth inducing. Moreover, Section 15126.2[d] of the state's CEQA Guidelines explicitly cautions against assuming that growth is "necessarily beneficial, detrimental, or of little significance to the environment." In light of these considerations, the proposed action's potential to induce growth is considered less than significant. No mitigation is required.

Indirect Effects

Growth served by new or expanded infrastructure installed under the proposed action would have some potential to result in corollary indirect impacts on natural and built environmental resources, including air quality, ambient noise, traffic infrastructure, water supply, and biological resources; and possibly also cultural and paleontological resources.

As identified above, the majority of any new growth served by new facilities constructed under the proposed action would likely occur as planned growth in areas that have undergone the general plan process. As such, it would be regulated by the goals and policies embodied in the applicable general plan, and by local ordinances and regulations that enact general plan policies, which would help to avoid and reduce potential adverse effects. Effects of growth on natural resources would be further buffered by standards and requirements of federal and state environmental regulations, including

- the federal and state Clean Air Acts;
- the federal Clean Water Act and applicable Basin Plans;
- California Senate Bills 610 and 221 of 2001, which prohibit approval of moderate-sized and large development projects without documentation that adequate water supply will be available to support the resulting new demand;
- the federal and state Endangered Species Acts; and
- other federal, state, and local laws and regulations.

In addition, new development would almost certainly require separate environmental review under CEQA and/or NEPA, entailing further site- and project-specific analysis of environmental effects.

In any case, because PG&E only provides new or expanded service in response to—not in advance of—an area's identified need, and the proposed action's potential to *induce* growth has thus been evaluated as less than significant, its potential to result in adverse effects as outcomes of growth is also considered less than significant. No mitigation is required.

Chapter 20

Environmental Sustainability

Chapter 20
Environmental Sustainability

NEPA and its implementing regulations require that an EIS address issues related to the environmental sustainability of the proposed action. Specific concerns that must be considered include the balance between short-term uses of the environment and the maintenance and enhancement of long-term productivity; the extent to which the proposed action would use natural resources, including nonrenewable resources; and the extent to which the proposed action would result in irreversible or irretrievable commitments of resources. The state's CEQA guidelines contain a related requirement to consider significant and irreversible environmental changes that could result from implementing a proposed project. The purpose of this chapter is to discuss the proposed action's environmental sustainability and potential to result in lasting substantial changes in the environment, consistent with these requirements.

Short-Term Uses vs. Long-Term Productivity

The purpose of this analysis is to ensure that lead agencies consider whether a proposed undertaking would prioritize near-term benefits over the long-term maintenance and enhancement of environmental health and productivity.

Some of the O&M and minor construction activities that would occur under the proposed action could result in short-term impacts on various environmental resources, including air quality, ambient noise, traffic flow, and surface water quality. Some activities could also affect wildlife habitat and/or result in take of special-status species. However, the level of impact would be reduced by permit review to meet current regulatory requirements; PG&E's existing environmental commitments, which would continue in force under the proposed action; additional measures implemented through the proposed HCP; and mitigation for potential impacts on paleontological resources identified in Chapter 10 of this EIS/EIR. Consequently, the lead agencies have concluded that impacts would be less than significant for all resources, as discussed in Chapters 3 through 17. Moreover, the long-term goal of the proposed action is to protect, conserve and enhance the HCP-covered species and their habitats. As such, the proposed action is explicitly focused on avoiding, minimizing, and offsetting adverse effects and providing long-term benefit to the environment while allowing PG&E to proceed with a program of O&M activities essential to meeting the needs of some 4 million California utility customers.

Like the proposed action, Alternatives 1, 2, and 3 would all enact an HCP embodying a long-term conservation vision for special-status species and their habitats. Each alternative offers a different approach to providing long-term conservation benefits. Alternative 1 stresses measures to avoid take and habitat loss, while Alternative 2 emphasizes enhanced compensation for habitat loss. Alternative 3 follows the same strategy outlined in the proposed HCP but would cover fewer species, with any additional compensation needs addressed on a case-by-case basis, so the effort to regionalize a conservation approach could be less effective under Alternative 3. Consequently, while none of the alternatives would prioritize short- over long-term needs, Alternatives 1 and 2 would likely result in greater long-term benefits.

Under the No Action Alternative, no programwide HCP would be enacted for PG&E's San Joaquin Valley O&M activities; instead, PG&E would continue to address threatened and endangered species issues by consulting with USFWS and DFG and undertaking conservation planning and permitting on a case-by-case basis. Consequently, although there would be no intent to deprioritize long-term environmental enhancement, in practice it would be much more difficult to implement a consistent, regional conservation strategy, and short-term uses could be emphasized at the expense of long-term environmental health and productivity.

Use of Natural Resources

Like many other types of projects, the O&M and minor construction activities enabled by the proposed action would require an ongoing commitment of a variety of nonrenewable (depletable) natural resources, including the following.

- Fossil fuels needed to produce vehicle fuels and lubricants as well as various plastics and other materials.
- Concrete, aggregate, sand, gravel, and steel for some types of maintenance and minor construction.

In addition, some activities would require timber, which is a slowly renewable resource. Many activities would also require the use of water.

Use of nonrenewable commodities such as petroleum, aggregate, and iron would represent an irreversible/irretrievable commitment of resources. Moderate use of sustainably harvested timber would be recoverable over the long term~~.~~<u>; PG&E uses sustainably harvested timber and recycled plastic lumber in some of its O&M activities, as appropriate and feasible, and this practice would continue under the proposed action.</u> The magnitude and duration of increased demand for water would be limited, and water use is expected to be within the capacity of available supply, so the amount of water required for ongoing O&M and minor construction is also considered renewable over time.

In addition to material resources, O&M and minor construction tasks enabled by the proposed action would entail a commitment of energy to refine petroleum for

fuels and to produce various chemicals used in maintenance, repair, and construction of electrical and natural gas infrastructure. Energy would also be required to recover and process resources such as aggregate, sand, and iron/steel; to produce concrete and other materials used for O&M and minor construction; and to harvest and mill timber. Energy use would represent an irreversible and irretrievable commitment of resources.

Because all of the alternatives would enable the same program of O&M activities, resource commitments under all action alternatives and the No Action Alternative would be very similar to those described for the proposed action.

Significant, Irreversible Environmental Changes

Implementing the proposed action could result in the following types of environmental changes.

- A very small loss of agricultural land associated with expansion of existing facilities and construction of new infrastructure.
- Potential for new constraints on recreational use as a result of the need for new facilities and compensation lands.
- A small loss of topsoil due to construction of new facilities.
- Long-term effects related to hazardous materials use.
- A long-term benefit to biological resources, aesthetics, and air and water quality because of a long-term increase in acreage of conservation lands.

Under all of the action alternatives, habitat compensation acreages are expected to consistently exceed the actual acreages impacted. This would be particularly beneficial to biological resources, aesthetics, air quality, and water quality. The benefits would continue as long as compensation lands continue in conservation status. Benefits are thus considered irreversible, because the intent of the proposed action—and the legal requirement under the ESA—is permanent compensation for both temporary and permanent effects of O&M and minor construction activities.

At the same time, acquisition of lands for new facilities and for compensation use has the potential to impose minor constraints on agriculture and recreation. These constraints are also considered effectively irreversible. For example, any agricultural land converted for expansion of existing facilities and construction of new facilities would become permanently unavailable—and possibly also unsuitable—for agriculture; however, note that the coexistence of infrastructure situated in agricultural lands is considered a compatible use as farming or ranching operations are likely to continue unimpeded. Land acquired for compensation use would remain physically suitable for cultivation or grazing use, but would be protected in perpetuity for the benefit of biological resources, and would only be used for agricultural production (primarily grazing, as discussed in Chapter 4, *Agricultural Resources*) to the extent such use was

consistent with the goals of habitat mitigation under the proposed HCP. However, as discussed in Chapter 4, the extent of agricultural lands converted to nonagricultural use would be very small, so the associated environmental change, although irreversible, is nonetheless considered less than significant. Constraints on recreational resources, although irreversible, are also expected to be less than significant, as discussed in Chapter 15 (*Recreation*). Similarly, the potential extent of topsoil loss would be small enough that, while any such loss would be irreversible, it is evaluated as less than significant (see Chapter 7, *Geology and Soils*).

As discussed in Chapters 14 (*Public Health and Environmental Hazards*) and 18 (*Cumulative Effects*), there is some potential for environmental contamination through the use of hazardous substances, including fuels, lubricants, herbicides, adhesives, paints, and paving media. However, in light of PG&E's existing program of hazardous materials training and BMPs, and additional protection afforded by permit review under the federal Clean Water Act, the risk is evaluated as incrementally less than significant. Moreover, in the event of a spill or release, most types of contamination likely to result from O&M or minor construction would represent reversible effects.

Chapter 21

Comparison Of Alternatives

Chapter 21
Comparison of Alternatives

NEPA requires lead agencies to identify the environmentally preferable alternative from the range of alternatives analyzed in an EIS. The *environmentally preferable alternative* refers to the alternative that would best accomplish NEPA's goals of minimizing adverse effects on the environment, and protecting natural and cultural resources. Identification of the environmentally preferable alternative is based on a comparison of the anticipated environmental outcomes of all alternatives analyzed. In many cases, this is necessarily a largely subjective evaluation. In addition, for some proposed actions, the environmentally preferable alternative may be different for different environmental resources.

Much like NEPA, the state's 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. As with the environmentally preferable alternative, the environmentally superior alternative is identified on the basis of a comparison between the environmental impacts of the various alternatives analyzed. If the No Project Alternative is identified as environmentally superior but would not meet project objectives, the lead agency must also identify the environmentally superior alternative that would implement the project (CEQA Guidelines Sec. 15126.6[a], [e]). In addition, the proposed project itself cannot be identified as the environmentally superior alternative, although the lead agency is expected to compare the environmental risks and benefits of the proposed approach with those of the environmentally superior alternative approach.

Consistent with NEPA and CEQA requirements, the purpose of this chapter is to identify the environmentally preferable/environmentally superior alternative.

Comparison of Alternatives

To facilitate comparison among alternatives, the matrix in Table 21-1 summarizes the environmental outcomes expected for the three action alternatives and the No Action Alternative, including both adverse and beneficial effects, as presented in Chapters 3 through 19 of this EIS/EIR. The discussion in Table 21-1 includes comparison between each alternative and the proposed action.

Identification of Environmentally Preferable/Environmentally Superior Alternative

Methodology

As identified above, Table 21-1 presents a summary comparison of the proposed action, the three action alternatives, and the No Action Alternative. This provides the basic context for identifying the environmentally preferable/environmentally superior alternative, but additional detail at a resource-specific level is needed. This was obtained by assessing each impact individually to identify the alternative that would offer the best outcome for that specific concern. A resource was considered to "prefer" an alternative when outcomes for the majority of impacts related to that resource would be best under a particular alternative. If more than one alternative was "preferred" by a resource (i.e., there was no clear majority), outcomes were weighed qualitatively to determine which alternative would offer the greatest environmental benefit with the least environmental detriment. Resource-specific results were then tallied to assess the "score" for each alternative. Because of the proposed action's focus on protection and conservation of sensitive biological resources, potential biological benefits were considered the final deciding factor.

Outcome

Results by Impact and Resource

Table 21-2 (see following pages) summarizes results by impact and by resource.

Alternatives 3 (HCP with Reduced Number of Covered Species) and 4 (No Action) were evaluated as likely to be less effective overall in reducing and compensating for take, because they would provide less coordinated conservation planning (see additional discussion in Table 21-1). For some resources, additional concerns could be associated with decreased conservation efficiency. Neither alternative would offer environmental benefits to offset these detriments. These considerations generally eliminated Alternative 3 and Alternative 4 from further evaluation.

In general, Alternative 1 was found to be environmentally preferable when increased compensation acreages were identified as potentially problematic for a resource, because Alternative 1 would reduce take by comparison with the proposed action, without increasing the compensation ratio. By contrast, Alternative 2 would be preferable for resources benefited by increased acreage of compensation lands. Additional discussion is presented in the following paragraphs.

Table 21-1. Comparison of Anticipated Environmental Effects—Alternatives 1 through 4

Resource	Alternative 1—HCP with Reduced Take	Alternative 2—HCP with Enhanced Compensation	Alternative 3—HCP with Reduced Number of Covered Species	Alternative 4—No Action
Land Use	Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action with minor differences specific to HCP commitments for the protection of biological resources. Specifically, under Alternative 1, compensation ratios for loss or disturbance of habitat would be the same as those described for the proposed action, but AMMs would be implemented more comprehensively. Although the level of take would be reduced because of the increased stringency in implementing the HCP's AMMs, compensation acreages are expected to be similar under both alternatives because compensation would be calculated based on acreage of disturbance, not level of take. Consequently, under Alternative 1, impacts related to land use would be similar to those described for the proposed action.	Like Alternative 1, Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Differences between Alternative 2 and the proposed action center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action, as described in Chapter 2). Alternative 2's emphasis on compensation would entail a greater compensation acreage at a given level of disturbance, and could result in the establishment of a greater number of preserves or preserves that encompass larger geographic areas by comparison with the proposed action. Nonetheless, consultation with appropriate local jurisdiction land managers would minimize or avoid substantial conflicts with existing and planned land uses and with applicable land use policies and plans. Therefore, impacts related to land use would be similar under Alternative 2 to those described for the proposed action, despite the greater geographic area potentially affected under Alternative 2.	Alternative 3 would enable the same program of O&M and minor construction activities described for the proposed action, and would enact the same additional environmental commitments for other resource areas identified in this EIS/EIR. The key difference between Alternative 3 and the proposed action relates to the number of species covered under Alternative 3 (reduced by comparison with the proposed action, as described in Chapter 2). Depending on their status at the time, other species might be subject to state, and possibly also federal, requirements for impact assessment and compensation, which would need to be addressed on a case-by-case basis. Reducing the number of HCP-covered species could result in the establishment of a smaller number of preserves or preserves that encompass smaller geographic areas by comparison with the proposed action. At the same time, additional, case-by-case assessment of compensation needs might be required for any individual activities identified as having the potential to affect noncovered special-status species. However, criteria for identifying suitable compensation lands would remain the same and selection of appropriate compensation lands would be subject to essentially the same agency approval process. Further, PG&E's commitment to consult with local jurisdictions regarding land use planning issues would carry forward. Thus, although it might be more difficult to achieve efficient land use planning and ensure consistency of compensation uses with other existing and planned uses, the net effect on land use under Alternative 3 would be similar to that identified for the proposed action. .	Under the No Action Alternative, PG&E would continue its existing program of O&M activities and current environmental programs and practices, including BMPs, unchanged. No HCP would be implemented, and no other new environmental commitments would be put in place. Individual activities with the potential to affect threatened and/or endangered species would be assessed on a case-by-case basis through consultation with USFWS and DFG for level of effect and compensation needs. Because compensation requirements would be assessed on a case-by-case basis, smaller parcels of land would probably be identified for enhancement at any given time, but case-by-case assessment could also result in identification of a larger number of parcels for compensation use. This is similar to but more extreme than the scenario described above for Alternative 3, where most compensation would likely occur under the auspices of an HCP process. Criteria for identifying suitable compensation lands would likely be similar to those described for the proposed action, and selection of appropriate compensation lands would be subject to the same agency approval process. Moreover, PG&E would still consult with local jurisdiction land managers in an attempt to minimize or avoid land use conflicts. Thus, outcomes for land use would probably be broadly similar under the No Action Alternative to those described for the proposed action. However, the area affected could vary, and with no HCP (and hence, no centralized conservation planning process) in place, it would probably be substantially more difficult to achieve efficient land use planning and ensure consistency of compensation uses with other existing and planned uses.
Agricultural Resources	Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences in the commitments for protection of biological resources. Alternative 1 would enact the same environmental commitments for other resource areas identified in this EIS/EIR for the proposed action, and compensation ratios for loss or disturbance of habitat would also be the same. The key difference between the proposed action and Alternative 1 is that Alternative 1 would implement avoidance and minimization measures (AMMs) at a lower level of effect than the proposed action, with the intent of reducing take. Although the level of take would be reduced because of the increased stringency associated with implementation of the AMMs, compensation needs are expected to be similar under both alternatives, because compensation acreages would be based on acreage affected rather than level of take. Consequently, under Alternative 1, impacts on agricultural resources would be similar to those described for the proposed action.	Alternative 2 would enable the same program of O&M and minor construction activities and the same environmental commitments for other resource areas identified in this EIS/EIR for the proposed action. Differences between Alternative 2 and the proposed action center on compensation ratios for habitat disturbed or lost (greater under Alternative 2 than under the proposed action). Under Alternative 2, assuming the same level of habitat disturbance, overall compensation requirements would be higher than under the proposed action, although criteria for identifying suitable compensation lands would remain the same and selection of appropriate compensation lands would be subject to the same agency approval. As the demand for compensation lands increases, availability of lands that support the appropriate habitat types can be expected to decrease, both within and outside of PG&E ROWs. However, where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options would be still available (i.e., purchase of mitigation credits, donations, and enhancement), and might be more extensively used; reliance on compensation options other than acquisition by purchase or easement might offset some of the difference in compensation needs. Nonetheless, the enhanced compensation requirements under Alternative 2 would result in greater overall compensation requirements and, as a result, could lead to the establishment of a greater number and/or larger acreage of preserves. Consequently, impacts on agricultural resources would likely be slightly greater under Alternative 2 than those described for the proposed action, when viewed from a NEPA perspective. Impacts under CEQA would be the same; that is, less than significant. This is because the physical attributes of agricultural/grazing lands that may be acquired for habitat compensation use under the proposed action would not be lost or otherwise altered by the proposed action, although they would be	Alternative 3 would enable the same program of O&M and minor construction activities as that described for the proposed action, and would enact the same additional environmental commitments for other resource areas identified in this EIS/EIR. The key difference between Alternative 3 and the proposed action relates to the number of species covered under Alternative 3 (reduced by comparison with the proposed action, as described in Chapter 2). Depending on their status at the time, other species might be subject to state, and possibly also federal, requirements for impact assessment and compensation, which would need to be addressed on a case-by-case basis. Under Alternative 3, reducing the number of covered species could result in the establishment of a smaller number of preserves or preserves that encompass smaller geographic areas by comparison with the proposed action. At the same time, additional, case-by-case assessment of compensation needs might be required for any individual activities identified as having the potential to affect noncovered special-status species. It is difficult to determine the precise effect that this approach would have on agricultural lands since detailed compensation needs cannot be identified at this time. However, because Alternative 3 could require the assessment of at least some compensation needs on a case-by-case basis, it could result in the identification of smaller parcels of land (including ROW areas) for enhancement use, compared to the proposed action. Also, while Alternative 3 could result in smaller contiguous areas for acquisition and/or enhancement use, more numerous acquisitions could also occur under Alternative 3. Depending on availability of appropriate habitat, multiple land acquisitions and/or enhancement areas could potentially be scattered throughout the action area. As the demand for compensation lands increases, availability of lands that support the appropriate habitat types can be expected to decrease, including areas within PG&E ROWs. Where appropriate and	Under the No Action Alternative, PG&E would continue its existing program of O&M activities unchanged. No HCP would be implemented, and no other new or additional environmental commitments would be put in place. Individual actions affecting suitable habitat for listed special-status species would be assessed through case-by-case consultation with USFWS and DFG for level of effect and compensation needs. Because the compensation requirements for habitat disturbance would be assessed on a case-by-case basis, smaller parcels of land would likely be identified for acquisition or enhancement at any given time, but case-by-case assessment could also result in a need for more numerous parcels, potentially distributed over a wider area. This is similar to but more extreme than the case described above for Alternative 3, where most compensation would likely occur under the auspices of an HCP process. The availability of desirable compensation lands is expected to decrease over time, as lands are used for compensation or other purposes. However, as described for the action alternatives, where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options would likely still be available (e.g., purchase of mitigation credits, donations, and enhancement). Because of the need for activity-by-activity consultation, the No Action Alternative would have the potential to result in some permanent loss of agricultural resources in the action area, and the overall nature of effects would be similar to that described above for the proposed action. However, the degree of impact is uncertain. Adverse effects on agricultural resources could be slightly reduced under the No Action Alternative compared to the proposed action since suitable compensation lands might be more difficult to acquire

Resource	Alternative 1—HCP with Reduced Take	Alternative 2—HCP with Enhanced Compensation	Alternative 3—HCP with Reduced Number of Covered Species	Alternative 4—No Action
		managed to benefit biological resources as opposed to focused solely on the production of agricultural commodities. In this sense, acquisition and management of agricultural/grazing lands to benefit biological resources is not expected to result in a significant impact on the environment associated with the loss of agricultural land.	available compensation lands cannot be identified for purchase or easement, other compensation options would still be available (e.g., purchase of mitigation credits, donations, and enhancement); reliance on compensation options other than acquisition by purchase or easement could offset some of the difference in compensation needs. However, criteria for identifying suitable compensation lands would remain the same, and selection of appropriate compensation lands would be subject to USFWS and DFG approval. Alternative 3 would thus have some potential to permanently affect agricultural lands (and particularly grazing lands) in the action area, and impacts could be spread over a wider area because more activity-by-activity compensation could be required. Impacts related to agricultural resources would probably be essentially the same or slightly greater under Alternative 3 compared to those described for the proposed action, when viewed from a NEPA perspective. As described for Alternative 2, impacts under CEQA would be the same; that is, less than significant. This is because the physical attributes of agricultural/grazing lands that may be acquired for habitat compensation use under the proposed action would not be lost or otherwise altered by the proposed action, although they would be managed to benefit biological resources as opposed to focused solely on the production of agricultural commodities. In this sense, acquisition and management of agricultural/grazing lands to benefit biological resources is not expected to result in a significant impact on the environment associated with the loss of agricultural land.	on a case-by-case basis, and smaller parcels might be less likely to meet the biological objectives of compensation; accordingly, payment-type compensation options might be used to a greater degree. It is difficult to assess the precise effect that this approach would have on agriculture because locations and other details about specific habitat enhancement sites are unknown at this time, as are the actual compensation acreages that would be required. Alternatively, if payment-type compensation options were not emphasized, the case-by-case approach to compensation determination under the No Action Alternative would result in a greater number of acquisitions/enhancements, some or all of which could be located on agricultural (largely grazing) lands. Consequently, impacts on agricultural resources could be slightly greater under the No Action Alternative than those described for the proposed action when viewed from a NEPA perspective. As described above for the action alternatives, impacts under CEQA would be the same in this case; that is, less than significant. This is because the physical attributes of agricultural/grazing lands that may be acquired for habitat compensation use under the proposed action would not be lost or otherwise altered by the proposed action, although they would be managed to benefit biological resources as opposed to focused solely on the production of agricultural commodities. In this sense, acquisition and management of agricultural/grazing lands to benefit biological resources is not expected to result in a significant impact on the environment associated with the loss of agricultural land.
Biological Resources	Alternative 1 would enable the same program of O&M and minor construction activities analyzed for the proposed action; differences between Alternative 1 and the proposed action center on mechanisms for avoiding take. Specifically, Alternative 1 focuses on increased avoidance of take, and would require much more comprehensive and stringent implementation of the HCP's AMM program, which would benefit both covered and noncovered special-status species, and would likely also provide corollary benefits for common species. Impacts on special-status species (covered and noncovered), identified as less than significant for the proposed action, are expected to be further reduced under Alternative 1. Impacts on common species, also expected to be less than significant under the proposed action, would likely also be somewhat reduced under Alternative 1.	Like Alternative 1, Alternative 2 would enable the same program of O&M and minor construction activities analyzed for the proposed action. Alternative 2 would also implement the same AMMs; however, because Alternative 2 stresses increased compensation for unavoidable habitat losses, habitat compensation requirements would be substantially increased under Alternative 2. As a result, impacts on biological resources would be essentially the same under Alternative 2 as those described for the proposed action, but temporary and permanent habitat losses would be compensated at a higher ratio, so a greater acreage of compensation lands (with corollary benefits for covered, noncovered, and common species) would accrue under Alternative 2.	Alternative 3 would enable the same program of O&M and minor construction activities analyzed for the proposed action and the other action alternatives. The key difference between Alternative 3 and the proposed action is that a smaller number of species would be covered under the Alternative 3 HCP; AMMs and habitat compensation would otherwise be essentially the same as those described for the proposed action. Because the Alternative 3 HCP would protect fewer special-status species, it would provide less corollary protection for noncovered special-status species and common species, and would likely require less habitat compensation over the long term. Impacts on biological resources could thus be somewhat greater under Alternative 3 than under the proposed action.	Under the No Action Alternative, PG&E would continue O&M and minor construction activities for its San Joaquin Valley natural gas and electricity facilities without implementing a program-wide HCP. Instead, potential take of threatened and endangered species would continue to be addressed on a case-by-case basis, pursuant to the requirements of ESA Section 7 and Section 2081 of the California Fish and Game Code. Through the consultation process, PG&E would likely address impacts on many or all of the species included in the proposed HCP and discussed in this EIS/EIR. Measures implemented to avoid, minimize, and mitigate impacts on special-status species, would likely also help to reduce or avoid impacts on common species. The general types of impacts on natural vegetation, special-status species, and common species expected under the No Action Alternative would be very similar to those identified above for the proposed action. The key differences are (1) no new AMMs would be implemented to buffer potential impacts, so impacts are more likely to be significant; and (2) potential take would be dealt with on a case-by-case basis rather than through a coordinated conservation program. Consequently, conservation efforts under the No Action Alternative would be less integrated; in particular, the purchase of conservation lands would probably be more fragmented. While case-by-case mitigation might be effective at targeting and preserving localized high-value habitat, the creation of a large number of smaller mitigation sites could result in less effective species conservation across the action area as a whole. Conservation lands would be less likely to offer preferred conditions such as larger contiguous areas of habitat or connectivity with other open space or conservation areas. This would be of particular concern for species such as the San Joaquin kit fox that require large areas of habitat or corridors allowing them to travel between areas of suitable habitat. The absence of a comprehensive monitoring and adaptive management program would also reduce opportunities to ensure the success of mitigation sites. In summary, because the No Action Alternative would approach conservation on a case-by-case basis, it would not offer the advantages of integrated regional conservation planning provided by the action alternatives. Outcomes for all categories of habitats and

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				wildlife are more likely to be adverse/significant under the No Action Alternative.
Aesthetics	Alternative 1 would enable the same program of O&M and minor construction activities as the proposed action. Consequently, Impacts AES1 through AES5 would be the same under Alternative 1 as those described above for the proposed action. Differences between Alternative 1 and the proposed action center on the strategy for mitigating the biological effects of PG&E's O&M and minor construction activities; Alternative 1 stresses reducing take. However, although the level of take would be reduced because of the increased stringency associated with implementation of the AMMs, compensation needs are expected to be similar under both alternatives because compensation acreages would be calculated based on acreage affected, not level of take. Consequently, under Alternative 1, impacts related to aesthetic resources would be similar to those described for the proposed action.	Alternative 2 would enable the same program of O&M and minor construction activities as the proposed action. Consequently, as with Alternative 1, Impacts AES1 through AES6 would be the same under Alternative 2 as those described above for the proposed action. Differences between Alternative 2 and the proposed action center on the strategy for mitigating the biological effects of PG&E's O&M and minor construction activities; Alternative 2 would entail compensation at higher ratios than the proposed action, and thus is expected to require substantially larger compensation acreages. Aesthetic benefits related to the preservation of natural open space would thus be maximized under Alternative 2.	Alternative 3 would enable the same program of O&M and minor construction activities as the proposed action; Impacts AES1 through AES6 would thus be the same under Alternative 3 as those described above for the proposed action. The key difference between Alternative 3 and the proposed action is that the Alternative 3 HCP would cover a smaller number of species, so the compensation acreages required under the Alternative 3 HCP are likely to be somewhat less. However, PG&E could still be required to consult separately with the U.S. Fish and Wildlife Service regarding potential take of other special-status species not covered by the Alternative 3 HCP, and any such consultation could result in the identification of additional habitat compensation needs; as identified in Chapter 3 (*Land Use and Planning*), the net result of Alternative 3 could be the preservation of a somewhat larger number of smaller and more areally distributed parcels compared to the larger, more consolidated preserve acreages anticipated under the proposed action. Smaller, more widely distributed preserves could ultimately result in benefits to more viewers. On the other hand, smaller, more areally distributed preserves could be less aesthetically effective than larger parcels. In summary, it is difficult to predict benefits under Alternative 3, but it is likely that they would be slightly less than those offered by the proposed action.	Under the No Action Alternative, PG&E would continue its existing program of O&M activities unchanged. Impacts AES1 through AES6 would be essentially the same under the No Action Alternative as those described above for the proposed action. No HCP would be implemented under the No Action Alternative, but PG&E would nonetheless be required to obtain permits for any incidental take of special-status species on a case-by-case basis. As described in Chapter 1 (*Introduction*), the permitting process would require conservation planning and consultation with USFWS, with the expectation that habitat losses would be compensated at ratios similar to those required under the proposed action. There would thus be some potential for aesthetic benefits related to the preservation of natural open space under the No Action Alternative. However, because conservation planning would be less centralized, and habitat preservation would occur in a less systematic way, smaller acreages would probably be preserved at any one time. The scenario for the No Action Alternative would be similar to that for Alternative 3, but is likely to result in even less centralized compensation planning. As described for Alternative 3, if compensation lands were widely distributed, they could ultimately benefit more viewers than would benefit from larger, more consolidated preserves. On the other hand, smaller, more areally distributed preserves could be less aesthetically effective than larger ones. In summary, aesthetic benefits under the No Action Alternative are difficult to predict, but are likely to be less marked than those offered by any of the action alternatives.
Geology and Soils	Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. The same program of BMPs, and the same regulatory protection including codes and standards, would continue to apply. Consequently, impacts related to geology and soils would be essentially the same under Alternative 1 as those described for the proposed action.	Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action. Differences between Alternative 2 and the proposed action would center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). As with Alternative 1, the same program of BMPs and the same regulatory protection, including codes and standards, would continue to apply. Thus, impacts related to geology and soils would be essentially the same under Alternative 2 as those described for the proposed action.	Alternative 3 would enable the same program of O&M and minor construction activities as that described for the proposed action. The key difference between Alternative 3 and the proposed action would relate to the number of species covered under the Alternative 3 (reduced by comparison with the proposed HCP, as described in Chapter 2). As described for the other action alternatives, the same program of BMPs and the same regulatory protection, including codes and standards, would continue to apply. Impacts related to geology and soils would be essentially the same under Alternative 3 as those described for the proposed action.	Under the No Action Alternative, PG&E would continue its existing program of O&M and minor construction activities unchanged. No HCP would be implemented, and no other new environmental commitments would be put in place. However, as identified for the three action alternatives, the same program of BMPs and the same regulatory protection, including codes and standards, would continue to apply under the No Action Alternative. Impacts related to geology and soils would thus be essentially the same under Alternative 4 as those described for the proposed action.
Water Resources	Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Alternative 1 would incorporate the same environmental commitments for water resources protection identified in this EIS/EIR for the proposed action. Consequently, any adverse effects on water resources would be essentially the same under Alternative 1 as those described for the proposed action.	Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action. Differences between Alternative 2 and the proposed action would center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). Alternative 2 would incorporate the same environmental commitments for water resources protection identified in this EIS/EIR for the proposed action. As with Alternative 1, any adverse effects on water resources would be essentially the same under Alternative 2 as those described for the proposed action. Alternative 2 could offer a slight benefit for water resources by comparison with the proposed action and action alternatives, because its enhanced compensation ratios would maximize the preservation of natural drainage patterns and permeable natural surfaces, and preserve the greatest area from recontouring, cultivation, development and other types of ground disturbance.	Alternative 3 would enable the same program of O&M and minor construction activities as that described for the proposed action. The key difference between Alternative 3 and the proposed action would relate to the number of species covered under the Alternative 3 HCP (reduced by comparison with the proposed HCP, as described in Chapter 2), which would likely reduce the total compensation acreage preserved. Alternative 3 would incorporate the same environmental commitments for water resources protection identified in this EIS/EIR for the proposed action. Any adverse effects on water resources would be essentially the same under Alternative 3 as those described for the proposed action. Potential benefits related to preservation of compensation lands would be less than those afforded under Alternative 2, and probably also less than those under the proposed action.	Under the No Action Alternative, PG&E would continue its existing program of O&M activities unchanged. No HCP would be implemented, and no other new or environmental commitments in addition to those already in place would be put implemented. However, PG&E would continue to follow the same standard methods and techniques for carrying out O&M activities, and would continue to implement the company's existing environmental programs, practices, and BMPs, and the same regulatory protection would apply. Therefore, impacts on water resources would be very similar under Alternative 4 to those described for the proposed action. Slight differences could result from variations in compensation requirements, but would be speculative to predict at this time.
Cultural Resources	Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. PG&E's current cultural resources program would continue in force under Alternative 1. Consequently, impacts on cultural resources would be essentially the same under Alternative 1 as those described for the proposed action.	Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action, and PG&E's current cultural resources program would continue in force under Alternative 2. Differences between Alternative 2 and the proposed action would center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). As with Alternative 1, impacts on cultural resources would be similar under Alternative 2 to those described for	Alternative 3 would enable the same program of O&M and minor construction activities as that described for the proposed action, and PG&E's current cultural resources program would also continue in force under Alternative 3. The key difference between Alternative 3 and the proposed action would relate to the number of species covered under the Alternative 3 (reduced by comparison with the proposed HCP, as described in Chapter 2). Impacts on cultural resources would be similar under Alternative 3 to those described for	Under the No Action Alternative, PG&E would continue its existing program of O&M and minor construction activities unchanged, but no HCP would be implemented, and any habitat compensation would occur on a case-by-case, piecemeal basis. The company's existing cultural resources program—including pre-activity database searches for larger activities, and BMPs consistent with relevant federal and state regulations for all activities—would continue in force, although compliance would be performed on a case-by-case basis as projects

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		the proposed action, but could be somewhat greater because of the enhanced compensation requirements. However, because PG&E's existing cultural resources program would continue in force under Alternative 2—including pre-activity database searches for larger activities, and BMPs consistent with relevant federal and state regulations for all activities—impacts are nonetheless expected to be less than significant.	the proposed action, although they could be somewhat reduced because the reduced number of covered species could reduce compensation acreage somewhat. Because the same protective measures would apply—including pre-activity database searches for larger activities, and BMPs consistent with relevant federal and state regulations for all activities—impacts are expected to be less than significant. .	arise. Consequently, O&M and minor construction impacts on cultural resources under the No Action Alternative would be very similar to those described for the proposed action. Impacts related to ground disturbance for habitat enhancement, restoration, or creation are speculative to predict because the nature and location of compensation parcels remains speculative at this time.
Paleontological Resources	Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Consequently, impacts on paleontological resources would be essentially the same under Alternative 1 as those described for the proposed action, and the same mitigation strategy would apply.	Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action. Differences between Alternative 2 and the proposed action would center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). As with Alternative 1, impacts on paleontological resources would be very similar under Alternative 2 to those described for the proposed action, and the same mitigation strategy would apply.	Alternative 3 would enable the same program of O&M and minor construction activities as that described for the proposed action. The key difference between Alternative 3 and the proposed action would relate to the number of species covered under the Alternative 3 (reduced by comparison with the proposed HCP, as described in Chapter 2). Impacts on paleontological resources would be very similar under Alternative 3 to those described for the proposed action, and the same mitigation strategy would apply.	Under the No Action Alternative, PG&E would continue its existing program of O&M activities unchanged. No HCP would be implemented, and no other new or additional environmental commitments would be put in place. However, because the activities most likely to affect paleontological resources would not change substantially, paleontological impacts would be essentially the same as those described for the proposed action. The same mitigation strategy would apply.
Transportation and Circulation	Alternative 1 would enable the same program of O&M and minor construction activities described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Alternative 1 would enact the same additional environmental commitments for other resource areas identified in this EIS/EIR for the proposed action, and compensation ratios for loss or disturbance of habitat would be the same as under the proposed action. The key difference between the proposed action and Alternative 1 is an additional level of stringency associated with the implementation of AMMs at a lower level of effect than under the proposed action, with the intent of reducing take. As discussed in Chapter 2 (*Proposed Action and Alternatives*), the AMMs implemented under Alternative 1 would be the same as those described above for the proposed HCP. However, under Alternative 1, AMMs for certain activities would be implemented at a lower level of disturbance. Although the level of take would be reduced because of the increased stringency associated with implementation of the AMMs, compensation is expected to be similar under both alternatives because compensation acreages would be calculated based on acreage affected, not on level of take. Consequently, under Alternative 1, impacts on traffic would be similar to those described for the proposed action.	Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Alternative 2 would enact the same additional environmental commitments for other resource areas identified in this EIS/EIR for the proposed action. Differences between Alternative 2 and the proposed action center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). Under Alternative 2, assuming the same level of habitat disturbance, overall compensation needs would likely be greater than under the proposed action. Thus, as identified in Chapter 3 (*Land Use and Planning*), Alternative 3 would probably result in the establishment of a greater number of preserves, or preserves that encompass larger geographic areas, compared to the proposed action. Criteria for identifying suitable compensation lands would remain the same under Alternative 2, and selection of appropriate compensation lands would be subject to the same USFWS and DFG approval process. Thus, as the demand for compensation lands increases, availability of lands that support the appropriate habitat types would decrease, both within and outside of PG&E ROWs. Where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options would still be available (e.g., purchase of mitigation credits, donations, and enhancement), and might be used to a greater extent; reliance on compensation options other than acquisition by purchase or easement might offset some of the difference in compensation ratios. However, Alternative 2's enhanced compensation requirements would probably still result in greater overall compensation requirements and hence a greater number and/or larger acreage of preserves. Thus, impacts on traffic under Alternative 2 would be similar to but somewhat greater than those described for the proposed action.	Alternative 3 would enable the same program of O&M and minor construction activities described for the proposed action, and would enact the same additional environmental commitments for other resource areas identified in this EIS/EIR. The key difference between Alternative 3 and the proposed action relates to the number of species covered under Alternative 3 (reduced by comparison with the proposed action, as described in Chapter 2). Reducing the number of covered species could result in the establishment of a smaller number of preserves or preserves that encompass smaller geographic areas by comparison with the proposed action. At the same time, separate, case-by-case consultation for level of effect and compensation needs could be necessary for noncovered species, depending on the species potentially affected, and their status at the time of the proposed activity. It is difficult to determine the precise effect that this approach would have on traffic since locations and other details about specific compensation lands are unknown at this time. However, because some compensation requirements might be assessed on a case-by-case basis, Alternative 3 would have the potential to result in a greater number of smaller preserve areas, potentially requiring slightly increased management-related trips while distributing traffic effects related to use and management of preserves over a greater area. In summary, impacts on traffic would likely be similar under Alternative 3 to those described for the proposed action, but could be somewhat greater overall.	Under the No Action Alternative, PG&E would continue its existing program of O&M activities unchanged. No HCP would be implemented, and no other new or additional environmental commitments would be put in place. Individual actions affecting suitable habitat for listed special-status species would be assessed through case-by-case consultation with USFWS and DFG for level of effect and compensation needs. Because the compensation requirements for habitat disturbance would be assessed on a case-by-case basis, smaller parcels of land would likely be identified for enhancement at any given time; case-by-case assessment could also result in the establishment of a greater number of preserves. This is similar to but more extreme than the case described above for Alternative 3, where most compensation would likely occur under the auspices of an HCP process. The availability of desirable compensation lands is expected to decrease over time, as lands are used for compensation or other purposes. However, as described for the action alternatives, where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options would likely still be available (e.g., purchase of mitigation credits, donations, and enhancement), and might be used to a greater extent. It is difficult to determine the precise effect that this approach would have on traffic since locations and other details about specific compensation lands are unknown at this time. However, since the resulting compensation requirements would be assessed on a case-by-case basis, Alternative 4 could result in a greater number of smaller contiguous preserve areas, requiring more management-related trips but distributing traffic effects over a wider area. Thus, impacts on traffic would likely be similar under the No Action Alternative to those described for the proposed action, but could be somewhat greater overall.
Noise and Vibration	Because O&M and minor construction activities would be the same under the proposed action and all alternatives, noise generation would be similar for all alternatives. There could be some in-practice difference in long-term noise generation related to increases/decreases in the extent of compensation lands under the various alternatives, and thus in the noise-generating activities (notably, earthwork) needed to manage them. However, it is impossible to predict the extent and type of management- or restoration-related earthwork needed under each alternative, because the location and condition of compensation lands cannot be identified at this time. Consequently, analysis of the (probably minor) differences in noise generation among the proposed action and alternatives would be speculative.			

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Air Quality	O&M and minor construction activities would be the principal source of pollutant emissions associated with the proposed action, so analysis of the proposed action's effects on air quality focused on O&M and minor construction activities. As identified above for noise and vibration, there could be some in-practice difference in long-term pollutant generation related to variation in the extent of compensation lands and the equipment and ground disturbance needed to manage them. However, as identified above for noise, it is impossible to predict the extent and type of management activities needed under each alternative, or the exact equipment required, because the location and condition of compensation lands cannot be identified at this time. Consequently, analysis of the—probably minor—differences in air pollutant emissions among the proposed action and alternatives would be speculative. The potential air quality benefits would depend on the acreage of compensation lands, and thus can be assessed comparatively at this time. Alternative 1 would focus on reducing take by comparison with the proposed action, through increased stringency in implementing the HCP's AMMs. However, although the level of take would be reduced, compensation needs are expected to be similar under both alternatives because compensation acreages would be calculated based on acreage affected, not level of take. Thus, air quality benefits would be very similar under Alternative 1 to those expected for the proposed action.	Alternative 2 would offer increase air quality benefits relative to the proposed action and other alternatives because of its increased requirement for compensation lands and the potential to preserve larger areas of vegetated open space.	Air quality benefits related to preservation of vegetated open space would be reduced under Alternative 3 by comparison with the other action alternatives, because the reduced list of covered species is expected to result in smaller compensation requirements.	It is difficult to predict the acreages required for compensation—and hence the potential for air quality benefits—under the piecemeal conservation approach that would result from implementing Alternative 4. However, it is unlikely that compensation acreages and the corresponding air quality benefits resulting from preservation of vegetated open space would match or exceed those anticipated under Alternative 2.
Public Health and Environmental Hazards	Alternative 1 would enable the same program of O&M and minor construction activities as that described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Alternative 1 would be subject to the same regulatory requirements and would incorporate the same program of training and BMPs for hazardous materials handling identified in this EIS/EIR for the proposed action. Consequently, impacts related to hazardous materials and public health and safety would be essentially the same under Alternative 1 as those described for the proposed action.	Alternative 2 would enable the same program of O&M and minor construction activities as that described for the proposed action. Differences between Alternative 2 and the proposed action would center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). Alternative 2 would be subject to the same regulatory requirements and would incorporate the same program of training and BMPs for hazardous materials handling identified in this EIS/EIR for the proposed action. As with Alternative 1, impacts related to hazardous materials and public health and safety would be essentially the same under Alternative 2 as those described for the proposed action.	Alternative 3 would enable the same program of O&M and minor construction activities as that described for the proposed action. The key difference between Alternative 3 and the proposed action would relate to the number of species covered under the Alternative 3 (reduced by comparison with the proposed HCP, as described in Chapter 2). Alternative 3 would be subject to the same regulatory requirements and would incorporate the same program of training and BMPs for hazardous materials handling identified in this EIS/EIR for the proposed action. As with Alternatives 1 and 2, impacts related to hazardous materials and public health and safety would be essentially the same under Alternative 3 as those described for the proposed action.	Under the No Action Alternative, PG&E would continue its existing program of O&M and minor construction activities unchanged. No HCP would be implemented, and any habitat compensation needed would occur on a case-by-case, piecemeal basis. However, PG&E would still implement their standard methods and techniques for carrying out O&M activities, including the existing program of training and BMPs for hazardous materials handling. Therefore, impacts related to hazardous materials and public health and safety would be essentially the same under Alternative 4 as those described for the proposed action.
Recreation	Alternative 1 would enable the same program of O&M and minor construction activities described for the proposed action, with minor differences specific to commitments for the protection of biological resources. Compensation ratios for loss or disturbance of habitat would be the same as under the proposed action; the key difference between the proposed action and Alternative 1 is an additional level of stringency associated with the implementation of AMMs at a lower level of effect than under the proposed action, with the intent of reducing take. As discussed in Chapter 2 (*Proposed Action and Alternatives*), the AMMs implemented under Alternative 1 would be the same as those described above for the proposed HCP. However, under Alternative 1, AMMs for certain activities would be implemented at a lower level of disturbance (for more detailed information about AMMs under the proposed action and the alternatives, see Chapter 2). Although the level of take would be reduced because of the increased stringency in implementing the HCP's AMMs, compensation is expected to be similar under both alternatives because compensation acreages would be calculated based on acreage affected, not level of take. Consequently, under Alternative 1, impacts related to recreational resources would be similar to those described for the proposed action.	Alternative 2 would enable the same program of O&M and minor construction activities described for the proposed action. Differences between Alternative 2 and the proposed action center on compensation ratios for habitat disturbed or lost (increased under Alternative 2 by comparison with the proposed action). As identified in Chapter 3 (*Land Use and Planning*), increased compensation ratios could result in the establishment of a greater number of preserves or preserves that encompass larger geographic areas as compared to those established under the proposed action. Under Alternative 2, assuming the same level of habitat disturbance, overall compensation requirements could be greater than under the proposed action, possibly resulting in greater potential to disturb recreational facilities and opportunities. Criteria for identifying suitable compensation lands would remain the same under Alternative 2 (see Chapter 4 of the proposed HCP in Appendix B), and selection of appropriate compensation lands would be subject to USFWS and DFG approval. Nonetheless, as the demand for compensation lands increases, availability of lands that support the appropriate habitat types can be expected to decrease, both within and outside of PG&E ROWs. Where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options are available (e.g., purchase of mitigation credits, donations, and enhancement). Implementation of compensation options other than acquisition by purchase or easement may offset some of the	Alternative 3 would enable the same program of O&M and minor construction activities described for the proposed action, and would enact the same additional environmental commitments for other resource areas identified in this EIS/EIR. The key difference between Alternative 3 and the proposed action relates to the number of species covered under Alternative 3 (reduced by comparison with the proposed action, as described in Chapter 2). Depending on their status at the time, other species might be subject to state, and possibly also federal, requirements for impact assessment and compensation, which would need to be addressed on a case-by-case basis. Reducing the number of HCP covered species could result in the establishment of a lesser number of preserves or preserves that encompass smaller geographic areas (as compared to those established under the proposed action) as a result of activities enabled under Alternative 3. At the same time, additional, case-by-case assessment of compensation needs might be required for any individual activities identified as having the potential to affect noncovered special-status species. It is difficult to determine the precise effect that this approach would have on recreation since the species potentially involved, their listing status, and detailed compensation needs cannot be identified at this time. However, because Alternative 3 could require the assessment of at least some compensation needs on a case-by-case basis, it could result in the identification of smaller parcels of land (including ROW areas) for enhancement use, compared to the proposed action. Also, while Alternative 3 could result in smaller contiguous areas where access	Under the No Action Alternative, PG&E would continue its existing program of O&M activities unchanged. No HCP would be implemented, and no other new environmental commitments would be put in place. The following paragraphs describe the range of possible outcomes for recreation under the No Action Alternative. Individual actions affecting suitable habitat for listed species would be assessed through case-by-case consultation with USFWS and DFG for level of effect and associated compensation needs. Because the compensation requirements for habitat disturbance would be evaluated on a case-by-case basis, smaller parcels of land (including portions of ROW areas) would likely be identified for enhancement at any given time, but case-by-case consultation could also result in more numerous occurrences of closures or access limitations. This is similar to but more extreme than the case described above for Alternative 3, where most compensation would be expected to occur under the auspices of an HCP process. The availability of desirable compensation lands is expected to decrease over time, as lands are used for compensation or other purposes. However, as described for the action alternatives, where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options would likely still be available (e.g., purchase of mitigation credits, donations, and enhancement). Potential adverse effects on existing recreational opportunities could

Resource	Alternative 1—HCP with Reduced Take	Alternative 2—HCP with Enhanced Compensation	Alternative 3—HCP with Reduced Number of Covered Species	Alternative 4—No Action
		difference in compensation ratios. However, Alternative 2 would still have the potential to permanently reduce recreational opportunities in the action area. Further, the enhanced compensation requirements under Alternative 2 could result in greater overall compensation requirements and as a result, a greater number and/or larger acreage of preserves. Consequently, impacts related to recreation would likely be slightly greater under Alternative 2 than those described for the proposed action.	may be limited or closed, more numerous occurrences of closures or access limitations could occur under Alternative 3. Depending on availability of appropriate habitat, multiple restricted access areas could potentially be scattered within the same recreational facility or distributed among several facilities throughout the action area. As the demand for compensation lands increases, availability of lands that support the appropriate habitat types can be expected to decrease, including areas within PG&E ROWs. Where appropriate and available compensation lands cannot be identified for purchase or easement, other compensation options are available (e.g., purchase of mitigation credits, donations, and enhancement); reliance on compensation options other than acquisition by purchase or easement could offset some of the difference in compensation needs. However, criteria for identifying suitable compensation lands would remain the same, and selection of appropriate compensation lands would be subject to DFG and possibly also USFWS approval, depending on the species involved. Alternative 3 would thus have some potential to permanently reduce recreational opportunities in the action area. Impacts would be similar under Alternative 3 to those described for the proposed action, but the case-by-case approach to compensation determination for impacts on noncovered species under Alternative 3 could result in a greater number of preserves, and could also result in greater restrictions on existing recreational opportunities. In summary, impacts related to recreation could be slightly greater under Alternative 3 compared to those described for the proposed action, but might also be slightly less, depending on the need for, and the outcomes of, case-by-case assessment outside the HCP process. Depending on the need for, and the outcomes of, separate case-by-case assessment outside the HCP process, impacts could also be slightly less than those identified for the proposed action.	be reduced under the No Action Alternative compared to the proposed action since suitable compensation lands might become more difficult to acquire on a case-by-case basis and payment-type compensation options might be used to a greater degree. It is difficult to assess the precise effect that this approach would have on recreation because locations and other details about specific habitat enhancement sites are unknown at this time, as are the actual compensation acreages that would be required. If payment-type compensation options were not emphasized, the case-by-case approach to compensation determination under the No Action Alternative could result in a greater number of preserves, and/or greater restrictions on existing recreational uses than the proposed action. Consequently, impacts related to recreation could also be greater under the No Action Alternative than those described for the proposed action.
Environmental Justice	Effects related to environmental justice are expected to be minimal under the action alternatives, as under the proposed action, and would not require mitigation.			Environmental justice impacts under the No Action Alternative, if any, are thus expected to be minimal, and would not require mitigation.
Socioeconomics	No socioeconomic effects have been identified under the proposed action or action alternatives.			Under the No Action Alternative, no HCP would be implemented, and ESA compliance would continue to be accomplished on a case-by-case basis. Consequently, any changes by comparison to existing conditions would be negligible, and mitigation would not be needed.
Growth Inducement	The proposed action and action alternatives would all enable the same program of service upgrades and expansion in support of planned growth. Under all alternatives, upgrades and expansions would be implemented only in response to identified need; thus, the proposed action and all action alternatives have been identified as growth accommodating rather than growth inducing.			Because the No Action Alternative would continue the same program of O&M and minor construction as the proposed action, it would also support planned growth, and thus has the same potential for growth accommodation (as distinct from growth inducement) as the proposed action and action alternatives.
Environmental Sustainability	Environmental sustainability would be very similar for all of the action alternatives to that described for the proposed action. However, Alternatives 1 and 2 would offer a slight advantage over Alternative 3 by providing a more coordinated/integrative approach to conservation planning.		Environmental sustainability would be very similar for all of the action alternatives to that described for the proposed action. However, Alternative 3 would be slightly less advantageous overall because it would offer less coordinated to conservation planning.	Under the No Action Alternative, no HCP would be implemented, and ESA compliance would continue to be accomplished on a case-by-case basis. This would be slightly less advantageous in terms of environmental sustainability than the proposed action and action alternatives, because it would not support coordinated conservation planning over the long term.

Resource	Impact	Effect of Increased Conservation Acreage on Impact—Beneficial or Adverse?	Environmentally Preferable Alternative by Impact	Environmentally Preferable Alternative for Resource Overall
Land Use	Impact LUP1—Potential for O&M and minor construction activities to result in physical division of an established community or inconsistency with existing or planned land uses	No effect	No clear differentiation between alternatives	**Alternative 1**
	Impact LUP2—Potential for compensation options to result in physical division of an established community	Adverse	Alternative 1	
	Impact LUP3—Potential incompatibility of preserves with existing (onsite) land uses	Adverse	Alternative 1	
	Impact LUP4—Potential incompatibility of preserves with adjacent land uses	Adverse	Alternative 1	
	Impact LUP5—Potential inconsistencies between preserve land acquisition and local land use plans and policies	Adverse	Alternative 1	
	Impact LUP6—Potential conflicts with existing HCPs or NCCPs	No effect	No clear differentiation between alternatives	
Agricultural Resources	Impact AG1—Potential for the conversion of important farmland to nonagricultural uses due to O&M and minor construction activities	Little or no effect	No clear differentiation between alternatives	**Alternative 1**
	Impact AG2—Potential for the conversion of important farmland due to implementation of compensation options	Potentially somewhat adverse under NEPA; no effect under CEQA	Alternative 1	
	Impact AGR3—Potential to conflict with existing Williamson Act contracts	Adverse	Alternative 1	
Biological Resources	Impact BIO1—Potential disturbance or loss of natural vegetation	Beneficial; but avoidance of impacts is preferable to compensation	Alternative 1	**Alternative 1**
	Impact BIO2—Potential disturbance or loss of vernal pool habitat	Beneficial; but avoidance of impacts is preferable to compensation	Alternative 1	

Resource	Impact	Effect of Increased Conservation Acreage on Impact—Beneficial or Adverse?	Environmentally Preferable Alternative by Impact	Environmentally Preferable Alternative for Resource Overall
	Impact BIO3—Potential disturbance or loss of covered special-status plant species and their habitat	Beneficial; but avoidance of impacts is preferable to compensation	Alternative 1	
	Impact BIO4—Potential disturbance or loss of covered special-status wildlife species and their habitat	Beneficial; but avoidance of impacts is preferable to compensation	Alternative 1	
	Impact BIO5—Potential loss of noncovered special-status plant species and their habitat	Probably beneficial	No clear differentiation between alternatives	
	Impact BIO6—Potential effects on noncovered special-status wildlife species and their habitat	Probably beneficial	No clear differentiation between alternatives	
	Impact BIO7—Potential effects on aquatic habitat as a result of inchannel work	No effect	No clear differentiation between alternatives	
	Impact BIO8—Potential disturbance or loss of common wildlife species and their habitats	Probably beneficial	No clear differentiation between alternatives	
	Impact BIO9—Potential to spread invasive nonnative plant species	No effect	No clear differentiation between alternatives	
Aesthetics	Impact AES1—Potential for adverse effects on visual resources, visual character, or visual quality as a result of O&M activities	No effect	No clear differentiation between alternatives	**Alternative 2**
	Impact AES2—Potential for adverse effects on visual resources associated scenic highways and other designated scenic vistas as a result of new minor construction	No effect	No clear differentiation between alternatives	
	Impact AES3—Potential for medium- and long-term degradation of visual character of public viewshed as a result of vegetation removal and earthwork for new minor construction	No effect	No clear differentiation between alternatives	
	Impact AES4—Potential for long-term degradation of region's visual resources through introduction of built elements	No effect	No clear differentiation between alternatives	

Resource	Impact	Effect of Increased Conservation Acreage on Impact—Beneficial or Adverse?	Environmentally Preferable Alternative by Impact	Environmentally Preferable Alternative for Resource Overall
	Impact AES5—Potential introduction of new substantial sources of light or glare	No effect	No clear differentiation between alternatives	
	Impact AES6—Potential introduction of substantial new shading on adjacent parcels	No effect	No clear differentiation between alternatives	
	Impact AES7—Aesthetic enhancement as a result of habitat compensation	Beneficial	Alternative 2	
Geology and Soils	Impact GEO1—Potential for damage to new or upgraded facilities as a result of surface fault rupture	No effect	No clear differentiation between alternatives	**No clear differentiation between alternatives**
	Impact GEO2—Potential for damage to new or upgraded facilities as a result of seismic groundshaking	No effect	No clear differentiation between alternatives	
	Impact GEO3—Potential for damage to new or upgraded facilities as a result of seismically induced liquefaction or other seismic ground failure	No effect	No clear differentiation between alternatives	
	Impact GEO4—Potential for damage to new or upgraded facilities as a result of slope failure; potential for construction activities to increase slope failure hazard	No effect	No clear differentiation between alternatives	
	Impact GEO5—Risks to new or upgraded facilities as a result of construction on expansive soils	No effect	No clear differentiation between alternatives	
	Impact GEO6—Potential for proposed action to result in accelerated soil erosion	No effect	No clear differentiation between alternatives	
	Impact GEO7—Potential loss of topsoil resources	No effect	No clear differentiation between alternatives	
Water Quality	Impact WR1—Potential to divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake	Beneficial	Alternative 2	**Alternative 2**
	Impact WR2—Potential for alteration of existing drainage patterns, increasing flood risk and/or erosion and siltation potential	Beneficial	Alternative 2	

Resource	Impact	Effect of Increased Conservation Acreage on Impact—Beneficial or Adverse?	Environmentally Preferable Alternative by Impact	Environmentally Preferable Alternative for Resource Overall
	Impact WR3—Potential for increased flood risks as a result of facilities installation.	No effect	No clear differentiation between alternatives	
	Impact WR4—Potential for increased stormwater runoff, and corollary effects	Beneficial	Alternative 2	
	Impact WR5—Potential use of streambed materials	No effect	No clear differentiation between alternatives	
	Impact WR6—Potential for reduction in groundwater recharge	Beneficial	Alternative 2	
	Impact WR7—Potential temporary degradation of surface water quality as a result of ground disturbance during O&M and construction activities	No effect	No clear differentiation between alternatives	
	Impact WR8—Potential temporary degradation of surface water quality as a result of inchannel work.	No effect	No clear differentiation between alternatives	
	Impact WR9—Potential for degradation of surface and groundwater quality as a result of hazardous materials spills or releases	No effect	No clear differentiation between alternatives	
Cultural Resources	Impact CR1—Potential disturbance or destruction of cultural resources as a result of O&M activities	No effect	No clear differentiation between alternatives	**No clear differentiation between alternatives**
	Impact CR2—Potential disturbance or destruction of cultural resources as a result of minor construction activities	No effect	No clear differentiation between alternatives	
	Impact CR3—Potential impacts on cultural resources as a result of habitat enhancement, restoration, or creation	No effect	No clear differentiation between alternatives	
Paleontological Resources	Impact PAL1—Potential for damage to paleontological resources	No effect	No clear differentiation between alternatives	**No clear differentiation between alternatives**
Transportation and Circulation	Impact TR1—Potential to result in temporary construction-related traffic increases and traffic safety hazards (O&M, minor construction, and preserve enhancements)	No effect	No clear differentiation between alternatives	**No clear differentiation between alternatives; Alternative 1 possibly slightly preferable overall**

Resource	Impact	Effect of Increased Conservation Acreage on Impact—Beneficial or Adverse?	Environmentally Preferable Alternative by Impact	Environmentally Preferable Alternative for Resource Overall
	Impact TR2—Potential long-term traffic increases and traffic safety hazards due to O&M activities and staffing at new facilities	No effect	No clear differentiation between alternatives	
	Impact TR3—Potential long-term traffic increases and traffic safety hazards due to activities at preserves	No effect	Alternative 1 slightly preferable	
	Impact TR4—Potential to result in inadequate parking capacity	No effect	No clear differentiation between alternatives	
	Impact TR5—Potential conflicts with transportation plans, programs, and planned projects	No effect	No clear differentiation between alternatives	
Noise and Vibration	Impact N1—Potential for temporary or permanent exposure of noise-sensitive land uses to elevated noise levels	No effect	No clear differentiation between alternatives	**No clear differentiation between alternatives**
	Impact N2—Potential for temporary or permanent exposure of noise-sensitive land uses to elevated vibration levels	No effect	No clear differentiation between alternatives	
Air Quality	Impact AIR1—Potential to generate increased pollutant emissions during O&M activities	No effect	No clear differentiation between alternatives	**Alternative 2**
	Impact AIR2—Potential to exceed federal General Conformity thresholds	No effect	No clear differentiation between alternatives	
	Impact AIR3—Air quality enhancement as a result of habitat compensation	Beneficial	Alternative 2	
Public Health and Environmental Hazards	Impact PH1—Potential to create a hazard to the public or the environment through routine transport, use, or disposal of hazardous materials other than herbicides; potential for inadvertent spills or releases of hazardous materials other than herbicides	No effect	No clear differentiation between alternatives	**No clear differentiation between alternatives**
	Impact PH2—Potential to create a hazard to the public or the environment through routine transport, use, or disposal of herbicides; potential for	No effect	No clear differentiation between alternatives	

Resource	Impact	Effect of Increased Conservation Acreage on Impact—Beneficial or Adverse?	Environmentally Preferable Alternative by Impact	Environmentally Preferable Alternative for Resource Overall
	inadvertent spills or releases of herbicides			
	Impact PH3—Potential for human or environmental exposure to hazardous materials as a result of ground disturbance on sites with known hazardous materials contamination	No effect	No clear differentiation between alternatives	
	Impact PH4—Potential to interfere with or impede the implementation of adopted emergency response plans; potential to interfere with emergency vehicle access or increase emergency services' response times	No effect	No clear differentiation between alternatives	
	Impact HC5—Potential handling of hazardous materials within 0.25 mile of an existing or planned school	No effect	No clear differentiation between alternatives	
Recreation	Impact REC1—Potential to result in, construct, or expand recreational facilities that might have an adverse physical effect on the environment	No effect	No clear differentiation between alternatives	**No clear differentiation between alternatives**
	Impact REC2—Potential to increase the use of recreational facilities accelerating or causing physical deterioration	No effect	No clear differentiation between alternatives	
	Impact REC3—Potential for reduced recreational opportunities due to O&M and short-term construction activities	No effect	No clear differentiation between alternatives	
	Impact REC4—Potential for reduced recreational opportunities due to installation of new, improved, or expanded aboveground facilities or structures	No effect	No clear differentiation between alternatives	
	Impact REC5—Potential for reduced recreational opportunities due to implementation of compensation options	Adverse	Alternative 1	
	Impact REC6—Potential to provide new or enhanced recreational opportunities due to establishment of preserves or other compensation lands	Beneficial	Alternative 2 (benefit considered speculative)	

Resource	Impact	Effect of Increased Conservation Acreage on Impact—Beneficial or Adverse?	Environmentally Preferable Alternative by Impact	Environmentally Preferable Alternative for Resource Overall
Socioeconomics	No impacts identified	No effect	No clear differentiation between alternatives	**No clear differentiation between alternatives**
Environmental Justice	No impacts identified	No effect	No clear differentiation between alternatives	**No clear differentiation between alternatives**

Air Quality, Aesthetics, and Water Quality

Preservation and enhancement of open space would benefit air quality, aesthetics, and water quality. All of the action alternatives would offer a potential air quality benefit because they would preserve vegetated open space from development. They would also benefit surface- and groundwater resources by preserving natural drainage patterns and permeable natural surfaces, and limiting the area subject to recontouring, cultivation, development and other types of ground disturbance. All three action alternatives would also benefit aesthetic resources—the acreage required for compensation is expected to consistently exceed the actual acreage impacted, so net open space acreage would increase over the 30-year permit term; moreover, the preserve lands would consist of high quality open space presumably offering scenic advantages. Benefits related to open space preservation would occur under all of the action alternatives, but all three resources—air quality, water resources, and aesthetic resources—would receive the most benefit under Alternative 2, which would require greater mitigation acreages to satisfy its enhanced compensation ratios.

Land Use and Agricultural Resources

Although land use impacts are identified as incrementally less than significant (see Chapter 3), the potential for some level of incompatibility between preservation of mitigation lands and the need for planning flexibility renders a larger compensation ratio less desirable from the land use planning perspective. An increased compensation ratio is also viewed as more likely to be problematic where agricultural lands are involved (see Chapter 4); with larger acreages needed for compensation, the potential that agricultural (most likely grazing) lands would be required would increase. While using grazing lands for habitat compensation would protect them in perpetuity from urban development, and would thus preserve the physical characteristics that support agriculture, the commitment to manage these lands for the priority benefit of biological resources could restrict planning flexibility for future grazing use. In view of these constraints, Alternative 1 is preferable for land use and agriculture (Table 21-2); Alternative 2 is less desirable because of its enhanced compensation requirement. In addition, while Alternatives 3 and 4 could require fewer acres of conservation land at the outset, long-term conservation planning could be more difficult, potentially increasing the need to acquire lands on a shorter turnaround, which could in turn foster land use and agricultural incompatibilities that the more coordinated planning associated with the Alternatives 1 and 2 would avoid.

Recreation

Recreation is the only resource for which different impacts were evaluated as "preferring" different alternatives (Table 21-2).

Depending on the compensation needs identified, there is some potential that recreational lands could be acquired for compensation use, or that conservation

easements could be established such that recreational access is altered (see discussion under *Impact REC5—Potential for reduced recreational opportunities due to implementation of compensation options* in Chapter 15). The likelihood would be greatest under Alternative 2, which would require the largest compensation acreages. Alternatives 3 and 4 would require smaller "upfront" compensation acreages, but would offer less proactive conservation planning, potentially increasing the likelihood of effects on recreation. Alternative 1 would offer long-term planning and would reduce take by comparison with the proposed action, without increasing compensation acreages, so it is "preferred" for impacts related to reduction of recreation opportunities due to compensation needs.

All of the alternatives offer potential benefits with regard to new or enhanced recreational opportunities on compensation lands (see Impact REC3 in Chapter 15), but because of the larger compensation ratio associated with Alternative 2, it is "preferred" for these impacts.

To identify the alternative "preferred" overall for recreation, the relative likelihood and importance of anticipated detriments and benefits were compared. Because any recreational use associated with the preserves would be restricted to passive forms of recreation and would be strictly regulated, increased recreational opportunities (greatest under Alternative 2) are not expected to provide a clear or compelling benefit. The potential for reduced opportunities on recreational lands already in use (also greatest under Alternative 2) is similarly expected to be small, but was considered a sufficient concern to outweigh any potential benefit. As a result Alternative 1 was identified as preferable for recreation overall.

Biological Resources

Because of the proposed action's primary focus on protecting and conserving sensitive biological resources, all of the action alternatives would benefit the covered species, and would likely also offer corollary benefits for other species using the same and contiguous habitats, particularly in light of the commitment to provide permanent compensation for both temporary and permanent habitat effects. Alternative 1 would reduce take by comparison with the proposed action and the other action alternatives, through stricter application of AMMs. Alternative 2 would use AMMs to reduce take, but would further emphasize compensation for take that cannot be avoided, requiring the highest compensation ratios of any alternative. Alternatives 3 and 4 were evaluated as potentially less effective than either the proposed action or Alternatives 1 and 2 in reducing and compensating for take, because they would provide less coordinated and proactive conservation planning. Additional deficits could be associated with this decrease in efficiency.

Although both Alternative 1 and Alternative 2 would involve a combination of AMMs and compensation, the increased effort to reduce take of existing populations under Alternative 1 is evaluated as offering more reliable benefits for

the covered species than Alternative 2's enhanced compensation requirement. This is because reducing take would help to ensure the health of known, existing populations of the covered species. By contrast, there is no way to guarantee that the desired species would be successful on compensation lands. Similarly, enhanced compensation under Alternative 2 could offer benefits for noncovered special-status species, but any such benefits are considered more tenuous than those for covered species, because compensation would be specifically designed to benefit the covered species—noncovered species might or might not use compensation lands, and beneficial outcomes for noncovered species would represent an unintentional corollary of compensation for impacts on covered species' habitat. Enhanced compensation under Alternative 2 would offer greater benefits for native vegetation in general, and probably also for common species, which are assumed to be widely present. However, because of the proposed action's priority focus on benefits to the covered species and greater certainty of benefits provided for these species under Alternative 1, Alternative 1 is preferred for biological resources overall.

Other Resources

Impacts on several of the resources analyzed would be unaffected by the differences between the alternatives. These include geology and soils; cultural resources; paleontological resources; transportation and circulation; noise and vibration; public health and environmental hazards; and growth-related issues. Impacts on these resources would relate almost entirely to tasks performed for O&M and minor construction, which would be the same under all alternatives. Moreover, all impacts have been identified as less than significant for these resources (see discussions in Chapters 7, 9, 10, 11, 12, 14, and 19). As a result it is difficult to differentiate clearly between the alternatives as they relate to these resources.

No impacts were identified for socioeconomics or environmental justice under the proposed action or any of the alternatives. These resources are also considered not to support differentiation between the alternatives.

Environmentally Preferable/Environmentally Superior Alternative

As discussed in *Methodology* above, the environmentally preferable/ environmentally superior alternative is expected to be the one identified as preferable for the most resource areas—that is, the one that offers the best outcome overall for the most resources.

Alternative 1 was identified as preferable for land use and planning (because of the increased regionalization it would provide) and for biological resources (because of its emphasis on reduced take). It would also be preferable for agricultural resources and for recreation, which could be subject to increased constraints as compensation acreages increase under Alternative 2 and could

suffer under the less coordinated planning approach offered by Alternative 3 and the No Action Alternative. On the other hand, Alternative 2 is clearly preferable for resources benefited by increased acreages of open space—aesthetic resources, water resources (in particular, water quality), and air quality. Finally, for many of the resource areas analyzed, environmental effects would be comparable under all alternatives, and it is difficult to differentiate clearly between them.

In summary, Alternative 1 would offer the best outcome for a total of four resources, while Alternative 2 would offer the best outcome for a total of three resources, reflecting a slight advantage under Alternative 1. Resources without a clearly preferable alternative are considered not to bear directly on identification of an environmentally preferable approach. Because of the proposed action's focus on protection and conservation of sensitive biological resources, potential biological benefits were considered the deciding factor, and Alternative 1, which focuses on avoiding impacts on known populations of sensitive species through increased stringency in implementing AMMs, is identified as the environmentally preferable/environmentally superior alternative.

Comparison of Environmentally Superior Alternative and Proposed Action

Alternative 1 would reduce take by comparison with the proposed action, by applying AMMs more comprehensively and stringently. Thus, it would offer some level of biological benefit over the proposed action. However, because Alternative 1 would require preactivity surveys for a wide variety of fairly minor activities, it would likely restrict the seasons during which some O&M activities could be conducted and thus could impede the timely performance of O&M and/or interfere with emergency repair activities. This could result in conflicts with CPUC safety regulations, and could also compromise PG&E's ability to deliver reliable electrical and natural gas service. In addition, PG&E's budget analyses suggest that full implementation of Alternative 1 would be prohibitively expensive. Thus, although potentially feasible, Alternative 1 has been evaluated as difficult to implement reliably in practice, and potentially counter to PG&E's legal responsibilities under CPUC regulations.

The proposed action would avoid these conflicts and support PG&E's service delivery responsibilities, while providing adequate protection for the covered species and their habitats. It offers the additional advantages of more manageable costs, and would still yield substantial biological benefits by comparison with existing procedures.

Chapter 22

List Of EIS/EIR Preparers

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Chapter 23

EIS/EIR Distribution and Noticing

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California State Library, Government Publications Section
P.O. Box 942837
Sacramento, CA 95814

Central Valley Regional Water Quality Control Board

Sacramento Main Office
11020 Sun Center Drive #200
Rancho Cordova, CA 95670-611

Fresno Branch Office
1685 E Street
Fresno, CA 93706-2007

Kern County Air Pollution Control District
2700 M Street, Suite 302
Bakersfield, CA 93301-2370

Mariposa County Air Pollution Control District
P.O. Box 5
Mariposa, CA 95338

Native American Heritage Commission
915 Capitol Mall
Sacramento, CA 95818

Office of Environmental Health Hazard Assessment
P.O. Box 4010
Sacramento, CA 95812-4010

San Joaquin Valley Air Pollution Control District
1990 E. Gettysburg
Fresno, CA 93726

2700 M Street, Suite 275
Bakersfield, CA 93301-2370

4230 Kiernan Avenue, Suite 130
Modesto, CA 95356-9321

State Historic Preservation Office
1416 9th Street, Room 1442
Sacramento, CA 95814

State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812

Organizations

Audubon California
Glenn Olson, VP, Executive Director
711 University Avenue
Sacramento, CA 95825

Center for Biological Diversity
San Francisco Bay Area
1095 Market Street, Suite 511
San Francisco, CA 94103

Center for Biological Diversity
Kassie Siegel, Staff Attorney
P.O. Box 493
Idyllwild, CA 92549

Local Jurisdictions

San Joaquin County

San Joaquin County Clerk
222 East Weber Avenue #707
Stockton, CA 95202

San Joaquin County Community Development Department
Kerry Sullivan, Planning Director
1810 East Hazelton Avenue
Stockton, CA 95205

Cities

City Clerk
1854 Main Street
Escalon, CA 95320

City of Escalon
Planning Department
1855 Coley Avenue
Escalon, CA 95320

City Clerk
390 Towne Centre Drive
Lathrop, California 95330

City Clerk
221 West Pine Street
Lodi, CA 95240

City Clerk
1001 West Center Street
Manteca, CA 95337

City Clerk
259 North Wilma Avenue
Ripon, CA 95366

City Clerk
425 North El Dorado Street
Stockton, CA 95202

City of Stockton
Community Development Department
345 East El Dorado Street
Stockton, CA 95202

City Clerk
325 East 10th Street
Tracy, CA 95376

City of Tracy
Development and Engineering Services
520 Tracy Boulevard
Tracy, CA 95376

Libraries

Cesar Chavez Central Library
605 North El Dorado Street
Stockton, CA 95202

Escalon Branch Library
1540 Second Street
Escalon, CA 95230

Fair Oaks Branch Library
2370 East Main Street
Stockton, CA 95205

Linden Branch Library
19059 East Main Street
Linden, CA 95236-9492

Lodi Public Library
201 West Locust Street
Lodi, CA 95240

Manteca Branch Library
320 West Center Street
Manteca, CA 95336

Margaret K. Troke Branch Library
502 West Benjamin Holt Drive
Stockton, CA 95207

Maya Angelou Southeast Branch Library
2324 Pock Lane
Stockton, CA 95205

Ripon Branch Library
430 West Main Street
Ripon, CA 95336

Thornton Branch Library
26341 North Thornton Road
Thornton, CA 95686

Tracy Branch Library
20 East Eaton Avenue
Tracy, CA 95376

Other Agencies and Organizations

Local Agency Formation Commission (LAFCO)
1860 East Hazelton Avenue
Stockton, CA 95205

San Joaquin Regional Transportation District
1533 East Lindsay Street
Stockton, CA 95205-4498

San Joaquin County Resource Conservation District
3422 West Hammer Lane, Suite A
Stockton, CA 95219

San Joaquin Council of Governments
555 East Weber Avenue
Stockton CA 95202-2804

San Joaquin Farm Bureau
P.O. Box 8444
Stockton, CA 95208

South San Joaquin Irrigation District
11011 East Highway 120
Manteca, CA 95336

Stockton East Water District
6767 East Main Street
Stockton, CA 95215

Stockton Municipal Utilities District
2500 Navy Drive
Stockton, CA 95206

Stanislaus County

Stanislaus County Clerk/Recorder
1201 I Street, Suite 101
Modesto, CA 95354

Stanislaus County Department of Planning and Community Development
Ron Freitas, Planning Director
1010 Tenth Street, Suite 3400, 3rd Floor
Modesto, CA 95354

Cities

City Clerk
2720 Second Street
Ceres, CA 95307

City Clerk
7018 Pine Street
P.O. Box 9
Hughson, CA 95326

City Clerk
1010 Tenth Street
Modesto, CA 95354

City Clerk
1162 Main Street
P.O. Box 787
Newman, CA 95360

City Clerk
280 North 3rd Avenue
Oakdale, CA 95361

City of Oakdale
Community Development Department
455 South 5th Street
Oakdale, CA 95361

City Clerk
33 South Del Puerto Avenue
Patterson, CA 95363

City Clerk
6707 Third Street
Riverbank, CA 95367

City Clerk
156 South Broadway, Suite 230
Turlock, CA 95380-5454

City Clerk
P.O. Box 199
Waterford, CA 95386

Libraries

Ceres Library
2250 Magnolia
Ceres, CA 95307

Denair Library
4801 Kersey Road
Denair, CA 95316

Empire Library
18 South Abbie Street
Empire, CA 95319

Hughson Library
2412 Third Street
Hughson, CA 95326

Keyes Library
4420 Maud Avenue
Keyes, CA 95328

Modesto Library
1500 I Street
Modesto, CA 95354

Newman Library
1305 Kern Street
Newman, CA 95360

Oakdale Library
151 South First Avenue
Oakdale, CA 95361

Patterson Library
46 North Salado
Patterson, CA 95363

Riverbank Library
3442 Santa Fe Avenue
Riverbank, CA 95367

Salida Library
4835 Sisk Road
Salida, CA 95368

Turlock Library
550 Minaret Avenue
Turlock, CA 95380

Waterford Library
324 E Street
Waterford, CA 95386

Other Agencies and Organizations

East Stanislaus County Resource Conservation District
3800 Cornucopia Way, Suite E
Modesto, CA 95358

Eastside Water District
P.O. Box 580
Denair, CA 95316

Modesto Irrigation District
P.O. Box 4060
Modesto, CA 95352-4060

Oakdale Irrigation District
1205 East F Street
Oakdale, CA 95361

Stanislaus Area Association of Governments
1025 15th Street
Modesto, CA 95354

Stanislaus County Farm Bureau
P.O. Box 3070
Modesto, CA 95353

Turlock Irrigation District
333 East Canal Drive
Turlock, CA 95380

West Stanislaus Resource Conservation District
20 North El Circulo
Patterson, CA 95363

Merced County

County Clerk/Recorder
2222 M Street
Merced, CA 95340

County Clerk/Recorder
Los Banos Office
545 J Street
Los Banos, CA 93635

Merced County Planning Department
William Nicholson, Planning Director
2222 M Street
Merced, CA 95340

Cities

City Clerk
750 Bellevue Road
Atwater, CA 95301

City Clerk
1546 Golden Gate Avenue
Dos Palos CA 93620

City Clerk
682 3rd Avenue
Gustine, CA 95322

City Clerk
P.O. Box 308
Livingston, CA 95334

City Clerk
520 J Street
Los Banos, CA 93635

City Clerk
678 West 18th Street
Merced, CA 95340

Libraries

Atwater Library
1600 Third Street
Atwater, CA 95301

Cressey Library
9257 North Cressey Way
Cressey, CA 95312

Dos Palos Library
2002 Almond
Dos Palos, CA 93620

Gustine Library
205 Sixth Street
Gustine, CA 95322

Livingston Library
1212 Main Street
Livingston, CA 95334

Los Banos Library
1312 7th Street
Los Banos, CA 95334

Merced County Library
2100 O Street
Merced, CA 95340

Other Agencies and Organizations

East Merced Resource Conservation District
2135 Wardrobe Avenue, Suite C
Merced, CA 95340

Grassland Resource Conservation District
22759 South Mercy Springs Road
Los Banos, CA 93635

Gustine-Romero Resource Conservation District
2199 South Jensen Road
Gustine, CA 95322

Los Banos Resource Conservation District
745 West J Street
Los Banos, CA 93635

Merced County Association of Governments
369 West 18th Street
Merced, CA 95340

Merced County Farm Bureau
P.O. Box 1232
Merced, CA 95341

Merced Irrigation District
P.O. Box 2288
Merced, CA 95344-0288

San Luis Resource Conservation District
745 West J Street
Los Banos, CA 93635

Fresno County

County Clerk
2221 Kern St
Fresno, CA 93721

Fresno County Planning and Evaluation
Carolina Hogg, Planning Director
2200 Tulare Street, 8th Floor
Fresno, CA 93721-2104

Fresno County Transportation Authority
2220 Tulare Street, Suite 411
Fresno, CA 93721

Cities

City Clerk
1033 Fifth Street
Clovis, CA 93612

City Clerk
155 W. Durian
Coalinga, CA 93210

City Clerk
1575 11th Street
Firebaugh, CA 93622

City Clerk
2600 Fresno St, 2nd Floor
Fresno, CA 93721

City Clerk
128 S. Fifth Street
Fowler, CA 93625

City Clerk
P.O. Box 339
Huron, CA 93234

City Clerk
850 S. Madera
Kerman, CA 93630

City Clerk
1401 Draper Street
Kingsburg, CA 93631

City Clerk
643 Quince Street
Mendota, CA 93640

City Clerk
633 Sixth Street
Orange Cove, CA 93646

City Clerk
1100 E. Parlier
Parlier, CA 93648

City Clerk
1717 9th Street
Reedley, CA 93654

City Clerk
21900 Colorado, P.O. Box 758
San Joaquin, CA 93660

City Clerk
1700 Seventh Street
Sanger, CA 93657

City Clerk
1710 Tucker Street
Selma, CA 93662

Libraries

Auberry Library
33049 Auberry Road
Auberry, CA 93602

Bear Mountain Library
30733 East Kings Canyon
Squaw Valley, CA 93675

Big Creek Library
55190 Point Road
Big Creek, CA 93605

Caruthers Library
13382 South Henderson
Caruthers, CA 93609

Cedar-Clinton Library
4150 East Clinton
Fresno, CA 93703

Central Fresno County Library
2420 Mariposa
Fresno, CA 93721

Clovis Library
1155 5th Street
Clovis, CA 93612

Easton Library
25 East Fantz
Easton, CA 93706

Fig Garden Library
3071 West Bullard
Fresno, CA 93711

Firebaugh Library
1315 O Street
Firebaugh, CA 93622

Fowler Library
119 East Merced Street
Fowler, CA 93625

Gillis Library
629 West Dakota
Fresno, CA 93705

Ivy Center Library
1350 East Annadale
Fresno, CA 93706

Kerman Library
15081 Weast Kearney Plaza
Kerman, CA 93630

Kingsburg Library
1399 Draper
Kingsburg, CA 93631

Laton Library
6313 DeWoody
Laton, CA 93242

Mendota Library
667 Quince Street
Mendota, CA 93640

Mosqueda Library
4670 East Butler
Fresno, CA 93702

Orange Cove Library
523 Park Boulevard
Orange Cove, CA 93646

Parlier Library
1130 East Parlier
Parlier, CA 93648

Piedra Library
25385 Trimmer Springs Road
Piedra, CA 93749

Pinedale Library
7170 North San Pablo
Pinedale, CA 93650

Politi Library
5771 North First
Fresno, CA 93710

Reedley Library
1027 E Street
Reedley, CA 93654

Riverdale Library
20975 Malsbary
Riverdale, CA 93656

San Joaquin Library
8781 Main Street
San Joaquin, CA 93660

Sanger Library
1812 Seventh Street
Sanger, CA 93657

Selma Library
2200 Selma Avenue
Selma, CA 93662

Shaver Lake Library
41344 Tollhouse Road
Shaver Lake, CA 93664

Sunnyside Library
5566 East Kings Canyon
Fresno, CA 93727

Talking Book Library
770 North San Pablo
Fresno, CA 93728

Tranquillity Library
5831 San Juanche
Tranquillity, CA 93668

Woodward Park Library
944 East Perrin
Fresno, CA 93720

Other Agencies and Organizations

Council of Fresno County Governments
2100 Tulare Street, Suite 619
Fresno, CA 93721

Firebaugh Resource Conservation District
P.O. Box 97
Mendota, CA 93640

Fresno County Farm Bureau
1274 West Hedges

Fresno, CA 93728

Fresno Irrigation District
2907 South Maple
Fresno, CA 93725

Fresno Metropolitan Flood Control District
5469 East Olive Avenue
Fresno, CA 93727

Kings River Conservation District
4886 East Jensen Avenue
Fresno, CA 93725

Navelencia Resource Conservation District
23108 East Jensen Avenue
Reedley, CA 93654

Poso Resource Conservation District
39586 West Valeria
Dos Palos, CA 93620

Sierra Resource Conservation District
843 West Euclid Avenue
Clovis, CA 93612

Tranquillity Resource Conservation District
P.O. Box 487
Tranquillity, CA 93668

West Side Resource Conservation District
P.O. Box 205
Five Points, CA 93624

Westlands Water District
P.O. Box 6056
Fresno, CA 93703-6056

Kings County

County Clerk
1400 West Lacey Boulevard
Hanford, CA 93230

Kings County Planning and Evaluation
William Zumwalt, Planning Director
1400 Lacey Boulevard
Hanford, CA 93230

Cities

City Clerk
919 Skyline Boulevard
Avenal, CA 93204

City Clerk
1033 Chittenden Avenue
Corcoran, CA 93212

City Clerk
319 North Douty Street
Hanford, CA 93230

City Clerk
119 Fox Street
Lemoore, CA 93245

Libraries

Avenal Branch Library
501 East Kings
Avenal, CA 93204

Corcoran Branch Library
1001-A Chittenden
Corcoran, CA 93212

Hanford Library (Main Library)
401 North Douty Street
Hanford, CA 93230

Kettleman City Branch Library
104 Becky Pease Street
Kettleman City, CA 93239

Lemoore Branch Library
457 C Street
Lemoore, CA 93245

Stratford Branch Library
20300 Main Street
Stratford, CA 93266

Armona Community Branch Library
11115 C Street
Armona, CA 93202

Other Agencies and Organizations

Excelsior/Kings River Resource Conservation District
650 North Campus Drive #8
Hanford, CA 93230

Kings County Association of Governments
1400 West Lacey Boulevard
Hanford, CA 93230

Kings County Farm Bureau
870 Greenfield Avenue
Hanford, CA 93230

Tulare Lake Resource Conservation District
P.O. Box 985
Corcoran, CA 93212

Kern County

County Clerk
1115 Truxtun Avenue
Bakersfield, CA 93301

Kern Planning Department
Ted James, Planning Director
Public Services Building
2700 M Street
Bakersfield, CA 93301-2370

Cities

City Clerk
P.O. Box 548
Arvin, CA 93203

City Clerk
1501 Truxtun Avenue
Bakersfield, CA 93301

City Clerk
21000 Hacienda Boulevard
California City, CA 93505

City Clerk
P.O. Box 1488
McFarland, CA 93250

City Clerk
1015 11th Avenue
Delano, CA 93215

City of Mojave
Public Utilities District
15844 K Street
Mojave, CA 93504

City Clerk
100 West California Avenue
Ridgecrest, CA 93555

City Clerk
336 Pacific Avenue
Shafter, CA 93263

City Clerk
209 East Kern
Taft, CA 93268

City Clerk
115 South Robinson Street
Tehachapi, CA 93561

City Clerk
746 8th St
Wasco, CA 93208

Libraries

Baker Branch Library
1400 Baker Street
Bakersfield, CA 93305

Beale Memorial Branch Library
701 Truxtun Avenue
Bakersfield, CA 93301

Bryce C. Rathbun Branch Library
200 West China Grade Loop
Bakersfield, CA 93308

Eleanor Wilson Branch Library
1901 Wilson Road
Bakersfield, CA 93304

Holloway-Gonzales Branch Library
506 East Brundage Lane
Bakersfield, CA 93307

Northeast Branch Library
3725 Columbus Street
Bakersfield, CA 93306

Southwest Branch Library
8301 Ming Avenue
Bakersfield, CA 93311

Arvin Branch Library
201 Campus Way
Arvin, CA 93203

Boron Branch Library
26967 20 Mule Team Road
Boron, CA 93516

Buttonwillow Branch Library
116 South Buttonwillow Avenue
Buttonwillow, CA 93206

California City Branch Library
9507 California City Boulevard
California City, CA 93505

Delano Branch Library
925 10th Avenue
Delano, CA 93215

Frazier Park Branch Library
3015 Mount Pinos Way
Frazier Park, CA 93225

Kernville Branch Library
48 Tobias Station
Kernville, CA 93238

Kern River Valley Branch Library
7054 Lake Isabella Boulevard
Lake Isabella, CA 93240

Lamont Branch Library
8304 Segrue Road
Lamont, CA 93241

Clara M. Jackson (McFarland) Branch Library
500 West Kern Avenue
McFarland, CA 93250

Mojave Branch Library
16916½ Highway 14, Space D2
Mojave, CA 93504

Ridgecrest Branch Library
131 East Las Flores Avenue
Ridgecrest, CA 93555

Shafter Branch Library
236 James Road
Shafter, CA 93263

Taft Branch Library
27 Emmons Park Drive
Taft, CA 93268

Tehachapi Branch Library
450 West F Street
Tehachapi, CA 93561

Wanda Kirk (Rosamond) Branch Library
3611 Rosamond Boulevard
Rosamond, CA 93560

Wasco Branch Library
1102 7th Street
Wasco, CA 93208

Wofford Heights Branch Library
6400-B Wofford Boulevard
Wofford Heights, CA 93285

Other Agencies and Organizations

Buena Vista Resource Conservation District
P.O. Box 756
Buttonwillow, CA 93206

East Kern County Resource Conservation District
1525 North Norma, Suite C

Ridgecrest, CA 93555

Friant Water Authority
Delano Office
332 Norwalk
Delano, CA 93215

Kern Council of Governments
1401 19th Street, Suite 300
Bakersfield, CA 93301

Kern County Farm Bureau
801 South Mount Vernon Avenue
Bakersfield, CA 93307

Kern County Water Agency
P.O. Box 58
Bakersfield, CA 93302-0058

Kern Valley Resource Conservation District
P.O. Box 58
Weldon, CA 93283

Kern Transportation Foundation
117 V Street
Bakersfield, CA 93304

Pond-Shafter-Wasco Resource Conservation District
5000 California Avenue, Suite 100
Bakersfield, CA 93309

Shafter-Wasco Irrigation District
P.O. Box 1168
Wasco, CA 93280

Tehachapi Resource Conservation District
P.O. Box 195
Tehachapi, CA 93561

Western Kern Resource Conservation District
Antelope Ranch
General Delivery
Cholame, CA 93431

Mariposa County

County Clerk
4982 10th Street

P.O. Box 247
Mariposa, CA 95338-0247

Mariposa County Planning Department
Kris Schenk, Planning Director
5100 Bullion Street
Mariposa, CA 95338-2039

Libraries

Mariposa County Library
P.O. Box 106
Mariposa, CA 95338

Red Cloud Library
10304 Fiske Road
Coulterville, CA 95311

Yosemite Library
P.O. Box 395
Yosemite National Park, CA 95389

El Portal Library
P.O. Box 160
El Portal, CA 95318

Bassett Memorial Library
P.O. Box 2008
Wawona, CA 95389

Other Agencies and Organizations

Mariposa County Farm Bureau
P.O. Box 1297
Mariposa, CA 95338

Mariposa County Resource Conservation District
P.O. Box 746
Mariposa, CA 95338

Madera County

County Clerk
209 West Yosemite Avenue
Madera, CA 93637

Madera County Planning Department
Rayburn Beach, Planning Director
2037 West Cleveland Avenue
Madera, CA 93637

Cities

City of Chowchilla Administrative Services
City Clerk's Office
145 West Robertson Boulevard
Chowchilla, CA 93610

Sonia Alvarez, City Clerk
City Hall
205 West Fourth Street
Madera, CA 93637

Libraries

Madera County Library
121 North G Street
Madera, CA 93637

Chowchilla Library
300 Kings Avenue
Chowchilla, CA 93610

Madera Ranchos Library
37167 Avenue 12, Suite 4C
Madera, CA 93638

North Fork Library
39208 Road 222
North Fork, CA 93643

Oakhurst Library
49044 Civic Circle Drive
Oakhurst, CA 93644

Other Agencies and Organizations

Chowchilla Red Top Resource Conservation District
11791 Avenue 22
Chowchilla, CA 93610

Coarsegold Resource Conservation District
P.O. Box 1288
North Fork, CA 93646

Columbia Resource Conservation District
6770 Avenue 7½
Firebaugh, CA 93622

Eastern Madera County Chamber of Commerce
49074 Civic Circle
Oakhurst, CA 93644

Madera County Farm Bureau
1102 South Pine Street
Madera, CA 93637

Madera County Transportation Commission
1816 Howard Road, Suite 8
Madera, CA 93637

Madera Irrigation District
12152 Road 28¼
Madera, CA 93637-9199

Madera Resource Conservation District
P.O. Box 97
Madera, CA 93637

Tulare County

Gregory B. Hardcastle, CPA
County Assessor/Clerk-Recorder
Tulare County Civic Center
221 South Mooney Boulevard
Visalia, CA 93291

Tulare County Planning Department
George Finney, Planning Director
5961 South Mooney Boulevard
Visalia, CA 93277-9394

Cities

City Clerk
405 East El Monte Way
Dinuba, CA 93618

City Clerk
Exeter City Hall
137 North F Street
Exeter, CA 93221

City Clerk
251 East Honolulu Street
P.O. Box 369
Lindsay, CA 93247

City Clerk
Porterville City Hall
291 North Main Street
Porterville, CA 93257

City Clerk
411 East Kern Avenue
Tulare, CA 93274

City Clerk
707 West Acequia
Visalia, CA 93291

Libraries

Tulare County Library
200 West Oak Avenue
Visalia, CA 93291-4582

Alpaugh Branch Library
3816 Avenue 54
P.O. Box 69
Alpaugh, CA 93201-0069

Dinuba Branch Library
150 South I Street
Dinuba, CA 93618-2399

Earlimart Branch Library
780 East Washington Street
P.O. Box 12153
Earlimart, CA 93219-2153

Exeter Branch Library
230 East Chestnut
Exeter, CA 93221-1712

Ivanhoe Branch Library
15964 Heather
Ivanhoe, CA 93235-1253

Lindsay Branch Library
165 North Gale Hill Street
Lindsay, CA 93247-2507

Orosi/Cutler Branch Library
12646 Avenue 416
Orosi, CA 93647-2018

Pixley Branch Library
Pixley Union Elementary School
300 North School
P.O. Box K
Pixley, CA 93256-1011

Springville Branch Library
35800 Highway 190
P.O. Box 257
Springville, CA 93265-0257

Strathmore Branch Library
19646 Road 230
P.O. Box 595
Strathmore, CA 93267-0595

Terra Bella Branch Library
23825 Avenue 92
P.O. Box 442
Terra Bella, CA 93270-0442

Three Rivers Branch Library
42052 Eggers Drive
P.O. Box 216
Three Rivers, CA 93271-0216

Tipton Branch Library
301 East Woods Avenue
P.O. Box 39
Tipton, CA 93272-0039

Woodlake Branch Library
400 West Whitney
Woodlake, CA 93286-1298

Other Agencies and Organizations

Friant Water Users Authority
Lindsay Office
854 N. Harvard Avenue
Lindsay, CA 93247

Lower Tule River Irrigation District
357 East Olive Avenue
Tipton, CA 93272
Springville Chamber of Commerce
P.O. Box 104
35680 Highway 190
Springville, CA 93265

Tulare Association of Governments
5961 South Mooney Boulevard
Visalia, CA 93277

Tulare County Farm Bureau
P.O. Box 748
Visalia, CA 93279

Tulare County Resource Conservation District
3530 West Orchard Court
Visalia, CA 93277

Tulare Irrigation District
1350 West San Joaquin Avenue
Tulare, CA 93274

Native American Tribes

Big Sandy Rancheria
Connie Lewis, Chairperson
P.O. Box 337
Auberry, CA 93602

Cold Springs Rancheria
Jenifer Philley, Chairperson
P.O. Box 209
Tollhouse, CA 93667

North Fork Rancheria
Judy E. Fink, Chairperson
P.O. Box 929
North Fork, CA 93643-0929

Picayune Rancheria
Joyce Burel, Chairperson
46575 Road 417
Coarsegold, CA 93614

Santa Rosa Rancheria
Clarence Atwell Jr., Chairman
P.O. Box 8
Lemoore, CA 93245

Table Mountain Rancheria
Leanne Walker-Grant, Chairperson
P.O. Box 410
Friant, CA 93626

Tule River Reservation
Neil Peyron, Chairman
P.O. Box 589
Porterville, CA 93258

Other Interested Parties

Rich Albers
U.S. Fish and Wildlife Service
7501 West Sandy Mush Road
Merced, CA 95340

Geoff Grey
California Department of Transportation
2015 East Shields Avenue #100
Fresno, CA 93726

Dick Haas
4660 East Cambridge
Fresno, CA 93703

Steve Haze
Millerton Watershed/SFC
P.O. Box 529
Prather, CA 93651

Cheryl D. Johnson
California Department of Transportation
2015 East Shields Avenue #100
Fresno, CA 93726

Cheryl D. Johnson
California Department of Transportation
3400 Lucky Lane
Loomis, CA 95650

Appendix A

Notice of Intent, Notice of Preparation, and Scoping Comments

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

Preparation of an Environmental Impact Statement for Issuance of an Incidental Take Permit Associated With a Habitat Conservation Plan for Pacific Gas & Electric Company's Operation and Maintenance Activities in the San Joaquin Valley, California

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of intent.

SUMMARY: Pursuant to the National Environmental Policy Act (NEPA), the Fish and Wildlife Service (we, the Service) advises the public that we intend to gather information necessary to prepare, in coordination with the California Department of Fish and Game (DFG), and Pacific Gas & Electric Company (PG&E), a joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) on the PG&E San Joaquin Valley Operation and Maintenance Habitat Conservation Plan (Plan). The Plan is being prepared under section 10(a)(1)(B) of the Federal Endangered Species Act of 1973, as amended, (Act). PG&E intends to request a permit for 31 species federally listed as threatened or endangered and 36 unlisted species that may become listed during the term of the permit. The permit is needed to authorize take of listed species that could occur as a result of implementation activities covered under the Plan.

The Service provides this notice to: (1) Describe the proposed action and possible alternatives; (2) advise other Federal and State agencies, affected Tribes, and the public of our intent to prepare an EIS/EIR; (3) announce the initiation of a public scoping period; and (4) obtain suggestions and information on the scope of issues and alternatives to be included in the EIS/EIR.

DATES: Public meetings will be held on: Tuesday, April 6, 2004, from 4 PM to 7 PM, and on Wednesday, April 7, 2004, from 4 PM to 7 PM. Written comments should be received on or before April 26, 2004.

ADDRESSES: The public meeting on Tuesday, April 6, 2004 will be held at Siefert Community Center, Room 2, 128 West Benjamin Holt drive, Stockton, CA, (209) 937–7350, and the public meeting on Wednesday, April 7, 2004 will be held at Mosqueda Community Center, Room 6, 4670 East Butler Avenue, Fresno, CA (559) 621–6600. Information, written comments, or questions related to the preparation of the EIS/EIR and NEPA process should be submitted to Lori Rinek, Chief, Conservation Planning and Recovery Division, U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, 2800 Cottage Way, W–2605, Sacramento, California 95825; FAX (916) 414–6713.

FOR FURTHER INFORMATION CONTACT: Craig Aubrey, Fish and Wildlife Biologist, or Lori Rinek, Chief, Conservation Planning and Recovery Division at the Sacramento Fish and Wildlife Office at (916) 414–6600.

SUPPLEMENTARY INFORMATION:

Reasonable Accommodation

Persons needing reasonable accommodations in order to attend and participate in the public meeting should contact Lori Rinek at (916) 414–6600 as soon as possible. In order to allow sufficient time to process requests, please call no later than one week before the public meeting. Information regarding this proposed action is available in alternative formats upon request.

Background

Section 9 of the Act and Federal regulations prohibit the ''take'' of a fish and wildlife species listed as endangered or threatened. Under the Act, the following activities are defined as take: harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect listed animal species, or attempt to engage in such conduct (16 U.S.C. 1538). However, under section 10(a) of the Act, we may issue permits to authorize ''incidental take'' of listed species. ''Incidental take'' is defined by the Act as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Regulations governing permits for threatened species and endangered species, respectively, are at 50 CFR 17.32 and 50 CFR 17.22.

Take of listed plant species is not prohibited under the Act and cannot be authorized under a section 10 permit. We propose to include plant species on the permit in recognition of the conservation benefits provided for them under the Plan. These species would also receive no surprises assurances under the Service's ''No Surprises'' regulation (63 FR 8859).

Currently, PG&E intends to request a permit for 67 species (covered species) under the Plan: 31 listed and 36 unlisted species. These include the federally listed endangered vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), blunt-nosed leopard lizard (*Gambelia sila*), Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*), giant kangaroo rat (*Dipodomys ingens*), Buena Vista Lake shrew (*Sorex ornatus relictus*), riparian woodrat (*Neotoma fuscipes riparia*), riparian brush rabbit (*Sylvilagus bachmani riparius*), San Joaquin kit fox (*Vulpes macrotis mutica*), large-flowered fiddleneck (*Amsinckia grandiflora*), California jewelflower (*Caulanthus californicus*), palmate-bracted bird's beak (*Cordylanthus palmatus*), Kern mallow (*Eremalche kernensis*), San Joaquin woolly-threads (*Monolopia congdonii*), Bakersfield cactus (*Opuntia basilaris* var. *treleasei*), hairy orcutt grass (*Orcuttia pilosa*), Hartweg's golden sunburst (*Pseudobahia bahiifolia*), Greene's tuctoria (*Tuctoria greenei*), Keck's checkermallow (*Sidalcea keckii*), and the threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), California red-legged frog (*Rana aurora draytonii*), giant garter snake (*Thamnophis gigas*), bald eagle (*Haliaeetus leucocephalus*), mariposa pussypaws (*Calyptridium pulchellum*), succulent owl's clover (*Castilleja campestris* ssp. *succulenta*), Hoover's spurge (*Chamaesyce hooveri*), Hoover's erastrium (*Erastrium hooverii*), Springville clarkia (*Clarkia springvillensis*), Colusa grass (*Neostapfia colusana*), San Joaquin Valley orcutt grass (*Orcuttia inaequalis*), San Joaquin adobe sunburst (*Pseudobahia peirsonii*), and their habitats.

The 36 unlisted species proposed to be covered under the Plan include: midvalley fairy shrimp (*Branchinecta mesovallensis*), California tiger salamander (*Ambystoma californiense*), limestone salamander (*Hydromantes brunus*), California black rail (*Lateralis jamaicensis coturniculus*), Swainson's hawk (*Buteo swainsoni*), white-tailed kite (*Elanus caerules*), golden eagle (*Aquila chrysaetos*), greater sandhill crane (*Grus canadensis tabida*), western burrowing owl (*Athene cunicularia hypugaea*), bank swallow (*Riparia riparia*), tricolored blackbird (*Agelaius tricolor*), San Joaquin antelope squirrel (*Ammospermophilus nelsoni*), lesser saltscale (*Atriplex minuscula*), Bakersfield smallscale (*Atriplex tularensis*), big tarplant (*Blepharizonia plumosa* spp. *plumosa*), tree-anemone (*Carpenteria californica*), slough thistle (*Cirsium crassicaule*), Mariposa clarkia (*Clarkia biloba* ssp. *australis*), Merced clarkia (*Clarkia lingulata*), Vasek's clarkia (*Clarkia tembloriensis* ssp. *calientensis*), hispid bird's-beak (*Cordylanthus mollis* ssp. *Hispidus*), Congdon's woolly sunflower (*Eriophyllum congdonii*), delta button-

celery (*Eryngium racemosum*), striped adobe-lily (= Greenhorn) (*Fritillaria striata*), Bogg's Lake hedge-hyssop (*Gratiola heterosepala*), pale-yellow layia (*Layia heterotricha*), Comanche layia (*Layia leucopappa*), legenere (*Legenere limosa*), Congdon's lewisia (*Lewisia congdonii*), Mason's lilaeopsis (*Lilaeopsis masonii*), Mariposa lupine (*Lupinus citrinus* var. *deflexus*), showy madia (*Madia radiata*), Hall's bush mallow (*Malacothamnus hallii*), pincushion navarretia (*Navarretia myersii* spp. *myersii*), oil neststraw (*Stylocline citroleum*), and Jared's pepper grass (*Lepidium jaredii* ssp. *jaredii*). Species may be added or deleted during the course of Plan development based on further analysis, new information, agency consultation, and public comment.

The Plan area includes the network of PG&E facilities within approximately 12,094,000 acres of the San Joaquin Valley. The Plan area comprises portions of nine counties: San Joaquin, Stanislaus, Merced, Fresno, Kings, Kern, Mariposa, Madera, and Tulare. The boundaries of the Plan area are generally defined by the north and eastern boundaries of San Joaquin and Stanislaus County lines, until reaching Mariposa County where it follows the 3,000-foot elevation contour or Federal lands, whichever is lower, south along the western Sierra Nevada foothills. On the west side of the San Joaquin Valley, the plan boundary follows the western boundary of San Joaquin, Stanislaus, Merced, Fresno, Kings, and Kern Counties. The southern limit of the plan area boundary is the 3,000-foot elevation contour near the Kern County line.

Implementation activities that may be covered under the Plan include activities associated with the operation, maintenance, and minor construction of PG&E's gas and electric transmission and distribution system as mandated for public safety by the California Public Utilities Commission, the California Energy Commission, and the Department of Transportation. More specifically, these activities may include: gas pipeline protection, recoating, repair and replacement; electric line protection, repair, reconductering, and replacement; electric pole repair/replacement; vegetation management to maintain clearances around facilities; and minor new gas and electric extensions. Under the Plan, the effects on covered species of the covered activities are expected to be minimized and mitigated through participation in a conservation program, which will be fully described in the Plan. This conservation program would focus on providing long-term protection of covered species by protecting biological communities in the Plan area.

Components of this conservation program are now under consideration by the Service and PG&E. These components will likely include: avoidance and minimization measures, monitoring, adaptive management, and mitigation measures consisting of preservation, restoration and enhancement of habitat.

Environmental Impact Statement/ Environmental Impact Report

PG&E and the Service have selected Jones & Stokes to prepare the Draft EIS/EIR. The joint document will be prepared in compliance with NEPA and the California Environmental Quality Act (CEQA). Although Jones & Stokes will prepare the EIS/EIR, the Service will be responsible for the scope and content of the document for NEPA purposes, and DFG will be responsible for the scope and content of the CEQA document, as the state lead agency pursuant to CEQA and the permitting entity pursuant to the California Endangered Species Act and Fish and Game Code 2081.

The EIS/EIR will consider the proposed action (*i.e.*, the issuance of a Section 10(a)(1)(B) permit under the Act), and a reasonable range of alternatives. A detailed description of the proposed action and alternatives will be included in the EIS/EIR. It is anticipated that several alternatives will be developed, which may vary by the level of conservation, impacts caused by the proposed activities, permit area, covered species, or a combination of these factors. Additionally, a No Action alternative will be considered. Under the No Action alternative, the Service would not issue a section 10(a)(1)(B) permit.

The EIS/EIR will also identify potentially significant impacts on biological resources, land use, air quality, water quality, mineral resources, water resources, economics, and other environmental issues that could occur directly or indirectly with implementation of the proposed action and alternatives. For all potentially significant impacts, the EIS/EIR will identify mitigation measures where feasible to reduce these impacts to a level below significance.

Environmental review of the EIS/EIR will be conducted in accordance with the requirements of NEPA (42 U.S.C. 4321 *et seq.*), its implementing regulations (40 CFR 1500–1508), other applicable regulations, and Service procedures for compliance with those regulations. This notice is being furnished in accordance with 40 CFR 1501.7 of NEPA to obtain suggestions and information from other agencies and the public on the scope of issues and alternatives to be addressed in the EIS/EIR. The primary purpose of the scoping process is to identify important issues raised by the public, related to the proposed action. Written comments from interested parties are invited to ensure that the full range of issues related to the permit request are identified. While written comments are encouraged, we will accept both written and oral comments at the public meeting. In addition, you may submit written comments by mail or facsimile transmission (see **ADDRESSES**). All comments received, including names and addresses, will become part of the official administrative record and may be made available to the public.

Dated: March 17, 2004.

Ken McDermond,

Deputy Manager, Region 1, California/Nevada Operations Office, Sacramento, California.

[FR Doc. 04–6664 Filed 3–24–04; 8:45 am]

BILLING CODE 4310–55–P

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

[CA–310–0777–XG]

Notice of Public Meeting: Northwest California Resource Advisory Council

AGENCY: Bureau of Land Management, Interior.

ACTION: Notice of public meeting.

SUMMARY: In accordance with the Federal Land Policy and Management Act of 1976 (FLPMA), and the Federal Advisory Committee Act of 1972 (FACA), the U. S. Department of the Interior, Bureau of Land Management (BLM) Northwest California Resource Advisory Council will meet as indicated below.

DATES: The meeting will be held Thursday, May 6 and Friday, May 7, 2004, in Redding, California. On May 6, the meeting begins at 10 a.m. at the BLM Redding Field Office, 355 Hemsted Drive. Members will depart for a field tour of public lands in the Sacramento River Bend Area. On May 7, the meeting begins at 8 a.m. at the McConnell Foundation headquarters, 800 Shasta View Drive in Redding. Time for public comment has been set aside for 1 p.m.

FOR FURTHER INFORMATION CONTACT: Francis Berg, BLM Redding Field Office, 355 Hemsted Dr., (530) 224–2100; or BLM Public Affairs Officer Joseph J. Fontana, (530) 252–5332.

DATE: April 5, 2004

SUBJECT
Notice of Preparation (NOP) to prepare an Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) for the Issuance of Incidental Take Permits Associated with a Habitat Conservation Plan (HCP), and a Programmatic Streambed Alteration Agreement for Pacific Gas and Electric's (PG&E) San Joaquin Valley Operation and Maintenance (O&M) activities in the San Joaquin Valley, California.

INTRODUCTION
Pursuant to the California Environmental Quality Act (CEQA), the U.S. Fish and Wildlife Service (Service) and California Department of Fish and Game (DFG) plan to prepare an EIS/EIR on the PG&E San Joaquin Valley O&M HCP (Plan). PG&E is an investor-owned electric and gas utility company, serving more then 4.8 million electricity customers and 4 million natural gas customers throughout California.

The Plan is being prepared under Section 10(a)(1)(B) of the Federal Endangered Species Act (ESA) and Section 2081(b) of the California Fish and Game Code. The Plan area includes the network of PG&E facilities within portions of nine counties throughout San Joaquin Valley. PG&E intends to request permits for 67 species listed as threatened or endangered or that may become listed during the term of the permit. The permit is needed to authorize take of listed species that could occur as a result of implementation activities covered under the Plan (see Proposed Implementation Activities below).

PG&E SAN JOAQUIN VALLEY OPERATION AND MAINTENANCE HABITAT CONSERVATION PLAN

Covered Species
Currently, 67 species are proposed for coverage under the Plan. Table 1 lists wildlife species and their current status; Table 2 lists plant species and their current status. Species may be added or deleted during the course of Plan development based on further analysis, new information, agency consultation, and public comment.

Plan Area
The Plan area includes the network of PG&E facilities within approximately 12,094,000 acres of the San Joaquin Valley. The Plan area comprises portions of nine counties: San Joaquin, Stanislaus, Merced, Fresno, Kings, Kern, Mariposa, Madera, and Tulare. The boundaries of the Plan area are generally defined by the north and eastern boundaries of San Joaquin and Stanislaus county lines, until reaching Mariposa County where it follows the 3,000-foot elevation contour or Federal lands, whichever is lower, south along the western Sierra Nevada foothills. On the west side of the San Joaquin Valley, the Plan boundary follows the western boundary of San Joaquin, Stanislaus, Merced, Fresno, Kings, and Kern counties. The southern limit of the Plan area boundary is the 3,000-foot elevation contour near the Kern County line.

Proposed Implementation Activities
Implementation activities that may be covered under the Plan include activities associated with operation, maintenance, and minor construction of PG&E's gas and electric transmission and distribution system as mandated for public safety by the California Public Utilities Commission, the California Energy Commission, and the Department of Transportation. More specifically, these activities may include: gas pipeline protection, recoating, repair and replacement; electric line protection, repair, reconductering, and replacement; electric pole repair/replacement; vegetation management to maintain clearances around facilities; and minor new gas and electric extensions.

Mitigation
Under the Plan, the effects on covered species of the covered activities are expected to be minimized and mitigated through participation in a conservation program, which will be fully described in the Plan. The conservation program would focus on providing long-term protection of covered species by protecting biological communities in the Plan area.

ENVIRONMENTAL IMPACT STATEMENT/REPORT
The Service and DFG will prepare a joint document in compliance with CEQA and the National Environmental Policy Act (NEPA). DFG will be responsible for the scope and content of the document for CEQA purposes, and the Service will be responsible for the scope and content of the document for NEPA purposes.

The EIS/EIR will consider the proposed action (issuance of take permits), and a reasonable range of alternatives. A detailed description of the proposed action and alternatives will be included in the EIS/EIR. It is anticipated that several alternatives will be developed, which may vary by the level of conservation, impacts caused by the proposed activities, permit area, covered species, or a combination of these factors.

The EIS/EIR will also identify potentially significant impacts on biological resources, air quality, water quality, noise, cultural resources, and other environmental issues that could occur directly or indirectly with implementation of the proposed action and alternatives. For all potentially significant impacts, the EIS/EIR will identify mitigation measures where feasible to reduce these impacts to a level below significance.

PUBLIC MEETING
Two public meetings have been scheduled to provide an overview of the proposed action and obtain feedback. The meetings will be held on the following dates at the following locations:

Tuesday, April 6, 2004
4:00 p.m. – 7:00 p.m.
Siefert Community Center
Room 2
128 West Benjamin Holt Drive
Stockton, CA
(209) 937-7350

Wednesday, April 7, 2004
4:00 p.m. – 7:00 p.m.
Mosqueda Community Center
Room 6
4670 East Butler Avenue
Fresno, CA
(559) 621-6600

SUBMITTING COMMENTS

Written comments from interested parties are invited to ensure that the full range of issues related to the proposed action are identified. All comments received, including names and addresses, will become part of the official administrative record and may be made available to the public. Information, written comments, or questions related to the preparation of the EIS/EIR should be received on or before May 3, 2004. Written comments should be directed to the contact below.

FOR FURTHER INFORMATION CONTACT:

Scott Flint
California Department of Fish and Game
1416 9th Street – Room 1280
Sacramento, CA 95814
Telephone: (916) 653-9719
E-mail: sflint@dfg.ca.gov

SUPPLEMENTAL INFORMATION

Persons needing reasonable accommodations in order to attend and participate in the public meeting should contact Scott Flint at (916) 653-9719 as soon as possible. In order to allow sufficient time to process requests, please call no later than one week before the public meeting. Information regarding this proposed action is available in alternative formats upon request.

CENTER FOR BIOLOGICAL DIVERSITY
CALIFORNIA AND PACIFIC OFFICE
protecting endangered species and wild places through science, education, policy, and environmental law

VIA FACSIMILE AND U.S. MAIL

April 30, 2004

Lori Rinek, Chief, Conservation
Planning and Recovery Division, U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
2800 Cottage Way, W-2605,
Sacramento, California 95825
FAX (916) 414-6713

Re: Preparation of an Environmental Impact Statement for Issuance of an Incidental Take Permit Associated With a Habitat Conservation Plan for Pacific Gas & Electric Company's Operation and Maintenance Activities in the San Joaquin Valley, California

Dear Ms. Rinek:

The Center for Biological Diversity ("the Center") submits the following comments on the Notice of Preparation of an Environmental Impact Statement for Issuance of an Incidental Take Permit Associated With a Habitat Conservation Plan for Pacific Gas & Electric Company's Operation and Maintenance Activities in the San Joaquin Valley, California (hereinafter "the Project" or "Proposed PG&E HCP").

The Center is a non-profit, public interest environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has over 9,000 members throughout California and the western United States, including in Los Angeles, Kern, and Ventura counties and other areas that the Project would impact.

Currently, PG&E intends to request a permit for 67 species (covered species) under the Plan: 31 listed and 36 unlisted species. These include the federally listed endangered vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), blunt-nosed leopard lizard (*Gambelia sila*), Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*), giant kangaroo rat (*Dipodomys ingens*), Buena Vista Lake shrew (*Sorex ornatus relictus*), riparian woodrat (*Neotoma fuscipes riparia*), riparian brush rabbit (*Sylvilagus bachmani riparius*), San Joaquin kit fox (*Vulpes macrotis mutica*), large-flowered fiddleneck (*Amsinckia grandiflora*), California jewelflower (*Caulanthus californicus*), palmate-bracted bird's beak (*Cordylanthus palmatus*), Kern mallow

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Kassie Siegel, Staff Attorney
PO Box493, Idyllwild, CA 92549
TEL.: (909) 659-6053 x. 302 • FAX: (909) 659-2484
Email: ksiegel@biologicaldiversity.org • www.biologicaldiversity.org

(*Eremalche kernensis*), San Joaquin woolly-threads (*Monolopia congdonii*), Bakersfield cactus (*Opuntia basilaris var. treleasei*), hairy orcutt grass (*Orcuttia pilosa*), Hartweg's golden sunburst (*Pseudobahia bahiifolia*), Greene's tuctoria (*Tuctoria greenei*), Keck's checkermallow (*Sidalcea keckii*), and the threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), California red-legged frog (*Rana aurora draytonii*), giant garter snake (*Thamnophis gigas*), bald eagle (*Haliaeetus leucocephalus*), mariposa pussypaws (*Calyptridium pulchellum*), succulent owl's clover (*Castilleja campestris ssp. succulenta*), Hoover's spurge (*Chamaesyce hooveri*), Hoover's erastrium (*Erastrium hooverii*), Springville clarkia (*Clarkia springvillensis*), Colusa grass (*Neostapfia colusana*), San Joaquin Valley orcutt grass (*Orcuttia inaequalis*), San Joaquin adobe sunburst (*Pseudobahia peirsonii*), and their habitats.

The 36 unlisted species proposed to be covered under the Plan include: midvalley fairy shrimp (*Branchinecta mesovallensis*), California tiger salamander (*Ambystoma californiense*), limestone salamander (*Hydromantes brunus*), California black rail (*Lateralis jamaicensis coturniculus*), Swainson's hawk (*Buteo swainsoni*), white- tailed kite (*Elanus caerules*), golden eagle (*Aquila chrysaetos*), greater sandhill crane (*Grus canadensis tabida*), western burrowing owl (*Athene cunicularia hypugaea*), bank swallow (*Riparia riparia*), tricolored blackbird (*Agelaius tricolor*), San Joaquin antelope squirrel (*Ammospermophilus nelsoni*), lesser saltscale (*Atriplex minuscula*), Bakersfield smallscale (*Atriplex tularensis*), big tarplant (*Blepharizonia plumosa spp. plumosa*), tree-anemone (*Carpenteria californica*), slough thistle (*Cirsium crassicaule*), Mariposa clarkia (*Clarkia biloba ssp. australis*), Merced clarkia (*Clarkia lingulata*), Vasek's clarkia (*Clarkia tembloriensis ssp. calientensis*), hispid bird's-beak (*Cordylanthus mollis ssp. Hispidus*), Congdon's woolly sunflower (*Eriophyllum congdonii*), delta button-celery (*Eryngium racemosum*), striped adobe-lily (= Greenhorn) (*Fritillaria striata*), Bogg's Lake hedge-hyssop (*Gratiola heterosepala*), pale-yellow layia (*Layia heterotricha*), Comanche layia (*Layia leucopappa*), legenere (*Legenere limosa*), Congdon's lewisia (*Lewisia congdonii*), Mason's lilaeopsis (*Lilaeopsis masonii*), Mariposa lupine (*Lupinus citrinus var. deflexus*), showy madia (*Madia radiata*), Hall's bush mallow (*Malacothamnus hallii*), pincushion navarretia (*Navarretia myersii spp. myersii*), oil neststraw (*Stylocline citroleum*), and Jared's pepper grass (*Lepidium jaredii ssp. jaredii*).

The Plan area includes the network of PG&E facilities within approximately 12,094,000 acres of the San Joaquin Valley. The Plan area comprises portions of nine counties: San Joaquin, Stanislaus, Merced, Fresno, Kings, Kern, Mariposa, Madera, and Tulare. The boundaries of the Plan area are generally defined by the north and eastern boundaries of San Joaquin and Stanislaus County lines, until reaching Mariposa County where it follows the 3,000-foot elevation contour or Federal lands, whichever is lower, south along the western Sierra Nevada foothills. On the west side of the San Joaquin Valley, the plan boundary follows the western boundary of San Joaquin, Stanislaus, Merced, Fresno, Kings, and Kern Counties. The southern limit of the plan area boundary is the 3,000-foot elevation contour near the Kern County line.

Implementation activities that may be covered under the Plan include activities associated with the operation, maintenance, and minor construction of PG&E's gas and electric transmission and distribution system as mandated for public safety by the California Public Utilities Commission, the California Energy Commission, and the Department of Transportation. More specifically, these activities may include: gas pipeline protection, recoating, repair and replacement; electric line protection, repair, reconductering, and replacement; electric pole

repair/replacement; vegetation management to maintain clearances around facilities; and minor new gas and electric extensions.

At over 12 million acres, the Proposed PG&E HCP may be geographically the largest HCP ever proposed. Similarly, the list of threatened, endangered, and sensitive species is extremely long. The Center has advocated for many of the proposed covered species which are being driven towards extinction by a number of factors including those proposed to be covered under the HCP. Because of its enormous significance, it is particularly important that the HCP scrupulously follow all statutory and regulatory guidelines. Please review recovery plans for each listed species to ensure that all components of the Proposed PG&E HCP are consistent with applicable recovery plans.

The Center looks forward to reviewing the Draft EIR/EIS and HCP. Please add this office to your mailing list for all future correspondence (Center for Biological Diversity, P.O. Box 493, Idyllwild, CA 92549, Attn: Kassie Siegel). Thank you for the opportunity to comment.

Sincerely,

Kassie Siegel

Appendix B

Pacific Gas & Electric Company San Joaquin Valley Operations and Maintenance Habitat Conservation Plan

December 2006

Final
PG&E San Joaquin Valley
Operation & Maintenance Habitat Conservation Plan

Prepared for:
Pacific Gas and Electric Company

Prepared by:
Jones & Stokes

Pacific Gas & Electric Company
San Joaquin Valley
Operations and Maintenance
Habitat Conservation Plan

Prepared for:

Pacific Gas & Electric Company
Habitat and Species Protection Program
77 Beale Street
San Francisco, CA 94105
Contact: Mary Boland
415/973-7744

Prepared by:

Jones & Stokes
2600 V Street
Sacramento, CA 95818-1914
Contact: Brad Norton
916/737-3000

December 2006

Jones & Stokes. 2006. *Pacific Gas & Electric Company San Joaquin Valley operations and maintenance habitat conservation plan*. December. (J&S 02-067.) Sacramento, CA.

Executive Summary

Purpose and Background

Pacific Gas & Electric (PG&E) has prepared the attached multi-species Habitat Conservation Plan (HCP) for routine operation and maintenance (O&M) activities to comply with the federal and state Endangered Species Acts. This HCP is unique in that it primarily addresses small-scale temporary effects that are dispersed over a large geographic area. The purpose of the HCP is to enable PG&E to continue to conduct current and future O&M activities in the San Joaquin Valley while minimizing, avoiding, and compensating for possible direct, indirect, and cumulative adverse effects on threatened and endangered species that could result from such management activities. The permit duration will be for 30 years. The HCP represents the culmination of more that 5 years work with U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (DFG).

Plan Area, Covered Species and Activities

PG&E's San Joaquin Valley O&M HCP plan area is defined to include PG&E's gas and electrical transmission and distribution facilities, the lands owned by PG&E and/or subject to PG&E easements for these facilities, private access routes to infrastructure associated with O&M activities, minor facility expansion areas, and mitigation areas for impacts resulting from covered activities. The plan area includes portions of nine counties including San Joaquin, Stanislaus, Merced, Fresno, Kings, Kern, Mariposa, Madera, and Tulare, and is approximately 276,350 acres.

This HCP covers 23 wildlife and 42 plant species for 33 routine O&M activities for PG&E's electric and gas transmission and distribution systems within nine counties of the San Joaquin Valley. Activities that are covered under the HCP include activities associated with the O&M (including limited minor new construction) of PG&E's gas and electric transmission and distribution system as mandated for public safety. Typical activities include: gas pipeline protection, recoating, repair and replacement; electric line protection, repair, reconductoring, and replacement; electric pole repair/replacement; vegetation management to maintain clearances around facilities; and minor new gas and electric extensions. Specific information on each activity is provided in the HCP.

Habitat Disturbance and Species Effects

The temporary and permanent habitat disturbance associated with each activity and approximate amount of each land cover type disturbed are identified in the HCP. Temporary habitat effects are estimated to occur in approximately 196 acres of sensitive land cover types annually; t~~T~~he largest single sensitive land cover type disturbed is grasslands at approximately 105 acres per year. An even smaller portion of this is expected to be occupied by covered species (e.g., approximately 70% for kit fox, the species with the broadest range). Permanent habitat effects are estimated to occur in approximately 1 acre of sensitive land cover types annually. Other disturbances that do not cause temporary or permanent habitat loss, but could potentially contribute to other forms of take and are also calculated. ~~and annual species effects and mitigation are estimated to be approximately 43 acres per year.~~ The implementation of 30 avoidance and minimization measures (AMMs) will help avoid or reduce ~~these~~ potential species effects. Under the HCP, the effects of covered activities are expected to be avoided, minimized, and mitigated through participation in a conservation program, which is briefly described below and fully described in the HCP.

Elements of Conservation Program

Components of the conservation program described in this HCP include: biological goals and objectives, an overview of HCP implementation, AMMs, surveys to avoid and minimize effects, and compensation. The biological goals and objectives are written to contribute to the conservation of natural communities and their associated covered species in the plan area. The overview of HCP implementation provides a narrative and flowchart description of how the HCP will be implemented. AMMs are proposed to avoid and minimize effects and ensure that PG&E consistently implements measures when activities are conducted in sensitive areas. Surveys to avoid and minimize effects are based on a monitoring program of pre-maintenance biological surveys for activities that typically disturb more than 0.1 acre and that account for the majority of ground-disturbing activities. In instances where a species population and range are very restricted, preconstruction surveys will also take place for the smallest activities. In the event there is suitable covered species habitat or if specific species are present, the AMMs, additional surveys, and additional avoidance measures will be implemented. To offset potential effects and for effects that cannot be avoided or minimized, PG&E will provide compensation. Compensation will be regionally located in the north, central and south San Joaquin Valley near areas of disturbance. Temporary effects will be mitigated at a ratio of 0.5:1 and permanent effects will be mitigated at a ratio of 3:1. Annual mitigation is expected to be approximately 43 acres per year. Therefore, a~~A~~pproximately 225 acres of compensation will be provided for the first 5 years of effects (also including wetland and rare plant mitigation) to ensure that mitigation stays ahead of impacts, and a total of approximately 1,350 acres of compensation will be provided over 30 years. ~~The 225 acres also includes the mitigation requirements for wetland mitigation and rare plant mitigation.~~

Other Key Issues

The HCP also includes information on monitoring, reporting, adaptive management (a feedback-loop process), no surprises, changed and unforeseen circumstances, implementation costs, funding, and an analysis of alternatives.

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Acronyms and Abbreviations

AMMss	avoidance and minimization measures
AMP	Adaptive Management Program
ATVs	all-terrain vehicles
BA	biological assessment
BLM	Bureau of Land Management
BMPs	Best management practices
BO	Biological Opinion
Cal-OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CDF	California Department of Forestry and Fire Protection
CDF	State of California, Department of Forestry and Fire Protection
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNLM	Center for Natural Lands Management
CNPS	California Native Plant Society
CPUC	California Public Utilities Commission
CSC	California species of special concern
CTS	California Tiger Salamander
CWA	federal Clean Water Act
DFG	California Department of Fish and Game
DOC	Department of Conservation
DOT	Department of Transportation
DWR	California Department of Water Resources

EA	environmental assessment
EIR	environmental impact report
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ESA	federal Endangered Species Act
ETSs	Electric Test Systems
FERC	Federal Energy Regulatory Commission
FR	Federal Register
GAP	California GAP
GIS	geographic information system
GPS	global position system
HCP	Habitat Conservation Plan
IA	Implementing Agreement
ISO	Independent System Operator
ITP	incidental take permit
IVM	Integrated Vegetation Management
MBTA	The Migratory Bird Treaty Act
MMP	mitigation and monitoring plan
NCCP	Natural Community Conservation Plan
NEPA	National Environmental Policy Act of 1969
NOAA Fisheries	National Oceanic and Atmospheric Administration National Marine Fisheries Service
NRC	Nuclear Regulatory Commission
NWPs	nationwide permits
O&M	operation and maintenance
PG&E	Pacific Gas and Electric Company
PLS	Pressure Limiting Station
PRBO	Point Reyes Bird Observatory
psi	pounds per square inch
PVC	polyvinyl chloride
ROW	right-of-way
RWQCBs	Regional Water Quality Control Boards
SCADA	Supervisory Control and Data Acquisition
SR	State Route
STATSGO	State Soil Geographic Data Base

SWRCB	State Water Resources Control Board
USACE	U.S. Army Corps of Engineers
USFS	United States Forest Service
USFWS	U.S. Fish and Wildlife Service
VELB	valley elderberry longhorn beetle
WHR	Wildlife Habitat Relationships

Chapter 1
Introduction

Background and Purpose

Pacific Gas and Electric Company (PG&E) is the largest investor-owned electric and gas utility in the United States, serving more than 4.8 million electricity customers and 4 million natural gas customers and employing more than 20,000 people. PG&E's service area encompasses approximately 70,000 square miles in 48 of California's 58 counties. Nearly 30% of the total service area lies within nine counties in the San Joaquin Valley.

The existing infrastructure requires long-term operation and maintenance (O&M) to deliver reliable energy to its customers. O&M activities to date have not been seriously constrained by restrictions imposed under the federal Endangered Species Act (ESA); however, because species continue to become listed as threatened or endangered, PG&E has entered into discussions with the U.S. Fish and Wildlife Service (USFWS) regarding development of a Habitat Conservation Plan (HCP) pursuant to Section 10(a)(1)(b) of the ESA. Although informal consultation was initiated in the mid-1990s, the effort was never completed. In 2001, PG&E reinitiated informal consultation with USFWS to address O&M activities in the San Joaquin Valley. This document is the result of these detailed discussions with USFWS and California Department of Fish and Game (DFG) staff, PG&E field supervisors, biologists, and other natural resource planners. Contingent upon the successful development of this HCP, PG&E anticipates development of additional HCPs for O&M activities throughout its service area.

The purpose of this HCP is to enable PG&E to continue to conduct current and future O&M activities in the San Joaquin Valley while minimizing, avoiding, and compensating for possible direct, indirect, and cumulative adverse effects on threatened and endangered species that could result from such management activities. This HCP is unique because, unlike standard development oriented HCPs which address permanent land conversion and loss of habitat, it primarily addresses small-scale temporary effects that are dispersed over a large geographic area.

The HCP development process entailed numerous corporate discussions as well as input from both state and federal agencies. PG&E considers the resulting plan to be the best approach for addressing management of its facilities and activities while complying with ESA and the California Endangered Species Act (CESA).

Overview of PG&E

The following brief discussion of PG&E's electric and gas systems and the company's financial solvency provides a context for the analysis presented in this HCP.

Natural Gas System

The natural gas system comprises transmission pipelines, compressor stations, regulator stations, and distribution pipelines. Gas pipelines are typically buried several feet underground. The transmission pipelines carry large quantities of gas at high pressure, and the compressor stations along them help push the gas to its final destination. The pressure regulators help reduce the high pressure gas in the transmission system to lower pressures used in the distribution system, which serves homes and businesses. Statewide, PG&E maintains more than 5,700 miles of high-pressure gas transmission pipelines, 59 compressors at 17 stations, and more than 35,000 miles of gas distribution pipelines. In the San Joaquin Valley, PG&E owns 1,550 miles of transmission pipelines and 8,326 miles of distribution pipelines.

Electrical System

Historically, PG&E has utilized a diverse mix of electrical generation from hydroelectric, nuclear, natural gas, and geothermal sources. However, as a result of the deregulation of the electric industry, PG&E has divested itself of most of its power generation plants. PG&E's role in the transmission and distribution of electricity is not anticipated to change.

PG&E's electricity system consists of transmission lines, distribution lines, and switching stations or substations. The high-voltage transmission lines transport power from the generation plants to switching stations or substations, where power is redirected and transformed to lower voltages. Distribution lines carry the lower voltage service to industries, businesses, and homes. Statewide, the PG&E system comprises about 18,450 miles of interconnected transmission lines, about 105,500 miles of distribution lines, and 1,014 substations. In the San Joaquin Valley, PG&E owns about 4,590 miles of transmission lines and about 24,540 miles of distribution lines.

The transmission lines operate at 500,000, 230,000, 115,000, 70,000 or 60,000 volts and may be constructed on steel towers, steel poles, or wooden poles. The switching stations and substations transform the electricity down to 21,000 or 12,000 volts for the distribution system. The distribution lines are installed either underground or on the overhead wooden poles typically found along highways and streets. Pole-mounted transformers further reduce the voltage to 110/220 for normal household use.

Company Financial Solvency

Although the 2001 California energy crisis forced PG&E into Chapter 11 bankruptcy, the company is solvent and is able to meet its current financial obligations, including any conditions and obligations of the HCP. PG&E emerged from bankruptcy in 2004 with adequate resources to fulfill all commitments, as described in the HCP and the final Implementing Agreement (IA).

Regulatory Context

Regulatory Agencies

As a public utility, PG&E is regulated by the state and federal agencies listed below.

- California Public Utilities Commission (CPUC)—As the primary regulating agency, CPUC establishes gas and retail electric rates, approves major construction projects, and provides general oversight of utility facility O&M programs and financial/accounting practices.
- Independent System Operator (ISO)—The ISO is responsible for ensuring a safe and reliable electric system in California.
- California Energy Commission (CEC)—CEC is responsible for long-term energy forecasting, energy planning programs, and certification of electrical generation plants.
- Federal Energy Regulatory Commission (FERC)—FERC regulates bulk electrical sales and the licensing of hydroelectric projects.
- Nuclear Regulatory Commission (NRC)—NRC monitors PG&E's Diablo Canyon and Humboldt Bay power plants.
- Department of Transportation (DOT)—The DOT Office of Pipeline Safety issues regulations addressing the construction, operation, and maintenance of all natural gas pipeline and compressor stations.

Federal and State Laws and Regulations

In addition to the agency oversight summarized above, PG&E is subject to compliance with all other state and federal laws, including those related to natural resource protection. Accordingly, PG&E activities fall within the purview of USFWS, DFG, the U.S. Army Corps of Engineers (USACE), the State Water Resources Control Board (SWRCB), and the Regional Water Quality Control Boards (RWQCBs) among others.

A number of federal laws require protection for certain fish, terrestrial wildlife, and plant species and their habitats. A basic understanding of these laws and

their ramifications is valuable in integrating the various compliance processes. Some parameters of these laws that overlap extensively with those of the ESA may directly or peripherally apply to this HCP. In addition to federal protections, many states, including California, have enacted legislation to protect species and habitats. Some of these laws are modeled to varying degrees on the ESA. Some of the most important federal and California state laws that provide species and habitat protection and the relevance of these laws to the HCP are summarized below.

Federal Endangered Species Act

In 1973, the federal government's decade-long effort to address the challenge of protecting endangered species culminated in passage of the third rendition of the ESA. Congress intended to improve upon previous protective regulations by creating a more comprehensive approach that would protect not only individual species but also their habitats. For the first time, the ESA enunciated the intention of conserving the ecosystems on which endangered and threatened species depend, with a goal of restoring listed species to a demographic condition that would render the protections of the ESA unnecessary.

USFWS and the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) administer the ESA. The ESA requires USFWS and NOAA Fisheries to maintain lists of threatened and endangered species and provides for substantial protections for listed species. NOAA Fisheries' jurisdiction under the ESA is limited to the protection of marine mammals and fishes and anadromous fishes; all other species are subject to USFWS jurisdiction.

Section 9 of the ESA prohibits the take of any fish or wildlife species listed under the ESA as endangered and most species listed as threatened. *Take*, as defined by the ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." *Harm* is defined by regulation as "any act that kills or injures the species, including significant habitat modification." All or some forms of take of threatened species are prohibited by regulation at the time of listing.

Mechanisms, however, are in place that provide for exceptions to the Section 9 take prohibitions. These are addressed in Section 7 (for federal actions) and Section 10 (for nonfederal actions) of the ESA.

Section 7

Section 7 of the ESA requires all federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of habitat critical to such species' survival. To ensure that its actions do not result in jeopardy to listed species or adverse modification of critical habitat, each federal agency must consult with USFWS or NOAA Fisheries—or both—regarding federal agency actions. The consultation is initiated when the federal agency submits a written request for initiation to USFWS or NOAA Fisheries, along

with the agency's biological assessment (BA) of its proposed action. If USFWS or NOAA Fisheries concludes that the action is not likely to adversely affect a listed species, the action may be carried forward without further review under the ESA. Otherwise, USFWS or NOAA Fisheries—or both—must prepare a written Biological Opinion (BO) describing how the agency's action will affect the listed species and its critical habitat.

If the BO concludes that the proposed action would jeopardize the continued existence of a listed species or adversely modify its critical habitat, the opinion must suggest "reasonable and prudent alternatives" that would avoid that result. If the BO concludes that the project as proposed would involve the take of a listed species, but not to an extent that would jeopardize the species' continued existence, the BO must include an *incidental take statement*. The incidental take statement must specify an amount of take that may occur as a result of the action and suggest reasonable and prudent measures to minimize the impact of the take. If the action complies with the BO and incidental take statement, it may be implemented without violation of the ESA, even if incidental take occurs.

Section 10

Until 1982, nonfederal entities had no means to acquire an exception similar to the incidental take authorization promulgated under Section 7. Private landowners and state agencies risked being in direct violation of the ESA no matter how carefully their projects were implemented. This statutory dilemma led Congress to amend Section 10 of the ESA in 1982 to authorize the issuance of an incidental take permit to nonfederal project proponents upon completion of an approved HCP.

In cases where federal land, funding, or authorization is not required for an action by a nonfederal entity, the take of listed species must be permitted by USFWS and/or NOAA Fisheries through the Section 10 process. Private landowners, corporations, state agencies, local agencies, and other nonfederal entities must obtain a Section 10(a)(1)(B) incidental take permit for take of federally listed fish and wildlife species "that is incidental to, but not the purpose of, otherwise lawful activities." Because ESA Section 9 prohibitions for listed plants apply only on lands under federal jurisdiction, Section 10 incidental take permits are only necessary for take of wildlife and fish species.

To receive an incidental take permit, the nonfederal entity is required under Section 10(a)(2)(A) to prepare an HCP that identifies expected take amounts, mitigation measures, and funding sources to implement the measures specified in the plan. The terms of the HCP, including any additional legal requirements of, and agreements between, PG&E and the agencies, will be made binding under the Implementing Agreement between the parties.

Issuance of an incidental take permit is a federal action and, as such, is subject to Section 7 consultation. Therefore, prior to the approval of an HCP, USFWS and/or NOAA Fisheries are required to undertake an internal Section 7 consultation. The agencies examine the HCP to ensure that it accurately documents the expected impacts of their federal action (i.e., issuance of a take permit) as well as the mitigation proposed to compensate for those impacts.

Elements specific to the Section 7 process (e.g., analysis of impacts on designated critical habitat, analysis of impacts on listed plant species, and analysis of indirect and cumulative impacts on listed species) are included in this HCP to meet the requirements of Section 7.

Clean Water Act Section 404

The U.S. Environmental Protection Agency (EPA) has delegated the authority to issue permits under the federal Clean Water Act (CWA) to USACE. The CWA is the primary federal law that protects the quality of the nation's surface waters, including lakes, rivers, and coastal areas. Programs conducted under the CWA are directed at both point-source pollution (wastes discharged from discrete sources such as pipes and outfalls) and nonpoint-source pollution (stormwater runoff from land areas, including construction sites). Under the CWA, EPA sets national standards and effluent limitations. The CWA embodies the concept that all discharges into the nation's waters are unlawful unless specifically authorized by a permit; issuance of such permits constitutes the CWA's principal regulatory tool.

Section 404 of the CWA regulates the discharge of dredged or fill material into waters of the United States, including wetlands. Under Section 404, USACE is responsible for issuing Department of the Army permits (Section 404 permits) to authorize the placement of dredged or fill materials into jurisdictional waters.

USACE issues two types of permits under Section 404: general permits (either nationwide permits [NWPs] or regional permits) and standard permits (either letters of permission or individual permits). General permits are issued by USACE to streamline the Section 404 process for nationwide, statewide, or regional activities that have minimal environmental impacts on the aquatic environment. Standard permits are issued for activities that do not qualify for a general permit (i.e., that may have more than a minimal adverse environmental impact). PG&E applies for standard permits (individual permits) as needed for specific O&M activities.

This HCP is expected to help simplify the Section 404 permitting process when PG&E is required to obtain a Section 404 permit for fill of wetlands where vernal pool species may be present.

Clean Water Act Section 401

Section 401 of the CWA requires that applicants for a federal license or permit, such as a Section 404 permit, for any activity that may result in a discharge to navigable waters, obtain a water quality certification from the state. The federal agency cannot issue the permit unless the state issues or waives Section 401 certification, and any conditions of the state's certification must be included as conditions of the federal permit. If the state denies the request, the federal permit cannot be issued. If the state fails to act on the request for certification within a

mandated time frame, the request is deemed waived. The SWRCB is the California agency designated to issue Section 401 certifications.

This HCP may be referenced for any secondary terrestrial species effects when obtaining a Section 401 certification; however, the vast majority of O&M activities in the San Joaquin Valley do not occur in water.

National Environmental Policy Act

The National Environmental Policy Act of 1969 (NEPA) requires federal agencies to include in their decision-making process appropriate and careful consideration of all environmental effects of a proposed action and of possible alternatives. Documentation of the environmental impact analysis and efforts to avoid or minimize the adverse effects of proposed actions must be made available for public notice and review. This analysis is documented in either an environmental assessment (EA) or an environmental impact statement (EIS). Project proponents must further demonstrate that their proposed action will not adversely affect the human or natural environment.

Issuance to PG&E of an incidental take permit under ESA Section 10 constitutes a federal action that requires compliance with NEPA. To satisfy NEPA requirements, USFWS will prepare an EIS. The final document desired by PG&E is a joint EIR/EIS to serve the purposes of compliance with both the California Environmental Quality Act (CEQA) (see below) and NEPA, respectively.

California Endangered Species Act

CESA protects wildlife and plants listed as threatened and endangered by the California Fish and Game Commission. Species designated by the California Fish and Game Commission as candidates for listing are also protected under CESA. CESA prohibits the take of candidate species, and state-listed wildlife and plants, except as provided by the Fish and Game Code. The California Fish and Game Code defines *take* as any action or attempt to "hunt, pursue, catch, capture, or kill." Modification of listed species habitat is not take per se under CESA. Modification of habitat can result in take under CESA, however, where such modification is the proximate cause of mortality of a State designated candidate or listed species.

The requirements for an application for an incidental take permit under CESA are described in Section 2081 of the California Fish and Game Code and regulations implementing Sections 2080 and 2081. These regulations are found in Title 14 of the California Code of Regulations, commencing with section 783.0. The Department may also authorize incidental take pursuant to Section 2835 in connection with an approved Natural Community Conservation Plan (NCCP) and, pursuant to Section 2080.1, no incidental take authorization under CESA

may be necessary where a state-listed species is also listed under the federal ESA.

PG&E will be applying for a 2081 permit for those state listed and candidate species for which DFG may authorize take; the HCP provides a vehicle for describing and analyzing project effects as they pertain to such a permit.

California Environmental Quality Act

CEQA is similar to but more extensive than NEPA in that it requires that significant environmental impacts of proposed projects be avoided or reduced to the extent feasible through adoption of feasible avoidance, minimization, or compensation measures. CEQA requires that project effects be mitigated to a less-than-significant level unless overriding considerations can be identified. Likewise, CEQA requires preparation of an environmental impact report (EIR) to address project related environmental impacts whenever substantial evidence supports a fair argument the proposed project may result in a significant effect on the environment.

DFG is the lead agency under CEQA for the San Joaquin Valley O&M HCP because it has the principle responsibility to approve the project under State law. That responsibility stems from PG&E's need for an incidental take permit (ITP) from DFG under CESA. DFG is also the lead agency for the proposed project because PG&E intends to seek a master streambed agreement from DFG. Where DFG is the lead agency because of the potential issuance of an ITP, CEQA compliance is prescribed by DFG's certified regulatory program found in its CESA implementing regulations. (See Pub. Resources Code, § 21080.5; Cal. Code Regs., tit. 14, §§ 783.3, subd. (b), 15251, subd. (p).) No certified regulatory program covers the issuance of streambed alteration agreements. As a result, DFG will comply with CEQA for the proposed project by preparing an EIR that looks all the potentially significant impacts that may result from implementation of the San Joaquin Valley O&M HCP. Specifically, DFG will prepare a joint EIR/EIS with USFWS, its federal lead agency counter part under NEPA. That document will provide detailed information on, among other things, the biological resources within the project area, the biological impacts of the proposed project, and the mitigation measures proposed to compensate for these impacts. A mitigation and monitoring plan (MMP) is required for all EIRs; this HCP is effectively PG&E's MMP for the effects of O&M activities on biological resources.

Fully Protected Species under the California Department of Fish and Game Code

Species for which DFG may not authorize take, except for scientific research, are described in Sections 3511 (Fully protected birds), 4700 (Fully protected mammals), 5050 (Fully protected reptiles and amphibians), and 5515 (Fully protected fish) of the California Fish and Game Codes. These protections state

that "…no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected [bird], [mammal], [reptile or amphibian], [fish]…."

This HCP analyzes the effects on fully protected species and provides measures to avoid the potential for take under State law and to minimize potential effects.

Protection of Birds and their Nests under the California Department of Fish and Game Code

Section 3503.5 of the Fish and Game Code prohibits the take, possession, or destruction of any birds of prey or their nests or eggs. Likewise, section 3503 provides "[i]t is unlawful to take, posssess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any other regulation…."

This HCP analyzes the effects on birds of prey and their nests, and provides measures to avoid and minimize potential effects.

California Department of Fish and Game Streambed Alteration Agreement Program

The California Department of Fish and Game regulates work that will substantially affect resources associated with rivers, streams, and lakes in California, pursuant to Fish and Game Code Sections 1600-1607. Any actions that would alter the flow or bed of a water body or occur within its annual high-water mark may require a Lake or Streambed Alteration Agreement.

Though the vast majority of O&M activities in the San Joaquin Valley do not occur in water, a Master Streambed Alteration Agreement is included in this HCP to ensure measures are in place in the event activities are conducted in water. Additional coordination with the USACE under Section 404 or SWRCB under Section 401 may also be required for specific O&M projects that occur in rivers, streams, or lakes.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Under the MBTA, taking, killing or possessing migratory birds is unlawful as is taking of any parts, nests, or eggs of such birds (16 USC 703).

For those covered species that are listed as threatened or endangered under the ESA and also protected by the MBTA, a Special Purpose Permit can be obtained. The Special Purpose Permit is valid for 3 years from the effective date of the permit, provided that the ESA section 10(a)(1)(B) permit remains in effect for

that period. The Special Purpose Permit shall be reviewed provided that the permittee continues to fulfill its obligations under the HCP and IA. Each renewal will be valid for the maximum period of time allowed by 50 CFR Section 21.27 or its successor at the time of renewal

This HCP analyzes the effects on migratory birds and provides measures to avoid and minimize potential effects. PG&E will use the incidental take permit to request a Special Purpose Permit consistent with Section 21.27.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions. Under the Bald and Golden Eagle Protection Act, it is a violation to "…take, possess, sell, purchase, barter, offer to sell, transport, export or import, at any time or in any manner, any bald eagle commonly known as the American eagle, or golden eagle, alive or dead, or any part, nest or egg, thereof…" Take is defined to include pursue, shoot, shoot at, poison, wound, kill capture, trap collect molest, and disturb.

In 1996, USFWS clarified that an incidental-take authorization provided under Section 7 or Section 10 of the ESA can include authorization for take under the Bald and Golden Eagle Protection Act. An incidental take permit issued under Section 10 of the ESA covering bald eagles will include the following language:

"The U.S. Fish and Wildlife Service will not refer the incidental take of any migratory bird or bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16USC 703-712), or the Bald and Golden Eagle Protection Act of 19470, as amended (16 USC 668-668-d), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein."

This HCP analyzes the effects on bald and golden eagles, and provides measures to avoid and minimize potential effects.

Development of the HCP

The purpose and overall goal of PG&E's San Joaquin Valley O&M HCP is to develop and implement a conservation plan that will:

- avoid, minimize, and compensate for potential adverse effects on threatened and endangered species resulting from covered activities;
- accommodate PG&E's current and future O&M activities in the San Joaquin Valley;
- provide the basis for take authorization pursuant to ESA and CESA; and

- integrate PG&E's other programs and agreements that protect or minimize potential impacts of O&M activities into the HCP and Implementing Agreement, including the ESA Section 7 consultation for the valley elderberry longhorn beetle (VELB), PG&E's Migratory Bird Protection Program, a Master Streambed Alteration Agreement, and a conservation practices regarding O&M practices near western burrowing owl.

Plan Area

PG&E's San Joaquin Valley O&M HCP plan area is defined to include PG&E's gas and electrical transmission and distribution facilities, the lands owned by PG&E and/or subject to PG&E easements for these facilities, private access routes to infrastructure associated with O&M activities, minor facility expansion areas, and mitigation areas for impacts resulting from covered activities.

The plan area boundary was established on the basis of elevation, land cover types, ownership, and land use information. This boundary is defined by the characteristics below.

- The plan area comprises portions of nine counties: San Joaquin, Stanislaus, Merced, Fresno, Kings, Kern, Mariposa, Madera, and Tulare.
- On the east side of the San Joaquin Valley, the plan boundary in the northern portion of the plan area follows the San Joaquin and Stanislaus County lines. The remainder of the eastern boundary follows the perimeter of federal lands or the 3,000-foot elevation contour, whichever is lower, along the western Sierra Nevada foothills.
- On the west side of the San Joaquin Valley, the plan boundary follows the western boundary of San Joaquin, Stanislaus, Merced, Fresno, Kings, and Kern Counties.
- The northern boundary of the plan area is the northern San Joaquin County line, and the southern limit of the plan area boundary is the 3,000-foot elevation contour north of the Kern County line.

The entire perimeter of the planning area encompasses a 12.1 million acre area; however, the plan area, the focused area where work is likely to occur including ROWs, access to ROWs, expansion areas, and mitigation areas, is approximately 276,350 acres (Table 1-1). In general, the plan area boundaries were selected by PG&E to include lands that exhibit similar ecological characteristics and that are managed by PG&E's San Joaquin Valley offices (Figure 1-1). Lands at elevations above 3,000 feet were not included because of ecosystem changes; large tracts of federal lands were excluded because these lands are predominantly at higher elevations, include additional species, and are subject to Section 7 of the ESA.

Land-Cover Mapping and Classification

One of the primary data sources for development of the HCP is a detailed geographic information system (GIS)–based map of land cover within the plan area. Land-cover types are defined as the dominant feature of the land surface discernible from aerial photographs and can be characterized as vegetation communities, water, or human uses. Land-cover types are the basic designations used to analyze the potential occurrence of and potential impacts on covered species.

The GIS-based maps of PG&E facilities and land cover informed development of the HCP. These GIS data layers provided regional-scale data for assessment of the effects of O&M activities on covered species. This assessment resulted in preliminary estimates of temporary and permanent loss of covered species habitat. In turn, these estimates supported development of a conservation strategy and requisite financing for this HCP. During implementation of the HCP, actual effects on covered species and mitigation requirements will be determined by site surveys preceding some O&M activities, as described in Chapter 4 (*Conservation Strategy*).

The land cover map was produced by combining data from the Department of Conservation's (DOC's) Important Farmland Mapping Program; the California Department of Water Resources' (DWR's) urban boundaries; DFG's Wetland Riparian and Vernal Pool GIS Mapping Layers; California Department of Forestry and Fire Protection's (CDF's) Hardwood Rangeland forest types; and California GAP (GAP) (1990 satellite imagery land cover data commonly referred to as "GAP" data). Where data sources overlapped, data from the highest quality source were incorporated into the land-cover layer for this HCP (Figure 1-2).

Land cover was reclassified from the original classification systems of the data sources into a system designed to support the impact analysis for covered species in the HCP. This classification system consists of 15 land cover categories (Table 1-2) and is based on Wildlife Habitat Relationships (WHR), Holland (1986), Sawyer and Keeler-Wolf (1995), Mayer and Laudenslayer (1988), and recommendations by Jones & Stokes senior wildlife biologists and botanists (Figure 1-1).

A more detailed description of data sources, the data integration process, the land cover classification system, and links to the formal metadata for the land cover layer are provided in Appendix A.

Selection of Covered Species

Covered species, as defined for the HCP, are species that PG&E intends to conserve and protect through this management plan. Covered species will be protected through avoidance, minimization, and compensation for effects of O&M activities. The list includes species for which PG&E is requesting

Table 1-1. PG&E's San Joaquin Valley O&M HCP Plan Area Estimated Size

Facility Type/ Access Area	Total Miles Facility	Total Miles Urban	Total Miles Ag	Total Miles Natural Land Cover	Average Right-of-Way Width (ft)	HCP Natural Land Cover Area (ac)	HCP Total Area (ac)
Gas Transmission	1,550	354	775	421	150	7,655	28,182
Electric Transmission	4,588	527	2,166	1,895	250	57,424	139,030
Electric Distribution	17,713	5,453	7,212	5,048	25	15,297	53,676
Gas Distribution	8,326	7,494	564	268	25	812	25,230
ROW Access and Minor New Construction[1]						8,119	24,612
Estimate for Unmapped Facilities[2]						1,429	5,617
Total Plan Area[3]						90,763	276,347

Notes:

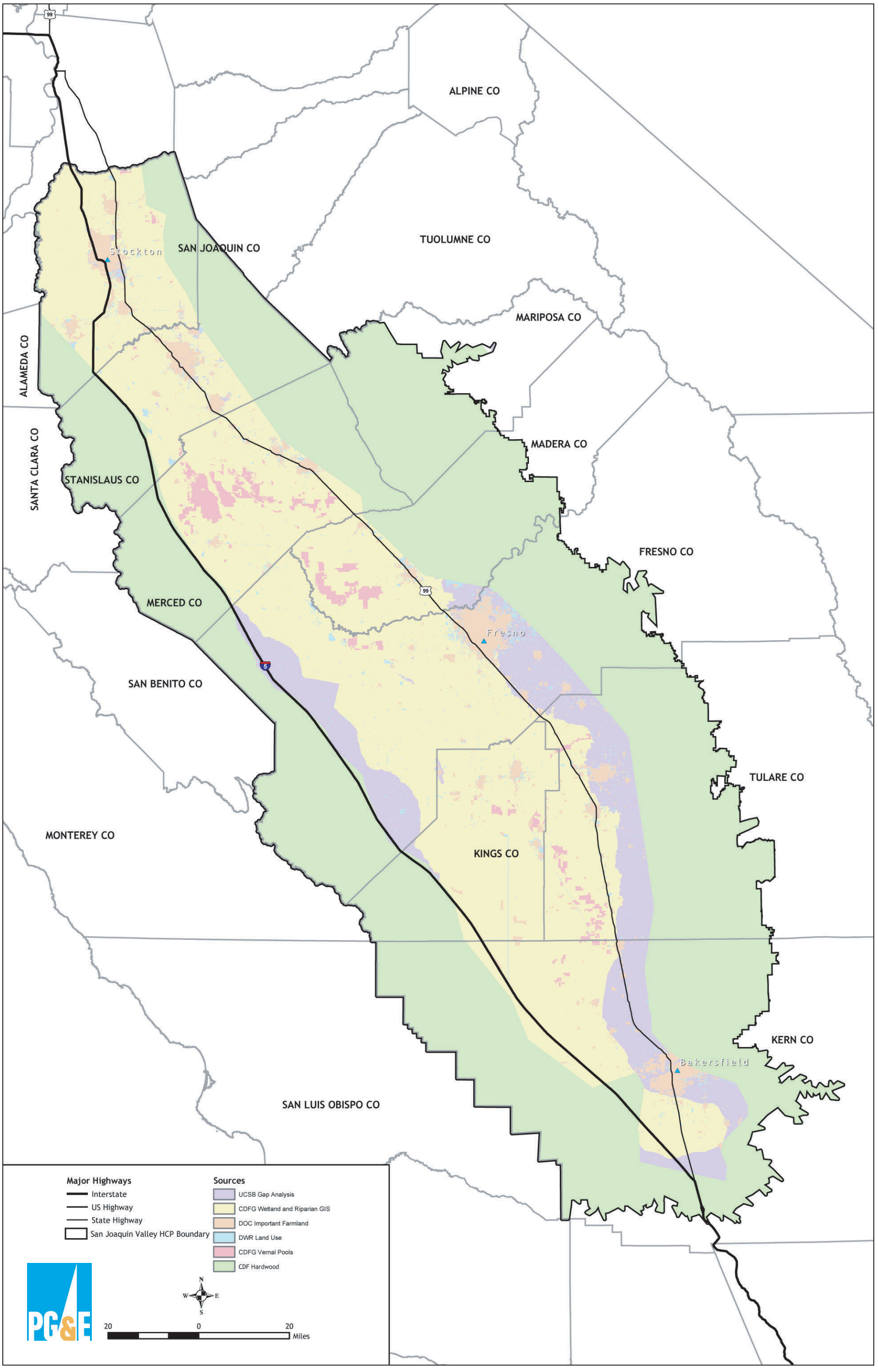
[1] ROW access and minor new construction were not mapped., The amount of natural land cover present where these activities take place was estimated to be 10% of the total land cover for all other existing facility types.

[2] A portion of PG&E's facilities are not mapped; it was assumed that 1% of gas transmission and electric transmission and 5% of electric distribution and gas distribution remain to be mapped.

[3] The total plan area is shown to highlight where effects could occur.

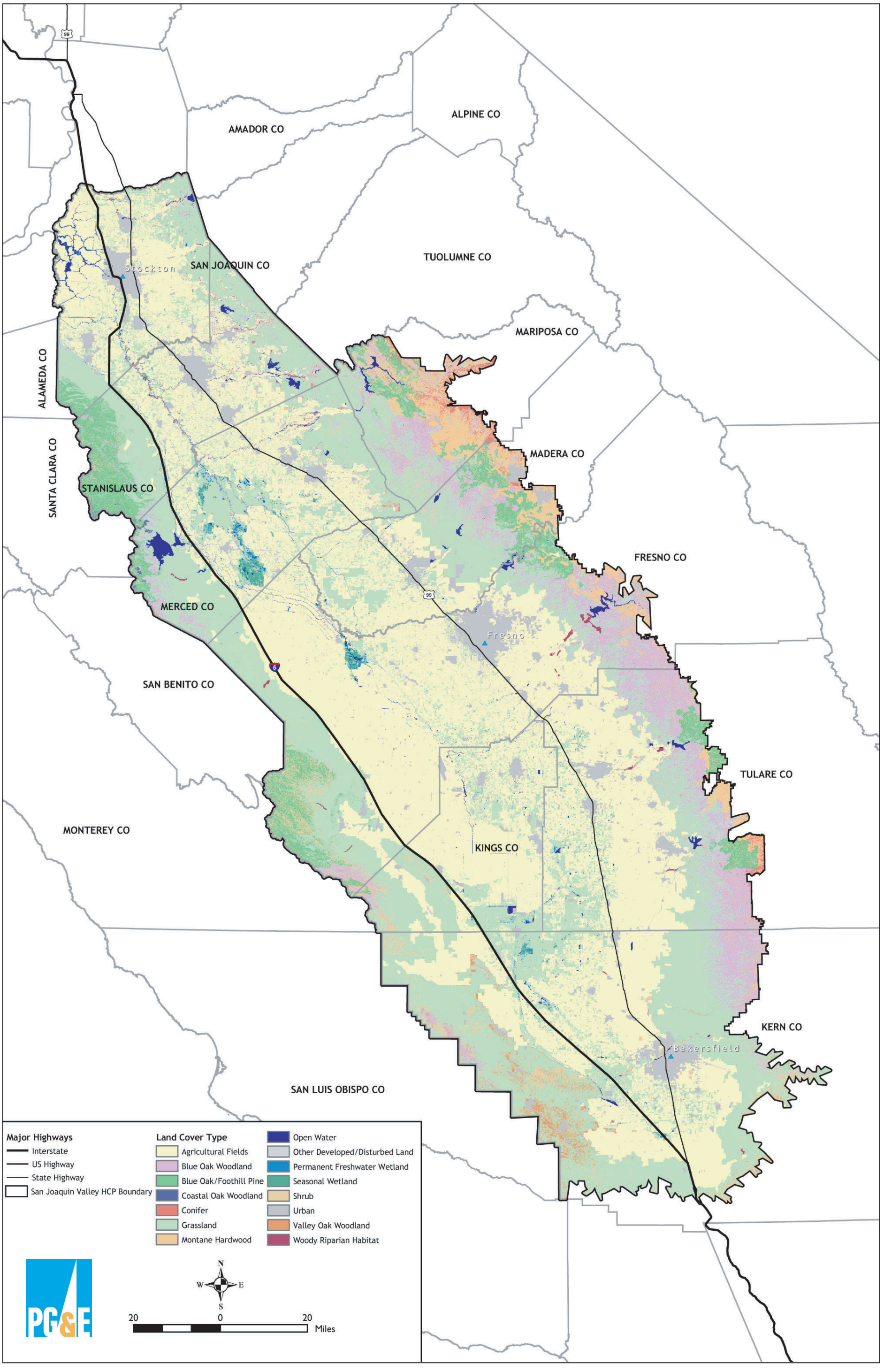
Table 1-2. Land Cover Types Used for Analysis in the HCP

Land Cover Type	Description
Natural Vegetation Types	
Blue oak woodland	Upland woodland with the overstory canopy dominated by blue oak
Blue oak/foothill pine	Upland woodland with the overstory canopy dominated by blue oak with foothill pine
Coastal oak woodland	Upland woodland with an overstory canopy dominated by live oaks
Conifer	Upland woodland or forest with an overstory dominated by conifer species
Grassland	Vegetation dominated by introduced and native grasses
Montane hardwood	Upland forest with the overstory canopy dominated by hardwood tree species
Open water	Permanent bodies of water that do not support emergent vegetation
Permanent freshwater wetland	Permanent wetlands (both managed and unmanaged) dominated by emergent plant species
Seasonal wetland	Wetlands dominated by native or nonnative herbaceous plants that annually pond surface water or maintain saturated soils at the ground surface for a portion of the year of sufficient duration to support facultative or obligate wetland plant species, including managed wetlands but excluding croplands farmed for profit (e.g., rice)
Upland scrub	Upland vegetation dominated by shrubs
Valley oak woodland	Woodland or savanna dominated by valley oak
Woody riparian habitat	Includes all successional stages of woodlands and forests generally dominated by willows, Fremont cottonwood, sycamore, valley oak and alder within the active and historical floodplains of streams and rivers
Agricultural and Developed Types	
Agricultural fields	Agricultural lands, including orchards and vineyards
Other developed and disturbed land	Includes residential, commercial, industrial, mined, barren, and other developed lands (e.g., freeway corridors) located outside of urban areas
Urban	High density residential, commercial, and industrial lands and associated infrastructure



Jones & Stokes

Figure 1-1
HCP Plan Area and Data Sources for Land-cover Mapping



Jones & Stokes

Figure 1-2
Land-Cover Types in Plan Area

authorization for take from USFWS and DFG, and other species that cannot be authorized for take. Incorporating these other species into the HCP will provide protections for these species. Including these other species as covered species in the HCP also is intended to provide the baseline data, analysis, ongoing data collection, and justification for adding unlisted fully protected species and certain bird species to the permits if the species become listed or the law allows take authorizations of these species in the future.

In determining which species to address in the HCP, PG&E developed a comprehensive list of 93 wildlife and 73 plant species that were considered for coverage (Appendix B). These lists were compiled using information from the following sources:

- California Natural Diversity Database (CNDDB) records for San Joaquin, Stanislaus, Merced, Mariposa, Madera, Fresno, Tulare, Kings, and Kern Counties;
- California Native Plant Society's (CNPS's) (2001) *Inventory of Rare and Endangered Vascular Plants of California*;
- Jones & Stokes research files and environmental reports;
- *San Joaquin County Multi-Species Conservation Plan*;
- *Recovery Plan for Upland Species of the San Joaquin Valley, California* (U.S. Fish and Wildlife Service 1998);
- Jones & Stokes and PG&E biological resource specialists; and
- informal consultation with USFWS and DFG.

For each species with potential to occur in the plan area, information was gathered on status, population trends, distribution, threats, and conservation and management efforts. The following criteria were then applied to each species to determine whether it would be covered in the HCP.

Status: The species is currently listed as threatened or endangered under ESA or CESA or is expected to be listed within the permit term (assumed to be up to 30 years). Species that are expected to be listed within the permit term include species that are:

- proposed for listing as threatened or endangered under ESA;
- candidates for possible future listing as threatened or endangered under ESA (66 Federal Register [FR] 54808, October 30, 2001);
- considered by CNPS to be "rare, threatened or endangered in California" (List 1B);
- fully protected in California (California Fish and Game Code Section 3511[birds], 4700 [mammals], and 5050 [reptiles and amphibians]);

and some species that are:

- California species of special concern (CSC) (DFG's Special Animals List 2001);
- identified by DFG and the Point Reyes Bird Observatory (PRBO) as a bird species of special concern in California (list developed in 2001 but not yet adopted); or
- unlisted and known by experts to be very rare, are declining rapidly, and for which important habitat may be affected.

Range: The species is known to occur or likely occurs within the plan area, based on credible evidence.

Impact: The species may be adversely affected by O&M activities or minor projects.

Data: Sufficient data exist on the species' life history, habitat requirements, and occurrence in the plan area to adequately evaluate impacts on the species and to develop conservation measures to mitigate these impacts to regulatory standards, or limited data are available but important habitat for the species occurs in the plan area.

Some wildlife species that were initially considered for coverage in the HCP were eliminated from further consideration and not included as covered species if they met at least one of the following criteria.

- The species has a highly localized distribution, and habitat for the species is avoided or the present range of the species is outside the plan area.
- The species is only a migrant, wintering, or locally breeding species exhibiting widespread movements and would not be affected by O&M activities in the plan area.
- The species is not included on the newly developed DFG and PRBO proposed California bird species of special concern list (5 July 2001).

Tables 1-3 and 1-4 list the wildlife and plant species, respectively, that were included for coverage in the HCP on the basis of the foregoing criteria. Detailed accounts of covered species appear in Appendix C.

PG&E determined that it would not cover fish in the HCP because of the limited occurrence of federally or state-listed fish in the plan area and the limited potential for listed fish to be affected. O&M activities infrequently require in-water work, and when work is needed within waters of the United States, PG&E will pursue a permit from the USACE under Section 404 of the CWA. If listed fish are present, consultation with the USACE will include consultation with USFWS and/or NOAA Fisheries under Section 7 of the ESA.

Table 1-3. Covered Wildlife Species for PG&E's San Joaquin Valley Habitat Conservation Plan

Common and Scientific Name	Legal Status [a]	
	Federal	State
Vernal pool fairy shrimp *Branchinecta lynchi*	T	–
Midvalley fairy shrimp *Branchinecta mesovallensis*	SC	–
Vernal pool tadpole shrimp *Lepidurus packardi*	E	–
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T	–
California tiger salamander *Ambystoma californiense* (*A. tigrinum c*.)	T	SSC
Limestone salamander *Hydromantes brunus*	SC	T, FP
California red-legged frog *Rana aurora draytoni*	T	SSC
Blunt-nosed leopard lizard *Gambelia (Crotaphytus) silus*	E	E, FP
Giant garter snake *Thamnophis gigas*	T	T
Swainson's hawk *Buteo swainsoni*	–	T
White-tailed kite *Elanus caeruleus*	–	FP
Golden eagle *Aquila chrysaetos*	–	FP
Bald eagle *Haliaeetus leucocephalus*	FPD, T	E, FP
Western burrowing owl *Athene cunicularia hypugea*	SC	SSC
Bank swallow *Riparia riparia*	–	T
Tricolored blackbird *Agelaius tricolor*	SC	SSC
Buena Vista Lake shrew *Sorex ornatus relictus*	E	SSC
Riparian brush rabbit *Sylvilagus bachmani riparius*	E	E
Riparian (San Joaquin Valley) woodrat *Neotoma fuscipes riparia*	E	SSC

Common and Scientific Name	Legal Status [a]	
	Federal	State
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	E	E
Giant kangaroo rat *Dipodomys ingens*	E	E
San Joaquin (Nelson's) antelope squirrel *Ammospermophilus nelsoni*	SC	T
San Joaquin kit fox *Vulpes macrotis mutica*	E	T

[a] Status Explanations:

Federal

E = listed as endangered under the federal Endangered Species Act (ESA).

T = listed as threatened under the federal ESA.

PE = proposed for federal listing as endangered under the federal ESA.

PT = proposed for federal listing as threatened under the federal ESA.

C = species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded.

P = petitioned for listing as threatened or endangered under the federal Endangered Species Act.

SC = species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.

FDP = federally proposed for delisting

– = no listing.

State

E = listed as endangered under the California ESA.

T = listed as threatened under the California ESA.

FP = fully protected under the California Fish and Game Code.

SSC = species of special concern in California.

– = no listing.

Table 1-4. Covered Plant Species for PG&E's San Joaquin Valley Habitat Conservation Plan

Common and Scientific Name	Legal Status [a]		
	Federal	State	CNPS
Large-flowered fiddleneck *Amsinckia grandiflora*	E	E	1B
Lesser saltscale *Atriplex minuscula*	–	–	1B
Bakersfield smallscale *Atriplex tularensis*	SC	E	1B
Big tarplant *Blepharizonia plumosa* ssp. *Plumosa*	–	–	1B
Mariposa pussypaws *Calyptridium pulchellum*	T	–	1B
Tree-anemone *Carpenteria californica*	SC	T	1B
Succulent owl's-clover *Castilleja campestris* ssp. *succulenta*	T	E	1B
California jewelflower *Caulanthus californicus*	E	E	1B
Hoover's spurge *Chamaesyce hooveri*	T	–	1B
Slough thistle *Cirsium crassicaule*	SC	–	1B
Mariposa clarkia *Clarkia biloba* ssp. *australis*	–	–	1B
Merced clarkia *Clarkia lingulata*	SC	E	1B
Springville clarkia *Clarkia springvillensis*	T	E	1B
Vasek's clarkia *Clarkia tembloriensis* ssp. *Calientensis*	SC	–	1B
Hispid bird's-beak *Cordylanthus mollis* ssp. *Hispidus*	SC	–	1B
Palmate-bracted bird's-beak *Cordylanthus palmatus*	E	E	1B
Kern mallow *Eremalche parryi* ssp. *kernensis*	E	–	1B
Congdon's woolly sunflower *Eriophyllum congdonii*	–	R	1B
Delta button-celery *Eryngium racemosum*	SC	E	1B

Table 1-4. Continued

Common and Scientific Name	Legal Status [a]		
	Federal	State	CNPS
Striped adobe-lily *Fritillaria striata*	SC	T	1B
Boggs Lake hedge-hyssop *Gratiola heterosepala*	–	E	1B
Pale-yellow layia *Layia heterotricha*	SC	–	1B
Comanche Point layia *Layia leucopappa*	SC	–	1B
Legenere *Legenere limosa*	SC	–	1B
Panoche pepper-grass *Lepidium jaredii* ssp. *album*	SC	–	1B
Congdon's lewisia *Lewisia congdonii*	–	R	1B
Mason's lilaeopsis *Lilaeopsis masonii*	SC	R	1B
Mariposa lupine *Lupinus citrinus* var. *deflexus*	SC	T	1B
Showy madia *Madia radiata*	–	–	1B
Hall's bush mallow *Malacothamnus hallii*	–	–	1B
San Joaquin woollythreads *Monolopia (Lembertia) congdonii*	E	–	1B
Pincushion navarretia *Navarretia myersii* (a.k.a. *N.m.*ssp. *m.*)	–	–	1B
Colusa grass *Neostapfia colusana*	T	E	1B
Bakersfield cactus *Opuntia basilaris* var. *treleasei*	E	E	1B
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	T	E	1B
Hairy Orcutt grass *Orcuttia pilosa*	E	E	1B
Hartweg's golden sunburst *Pseudobahia bahiifolia*	E	E	1B
San Joaquin adobe sunburst *Pseudobahia peirsonii*	T	E	1B
Keck's checkerbloom *Sidalcea keckii*	E	–	1B

Table 1-4. Continued

Common and Scientific Name	Legal Status [a]		
	Federal	State	CNPS
Oil neststraw *Stylocline citroleum*	–	–	1B
Greene's tuctoria *Tuctoria greenei*	E	R	1B
Kings gold *Twisselmannia californica*	-	-	1B

[a] Status Explanations:

Federal

E = listed as endangered under the federal Endangered Species Act (ESA).

T = listed as threatened under the federal ESA.

SC = species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.

– = no listing.

State

E = listed as endangered under the California ESA.

R = listed as rare under the California Native Plant Protection Act. This category is no longer used for newly listed plants, but some plants previously listed as rare retain the designation.

– = no listing.

CNPS = California Native Plant Society

1B = List 1B species: rare, threatened, or endangered in California and elsewhere.

4 = List 4 species: plants of limited distribution

Selection of Covered Activities

Covered activities are activities that may result in take of a covered species. All O&M-related activities that may result in take were included in the HCP. These are described in detail in Chapter 2 (*Covered Activities*).

Consideration of and Relationship to Other Planning Efforts

PG&E's Environmental Programs

Currently, PG&E is evaluating its statewide activities in the context of how best to address potential impacts on state- and federally listed species and habitat for such species on a regional basis. This HCP provides an opportunity to integrate and standardize several programs for consistent tracking of avoidance and minimization measures, project effects, and compensation for O&M activities. Several programs that are key to this are described below.

Valley Elderberry Longhorn Beetle Conservation Program

In 2003, USFWS completed a BO for anticipated effects on valley elderberry longhorn beetle (VELB) from PG&E's routine operation and maintenance activities over the next thirty (30) years. The BO and PG&E's VELB Conservation Program (see both documents in Appendix D) present the information and analysis relevant to potential impacts on VELB resulting from ongoing routine O&M of PG&E facilities (including facility access roads) on U.S. Forest Service lands, Bureau of Land Management administered public lands, and all other lands in PG&E's service territory containing gas, electric, and/or related facilities within the species' range.

The BO and VELB Conservation Program describe the systemwide analysis that PG&E and USFWS used to address potential VELB impacts on lands affected by the same routine O&M activities to those covered by the HCP. Principally, the VELB Conservation Program: (1) addresses potential harm to VELB habitat associated with PG&E's routine O&M activities throughout the PG&E service area, and (2) provides funds for VELB Recovery Plan efforts in California. As detailed in Appendix D, the centerpiece of the VELB Conservation Program is PG&E's acquisition and/or management of approximately 1,000 acres of high quality VELB habitat to mitigate for any impacts to VELB from PG&E's routine operations and maintenances throughout its service territory over the next 30 years. Because the Biological Opinion provides incidental take authorization for PG&E's routine operations and maintenance, including in the San Joaquin Valley, it is not necessary for the HCP to analyze the impacts on or seek coverage for VELB for those activities within the Plan Area. PG&E will apply the same avoidance and minimization measures required by the VELB Conservation Program to all routine operations and maintenance activities in the

Plan Area. Similarly, the lands acquired and managed in perpetuity under the VELB Conservation Program will mitigate for impacts from PG&E's routine operations and maintenance throughout the system, including in the San Joaquin Valley

This HCP covers additional activities not covered by the impacts analysis in the BO, including substation expansion and other minor new construction activities (e.g., electric pole and tower extensions, pipeline extensions, and pressure limiting station construction). Therefore, the effects analysis for VELB in this HCP focuses on the likely impacts to VELB from these minor new construction activities in the Plan Area; likewise, the compensation targets for VELB identified in this HCP are limited to what is necessary to offset the impacts from minor new construction in the Plan Area, beyond what is required to mitigate for routine operations and maintenance.

To best integrate the VELB Conservation Program into this HCP, PG&E is proposing to meet these additional compensation targets for VELB identified in this HCP under the rubric of the VELB Conservation Program. In other words, to the extent that this document estimates likely impacts on VELB from minor new construction in this Plan Area, PG&E will actually monitor and mitigate actual impacts from these additional activities in the Plan Area according to the methodology provided by the Biological Opinion and the VELB Conservation Program. PG&E is intending to permanently acquire and manage significantly more high quality VELB habitat than what is required by the Biological Opinion, with the intent that the surplus acreage will accommodate the additional effects from the minor new construction activities covered by this HCP, as well as other PG&E activities. Throughout the term of this HCP, PG&E's integrated tracking and reporting process will document and compare the actual impacts to VELB from minor new construction in the Plan Area to surplus acreage acquired under the VELB Conservation Program, to ensure that all impacts covered by this HCP are adequately mitigated.

Migratory Bird Protection Program

The purpose of the Migratory Bird Protection Program is to ensure that ongoing operation of PG&E's facilities in California are in compliance with the MBTA, the Bald and Golden Eagle Protection Act, ESA, and CESA. This program was initiated in April 2002 and became fully operational in spring of 2003. The Migratory Bird Protection Program establishes the process by which PG&E will comply with an April 2002 Settlement Agreement with USFWS.

The statewide program includes:

- retrofit of a minimum of 2,000 planned locations annually;
- retrofit of involved or adjacent poles annually in response to incidents;
- building new and replaced "bird safe" poles annually;

- adoption of Raptor Concentration Zones and assurance that new construction within these zones that is "bird-safe;" and
- notification of USFWS of migratory bird electrocutions and preparation of quarterly reports regarding the number of bird interactions and corrective actions taken.

Key reference materials for the program are included in Appendix E. The program has resulted in safety improvements of many poles and in more effective tracking of bird electrocutions. The categories of covered activities described in Chapter 2 include this program's activities.

Master Streambed Alteration Agreement

PG&E developed a draft master streambed alteration agreement in compliance with Section 1600 et seq. of the California Fish and Game Code to standardize activities and avoidance and minimization measures in riparian areas.

DFG is currently revising the master streambed alteration agreement to reflect the latest updates to California Fish and Game Code. The master streambed alteration agreement is a long-term, programmatic-scale agreement that covers all O&M and minor construction activities that are part of the proposed project. Authorized activities addressed in the agreement include:

- obstruction and sediment removal;
- vegetation removal;
- bank stabilization at watercourse crossings;
- repair, improvement, and maintenance of bank stabilization structures;
- repairs to existing watercourse crossings;
- diversion of water;
- test drilling and potholing; and
- provisions for variances.

The agreement also addresses unauthorized activities, general conditions, time of operation, notification, fees, amendments, and other legal requirements.

Western Burrowing Owl Conservation Program

PG&E is in the process of developing a standardized Western Burrowing Owl Conservation Program. The specific program for PG&E facilities is required because burrowing owls have adapted in some areas to use PG&E facilities, and therefore, it is not feasible and necessary to implement standardized protocols for owl protection that are designed more for permanent development. The Western

Burrowing Owl Conservation Program will expand on PG&E's existing efforts to minimize effects on burrowing owls, and will include measures to:

- avoid adverse effects on western burrowing owl during O&M activities and new construction,
- outline standard practices to implement in areas with known Western burrowing owl activity, and
- develop management plans for on-site protection at PG&E facilities.

The Western Burrowing Owl Conservation Program ~~and subsequent MOU with DFG are~~is expected to be completed by fall 200~~8~~6.

Merced River Canyon Memorandum of Understanding

In 1994, PG&E entered into an MOU with DFG, California Department of Transportation (Caltrans), Bureau of Land Management (BLM), and United States Forest Service (USFS) to protect several species of concern along State Route (SR) 140. These species include six plant species (Merced clarkia, Mariposa clarkia, Congdon's lewisia, Tompkins's sedge, Yosemite onion, and Congdon's woolly sunflower), and one amphibian (limestone salamander). The MOU restricts PG&E's O&M activities along specific areas of an 18-mile segment of SR 140. The terms of this MOU are included in PG&E's overall environmental compliance program but are not included in this HCP because of the longstanding nature of this MOU and the multiple federal agencies involved.

Other Relevant Plans

This HCP utilizes other conservation planning efforts, such as the *Recovery Plan for Upland Species of the San Joaquin Valley* (U.S Fish and Wildlife Service 1998), and considers other regional planning efforts such as the *San Joaquin Valley Open Space and Multi-Species Conservation Plan* (San Joaquin County Association of Governments 2001) and local mitigation banking opportunities.

Duration of Permits

The PG&E San Joaquin Valley O&M HCP is a 30-year plan, and the relevant permits and authorizations will have a term of 30 years. Accordingly, all assessments made in this HCP are based on a 30-year time period. Prior to the expiration of the PG&E San Joaquin Valley O&M HCP permits at the end of 30 years, PG&E may apply to renew or amend the HCP and its associated permits and authorizations to extend its term.

Assurances Requested

No Surprises

The federal *No Surprises Regulation* was established by the Secretary of the Interior on March 25, 1998. It provides assurances to Section-10 permit holders that no additional money, commitments, or restrictions of land or water will be required should unforeseen circumstances requiring additional mitigation arise once the permit is in place. The No Surprises Regulation states that if a Permittee is properly implementing an HCP that has been approved by USFWS and/or NOAA Fisheries, no additional commitment of resources, beyond that already specified in the plan, will be required.

The PG&E San Joaquin Valley O&M HCP provides minimization and compensation measures required under the HCP ("No Surprises") Assurances Rule (63 FR 8859) for incidental take of species covered in the plan, resulting from otherwise lawful activities. No further mitigation or compensation will be required by USFWS to address impacts on covered species caused by permitted activities undertaken by PG&E pursuant to ESA (as described below and except as otherwise required by law and/or provided under the terms of the PG&E San Joaquin Valley HCP and Unforeseen Circumstances). Unforeseen Circumstances are described in detail in Chapter 6 (*Monitoring, Reporting, and Adaptive Management Program*).

Section 7 Consultation

An important goal of the HCP is to provide a framework for ESA compliance for all covered activities in the inventory area. Whether a covered activity occurs under Section 7 or 10 of the federal ESA, the HCP will provide the framework for compliance.

Projects that fall under Section 7 of the ESA are evaluated under different standards than projects subject to Section 10 of the ESA (see description in *Regulatory Context* sections above). Non-federal projects must obtain a permit for take of listed species, while federal agencies must consult with USFWS or NOAA-Fisheries whenever their actions have the potential to affect a listed species. The definition of "affect" differs slightly from that of "take" and may be applied differently, depending on the species and the project. In most cases, however, the Section 7 and 10 standards are functionally equivalent, so PG&E anticipates that the conservation measures in this HCP will apply to both federal and non-federal projects.

In order to authorize permit issuance for this HCP, the USFWS will evaluate the direct, indirect, and cumulative effects of covered activities in an internal ESA biological opinion (see *Section 7* and *Section 10* discussions above). As a result, and to the maximum extent allowable, in any subsequent consultation under Section 7 of ESA with regard to covered species and covered activities, PG&E requests assurances that the USFWS shall insure that the ESA biological opinion

issued in connection with the proposed project is consistent with the internal FESA biological opinion. PG&E also requests that any reasonable and prudent measures included under the terms and condition of a ESA biological opinion be, to the maximum extent appropriate, consistent with the conservation measures of the HCP and the Implementing Agreement.

Chapter 2
Covered Activities

Introduction

The covered activities addressed in this HCP are those activities necessary for the safe and efficient operation of PG&E's gas and electric systems. To meet the needs of customers and to satisfy the CPUC's requirements to offer "adequate, efficient, just, and reasonable" service, PG&E must construct, operate, and maintain safe and efficient gas and electric service. This HCP covers two categories of activities for which PG&E is requesting take authorization that are conducted in accordance with the CPUC requirements: O&M Activities and Minor Construction Activities.

Operation Activities typically include inspecting, monitoring, testing, and operating valves, reclosures, switches, etc. These activities involve personnel working at facilities; personnel typically use existing access roads.

Maintenance Activities include repairing and replacing facilities, structures, and access roads. They also include emergency repair and replacement, and vegetation management, including tree trimming and fire breaks.

Minor Construction Activities include installing new or replacement structures to upgrade existing facilities or to extend service to new customers. These activities are limited to 1 mile or less of new electric or gas line and 0.5 acre or less of permanent facilities (substations). The length of service extension allowed under minor new construction is understood as a total length of 1 mile from the current terminus of an existing line, regardless of the nature of the facilities involved. Multiple consecutive (end-to-end) extensions with a total length exceeding 1 mile would not be covered under the proposed HCP. Multiple 1-mile extensions in different geographic areas would be covered, but each would be treated as a separate activity. The size of a minor construction project would be estimated as the total footprint, expressed in acres. Both linear and acreage estimates will be required to address the entirety of a proposed project; consistent with the requirements of federal and state environmental review, the HCP will not allow segmentation of proposed construction to obtain coverage under the HCP.

The covered activities do not include any facilities outside the plan area or new construction actions unrelated to maintenance, repair, and operation of existing pipeline and transmission/distribution lines. The following description of O&M

activities associated with the plan area's natural gas and electric systems is based on standard procedures. Actual activities conducted currently or in the future may differ slightly in terms of procedures and areas; however, future actions are expected to have a similar level of impact to that presented here.

Natural Gas System

Description of Transmission and Distribution System

PG&E's natural gas system consists of a transmission system and a distribution system. The transmission system comprises three primary gas transmission lines totaling approximately 1,550 miles of pipeline in the plan area.

- Line 401 is a 426-mile-long, 42-inch-diameter pipeline running from the California/Oregon border south to PG&Es Panoche Metering Station in Fresno County.
- Line 2 is a 115-mile-long, 12- to 20-inch-diameter pipeline running from the Brentwood Compressor Station to the Panoche Metering Station.
- Lines 300A and B are 502-mile-long, dual 34-inch-diameter pipelines running from the California/Arizona border near Needles, California, to PG&E's Milpitas Terminal in the San Francisco Bay Area.

Natural gas is transported through the transmission system in steel pipelines buried with 3–4 feet (measured to the top of the pipe) of native soil. The diameter of the piping is 8–42 inches. Gas pressure in transmission pipelines generally exceeds 60 pounds per square inch (psi) and is maintained by one compressor station located in the plan area. The gas distribution system consists of approximately 8,326 miles of both steel and plastic lines from 0.75 to 8 inches in diameter. The lines are typically buried 2–4 feet deep. Approximately 90% of the gas distribution lines occur in urban areas. The distribution and transmission pipelines are buried in native soil; however, in areas of rocky soil, imported backfill is used to offset potential damage to the pipes. Gas pressure in distribution pipelines is generally less than 60 psi.

The right-of-way (ROW) width of the natural gas system varies from 15 to 100 feet. Less than 1% of the linear ROW is owned in fee title; the remainder is in easements and in franchise. Generally, PG&E has nonexclusive easements without the right to fence the pipeline corridors. Exclusive easements with the right to construct fences are obtained when security fencing is required for valve lots, compressor stations, and other facilities.

Methods and Techniques

All work practices are performed in accordance with federal, state, and local environmental, safety, and construction regulations and standards. Where applicable, work is conducted in accordance with landowner agreements.

General discussions of the methodology used in access, clearing, grading, and erosion control activities follow.

Access

Under normal conditions, public and private existing roads are used to access the ROW to the maximum extent possible. PG&E is seeking coverage for private roads. The most rural private roads may be dirt or gravel and may periodically require repair or maintenance. In the event that no road exists or an emergency arises, cross-country travel or construction of a new temporary access road may be necessary. Speed limits are restricted to speeds deemed safe under driving conditions. No accurate information is available to estimate either the need for construction of new temporary roads or the frequency of off-road or cross-country travel.

Clearing

Clearing activities, when necessary, conform to landowner agreements or with permits issued by regulatory/land management agencies. After placing a staked engineering survey line on the ground, maintenance personnel clear and grade the construction ROW to the extent necessary to allow safe and efficient use of construction equipment. In the event that minor clearing of privately owned commercial tree species is necessary, construction personnel move and stack the trees in accordance with the landowner's preference. Stump profiles are kept as low as possible. Stumps are removed only when required for pipeline installation. Construction personnel dispose appropriately of debris created during preparation of the ROW.

Grading and Cut-and-Fill

Grading is limited to the work necessary to ensure the safe movement of construction equipment in the ROW. Construction of temporary bridges or culverts across creeks in the ROW may be necessary to ensure vehicle safety and to reduce environmental impacts. Grading and cut-and-fill activities are designed to minimize effects on natural drainage and slope stability. On steep terrain where the ROW must be graded at two elevations (i.e., *two-toning*), such areas are restored after construction to approximate preexisting topographic contours.

Topsoil is preserved by segregating and windrowing (i.e., soil is stored near the site). Surface rocks, where present and useful for reclamation, are set aside with the topsoil windrow. Every attempt is made to cover the pipeline by placing a fine grade of soil near the pipe and leaving the rocks for top cover.

Hydrostatic Testing

New pipes or valves are hydrostatically tested prior to operation to ensure their integrity. Hydrostatic testing is typically conducted before backfilling the underground facilities. Existing pipes and valves are also periodically hydrostatically tested. All testing complies with CPUC, Caltrans, and California Occupational Safety and Health Administration (Cal-OSHA) requirements. Water is the most commonly used test medium, but compressed air or compressed nitrogen gas is occasionally used for testing of small-diameter pipes. Testing pressure and duration are determined by pipe size, pipe specifications, pipe wall thickness, and elevation. Prefabricated test heads are installed on the section of line to be tested. The section is then filled with water from an available source (such as a fire hydrant) or transported to the site by water trucks or through temporary aboveground water lines. Once the pipeline is filled, a hydrostatic pump is used to increase the internal pressure to the designed test pressure, typically 1.5 times the system's maximum operating pressure. Upon successful completion of the hydrostatic test, pressure is reduced and the water is expelled from the pipeline using air compressors and cylindrical foam pigs and disposed of in a manner consistent with local water quality and endangered species considerations (i.e., not released overland in areas suitable for burrowing species).

Erosion Control

Erosion control techniques are employed to preclude pipeline washout, gully development, and sedimentation of local drainages. Erosion control measures may include installation of water bars, diversion channels, terraces, ditch plugs, riprap, imprinting, and other soil stabilization practices.

O&M Activities for the Natural Gas System

G1. Patrols

Aerial Patrol

Aerial patrols of certain pipelines and associated facilities are conducted on a weekly basis using fixed-wing aircraft or helicopters.

Ground Patrol

CPUC General Order 112-D requires periodic ground patrols of the gas transmission lines. Ground patrols of the pipelines and associated facilities are conducted on a quarterly to annual basis using a light truck on existing access and pipeline patrol roads. The purpose of the patrols is to observe surface conditions on and adjacent to the transmission line ROW for indications of leaks, construction activity, and other factors affecting safety and operation. Ground patrols include reading gas meters.

Leak Detection Patrol

Leak detection patrol is conducted by foot or rubber-tired, all-terrain vehicles (ATVs) at least annually in suburban/urban areas and at least once every fifth year in rural areas. Rural areas are also patrolled yearly by helicopter, except in the fifth year (when a foot patrol is conducted). PG&E uses either a portable hydrogen-flame ionization gas detector or a laser-methane detector to sample air above the gas line to test for leaks.

G2. Inspections

Valves

The valve sites along the pipelines are inspected and operated three to four times per year. Light trucks are used on existing access and pipeline patrol roads. Valves are lubricated as necessary using a gun pump to administer either motor oil or grease (e.g., 1033).

Telecommunication Sites

Routine inspections of telecommunication sites are conducted monthly unless problems are identified at specific sites. Access is by light truck on existing access and pipeline patrol roads or by helicopter.

Anode Beds

Cathodic protection is inspected every 2 months by checking the electrical current at various test locations along the line and at anode bed sites. Access is by light truck on existing access and pipeline patrol roads.

Pressure Limiting Stations

Routine inspections of existing pressure limiting stations are conducted every 2 months. Access is by light truck on existing access and pipeline patrol roads.

Land Surveys

PG&E staff periodically conduct land surveys of facilities and facility ROWs. Access is by light truck on existing roads and may include cross country or pedestrian travel of survey areas.

G3. Remedial Maintenance

Remedial maintenance corrects weather erosion, line coating, and vandalism problems. Maintenance materials used for site-specific solutions of erosion problems may include riprap, soil matting, concrete, and concrete pillow systems. In the rare event of insufficient depth of pipeline cover, concrete can be used as a cap cover. During these procedures, the pipeline remains in operation. Vandalism can affect any structures located above ground; it usually entails visual (i.e., spray paint) rather than structural impacts.

G4. Compressor Station Maintenance

One compressor station, located near Kettleman City, occurs in the plan area. The station occupies a fully developed and fenced site; no native habitat is present. Inspections are conducted daily and maintenance is ongoing. Typical maintenance tasks include overhauling compressors and engines, retrofitting emission systems, maintaining or reconstructing the cooling water tower, repairing and replacing piping, painting the station, and drilling or cleaning water well(s). In addition, operational and air quality standards may require modifications or upgrades of the station equipment. Such improvements are made with approved permits in order to meet the standards.

Existing paved roads provide access to the compressor station.

G5. Pipeline Electric Test System Installation

Electric Test Systems (ETSs) are installed 1–5 miles apart on pipelines to determine pipe corrosion, measure conductivity, and locate the pipe during excavation. This technology avoids the need to systematically expose the pipe and physically examine it for signs of corrosion. The ETS consists of two leads (wires) attached to the pipe with a liquid weld material; the leads are exposed at the surface inside a 4-foot-tall, 4-inch-diameter plastic tube. Installation entails exposing a 3- to 5-foot-long section of pipe, attaching the leads with liquid weld,

and recovering the pipe. Surface disturbance typically involves about 100 square feet. Most sites are accessible by existing access roads. Where an ETS is not accessible via an existing road, it is accessed by foot or rubber-tired vehicle. During this activity, the pipeline remains in operation.

G6. Pipeline Valve Recoating

Pipeline valve recoating involves excavating around and under an existing valve and recoating it with epoxy to prevent corrosion of the valve assembly. Clearing the site and excavating generally disturb a total of about 5,000 square feet of surface. A 50-foot-wide terraced hole is excavated around the existing valve, and the coating is removed by hand or sandblasted. The size of the hole may vary to meet Cal-OSHA requirements. A small lay-down area (about 50 by 50 feet) beside the valve site also is required. The pipeline is not disturbed or opened and remains operational during the recoating activity. Most valve sites are accessible by existing access roads.

G7. Pipeline Valve Replacement

Mainline valves, which regulate the flow of gas through the pipeline, occasionally malfunction or wear out, causing leaks. The faulty valves are replaced for operational and public safety reasons. Mainline valves are generally 10–20 miles apart.

Prior to valve replacement, a portion of the gas line must be *blown down* (i.e., gas is evacuated from the affected section of pipe at a control point without affecting the environment). Valve replacement involves excavating approximately 75 feet of the pipe on either side of the valve, with a working corridor approximately 100–150 feet wide. A laydown area (generally 50 x 50 feet) may be required; if so, the surface area may be cleared. Once the valve is replaced, the pipeline must be hydrostatically tested; water is pumped into the pipe and sustained at a pressure appropriate to ensure the integrity of the pipeline and valve.

This activity can occur any time depending on weather and on operational restrictions related to the need to shut down the line temporarily.

G8. Pipeline Cathodic Protection

As a pipeline's coating degrades over time, it requires increased *cathodic protection* to prevent corrosion. Increased cathodic-protection current speeds the consumption of *anode* beds and decreases their effectiveness. Consequently, anode beds must be replaced periodically, and additional anode beds may be needed. There is some flexibility as to where the anode beds can be located. Pipe coatings commonly degrade faster in areas of high moisture content (e.g., resulting from precipitation or irrigation) than in dryer areas. Anode beds are usually located approximately every 10–20 miles along the pipeline. The anode

beds must be constructed approximately 1,000 feet from the pipeline to adequately distribute the current. The pipeline continues to operate during anode bed installation or replacement.

Installation of anode beds involves drilling deep (to more than 300 feet) ground wells and installing zinc or magnesium bars, platinum anode rods, or ground mats. Once an anode bed is installed, it is connected to the pipeline by an underground cable. This installation method is used where pipelines are exposed to large amounts of induced AC current (typically from adjacent high-voltage electric transmission lines) or where the soil conditions dictate.

Clearing the site and erecting additional poles to carry power from the existing distribution line to the anode bed causes surface disturbance. An approximately 30-foot-wide construction corridor and an approximately 15-foot-wide permanent ROW are needed to place the underground cable from the anode bed to the pipeline. Electricity from the distribution system is preferable to solar power for providing current to the underground cable. An approximately 50- by 75-foot fenced area is constructed to house a solar battery/electrical source for use where electric utility power is unavailable.

G9. Pipeline Lowering

Gas pipelines may need to be lowered to increase the depth below surface and thereby improve public safety. Such need arises mostly in agricultural areas and areas of intense land use, but may it also occur in other land-cover types where pipe structures are exposed.

Lowering involves trenching parallel to, and to a greater depth, than the existing pipeline. The trench extends approximately 300–500 feet beyond both ends of the section of pipeline to be lowered. Gas pressure is reduced to the lowest possible operating pressure for safety reasons; the pipeline is then briefly removed from service (*line clearance*). The existing pipeline is cut and moved to the lower trench section. Prefabricated bends are installed to connect the lowered section of the pipe to the remaining pipeline. The pipe may also be rewrapped. The activity requires an approximately 100- to 150-foot-wide construction corridor. This activity can occur at any time of year, depending on operational restrictions relating to the need to shut down the pipeline temporarily.

G10. Pipeline Coating Replacement

Natural gas pipelines are coated to protect them from degradation and external corrosion. When a pipeline's coating has deteriorated to the point of requiring replacement, the pipe is rewrapped with epoxy. To determine whether the coating has maintained its integrity, electrical current is induced on the pipeline and then measured for a loss of voltage, which would indicate a degradation in coating integrity.

To avoid bending or affecting the integrity of the pipe, the pipeline must be excavated in sections and supported at intervals of (typically) 40 feet. The old coating is removed by jetting, scraping, and/or sandblasting. The surface is then prepared for the new wrap by running a self-contained grit- or shot-blasting machine over the pipe. The coating is applied using a coating machine. The pipeline continues to operate during this activity. An approximately 100-foot-wide working corridor is needed.

G11. Pipeline Replacement

Public safety sometimes necessitates replacing sections of pipe. Development alongside the pipeline can result in a change of class location (for maintenance classes refer to glossary) or the pipe ages, corrodes, or is damaged by people or acts of nature. In the case of class location changes, the line must be moved or replaced with thicker-walled pipe to comply with the CPUC-mandated safety factor. PG&E uses standard pipeline construction techniques, as described below (G16, *New/Replacement Pipeline Installation*). As the old pipeline is removed from service for the tie-in to the new line, it is blown down. Any gas condensate is captured and removed from the old pipeline and disposed of in compliance with current regulatory standards. The existing pipeline is either abandoned in place by filling it with an inert gas and capping it, or it is removed after the new/replacement section of pipe is operational.

The length of pipe affected can vary depending on the reason for its replacement. The minimum length of pipe replaced is typically 40 feet (one joint of pipe), although 1 mile could be replaced on average per year. The construction corridor is 100 feet wide. Once installed, the pipeline is hydrostatically tested and backfilled. This activity can occur at any time of year, depending on operational restrictions relating to the need to shut down the pipeline temporarily.

G12. Pipeline Telecommunication Site Maintenance

A Supervisory Control and Data Acquisition (SCADA) system monitors pipeline functions. This remote monitoring system transmits pipeline operational information about the system to PG&E's operations offices at the Kettleman Compressor Station. Periodic vehicle or helicopter access is required to check the telecommunication facilities, replace batteries, conduct minor maintenance, or make adjustments to the facilities or components. Access roads may need periodic blading to keep them passable for four-wheel-drive trucks.

In the event of major storm damage, reconstruction of the facility or a component replacement is required as soon as weather permits. A staging area may be required for major maintenance or storm damage repairs. The staging area is generally located either next to the site or at a distant location (for helicopter transport of workers and materials). The pipelines continue to operate during these maintenance activities.

G13. Vegetation Management and Access Road Maintenance

PG&E manages vegetation along the pipeline ROWs to prevent damage to the natural gas system, facilitate inspections, and comply with regulations. The vegetation management program is designed to eliminate weeds, brush, and trees around equipment and facilities for fire hazard reduction, security, safety, and maintenance access (PG&E clears tree canopy cover obscuring the ROW in order to facilitate aerial inspection of the ROW).

Specific vegetation management activities are often initiated for the reasons listed below.

- Unsurfaced access roads must be maintained to permit vehicular passage for routine patrols. Access road maintenance is usually limited to blading the road and may occasionally require import of fill or riprap.
- CPUC General Order 112-D requires PG&E to patrol periodically for gas leaks (see G1, *Patrols*, above). Trees and brush interfering with these patrols may require periodic removal.
- Local fire districts periodically require PG&E to abate ruderal vegetation and annual grasses when fire districts determine that a fire hazard exists.

Areas within the ROW requiring vegetation removal are identified during routine patrols. Vegetation management is usually accomplished by manually removing (chainsawing) large-diameter woody vegetation, then mechanically removing other vegetation (with a brush hog, hydro-axe, or brush rake), usually to establish a maximum height of 1 foot or less. The methods described above are considered covered activities under the HCP.

Minor Construction Activities

G14. Pipeline Pressure Limiting Station Construction

Human population densities determine the class location designations of pipelines. A change of class location designation may require a pipeline to be moved or replaced with thicker-walled pipe to increase safety, as mandated by CPUC (see G11, *Pipeline Replacement*, above).

An alternative to replacing the pipeline is installing a Pressure Limiting Station (PLS) that lowers the pressure of gas in the line. A typical PLS encompasses an area approximately 250 by 100 feet, including aboveground pipe and valve structures and a small control/monitoring building (usually 100 square feet) surrounded by security fencing. The control building houses pressure flow monitoring and SCADA equipment. Electricity for the SCADA equipment is provided by PG&E or batteries charged by solar panels or a generator.

PLS construction involves excavating a joint of pipeline. A construction corridor approximately 125 feet wide and an approximately 100-by-100-foot lay-down area may be required outside the-250-by-100-foot footprint of the PLS. To install a PLS, a portion of the pipeline is blown down. Once the PLS is in place, the pipeline must be hydrostatically tested.

G15. Pipeline Valve Installation

Occasionally mainline valves are installed to regulate the flow of gas or to provide the capability of isolating portions of pipeline. The new valve set is installed by excavating 75 feet of the gas line on both sides of the new valve location, with a 100- to 150-foot-wide construction strip.

Prior to installing the valve, a portion of the pipeline must be blown down. Once the valve is installed, the pipeline is hydrostatically tested. This activity can take place at any time of year, depending on weather and operational restrictions related to the need to shut down the line temporarily.

G16. New/Replacement Pipeline Installation

Installing either new sections of existing pipeline segments or replacement pipelines involves clearing and grading the ROW; trenching and excavating; pipe placement (including welding, inspection of welds, field coating or fiber wrapping, and backfilling); hydrostatic testing; corrosion protection; marking the pipeline; erosion control; and cleanup and restoration.

In most terrains, trenching is used to install the pipeline, unless specific circumstances (rare open crossings) dictate construction of aboveground sections. Specialized trenching and boring methods are used at crossings of rivers, streams, backwaters, and washes; faults; and roads, railroads, utilities, aqueducts, and canals. These excavation methods and the other actions involved in new/replacement pipeline installation are described in detail below.

Clearing and Grading

This process is described above (see *Methods and Techniques*.)

Trenching and Excavating

The process of excavating the pipeline trench (or valve locations) varies according to soil type and terrain. All trenching and excavating is conducted in accordance with Cal-OSHA requirements for employee and public safety. Self-propelled trenching machines or backhoes are used for trench excavation on moderate terrain. River crossing trenches are excavated using a backhoe, dragline, or clamshell. If rock or rocky formations are encountered, tractor-

mounted mechanical rippers are used to expedite excavation. In areas where mechanical rippers are not practical or sufficient, blasting or rock trenching equipment may be employed. To prevent damage to adjacent structures and power and communication lines, blasting mats are used.

The width and depth of the trench depends on the diameter of the pipe, soil type, terrain, and minimum depth requirements. Typically, the trench is 12 inches wider than the diameter of the pipe being installed. The trench must be deep enough to achieve adequate soil cover over the pipe. The following minimum soil covers apply for the described areas:

- uncultivated areas: 2.5–3 feet
- cultivated areas: 3–6 feet
- rocky areas: 1.5–2 feet

In areas where it is necessary to trench through topsoil and subsoil, a two-pass trenching process is used. The first pass removes topsoil, and the second pass removes subsoil. Removed soils (*spoil*) from each of the excavations are placed in separate banks. This technique allows for proper soil-profile restoration after backfilling. Spoil banks contain gaps at appropriate locations to prevent stormwater runoff from ponding. In cultivated and improved areas and areas with thin layers of topsoil, it is sometimes necessary to remove and stockpile all topsoil from the disturbed area of the construction ROW. This stockpiled topsoil is then replaced across the ROW during cleanup activities. In agricultural areas with drainage tile systems, any tiles that are damaged, cut, or removed during pipeline construction are repaired or replaced to the satisfaction of the landowner. During construction, temporary measures are used to ensure that drainage systems continue to function effectively.

The bottom of the trench is cleared of loose rocks and, when necessary, imported material or other suitable bedding material is provided as a cushion for the pipe. Backhoes are used to clean the trench after ripping or blasting. Access across the trench is provided at convenient intervals for public safety.

Crossings

Boring and open trenching are typical construction methods for crossings. Boring is typically used when crossing active waterways, railroads, and major roadways. Three boring methods are used: jack and bore, directional bore, and microtunneling. The method is determined by the crossing type, soil type, terrain, and type of facility being installed. Discussions of crossing techniques are followed by discussions of the characteristics and requirements of different crossing types.

Crossing Techniques

- **Jack and Bore.** This boring method (also referred to as dry bore) is often used to cross major highway systems (all federal and state highways) and railroads, as well as places where open cuts are prohibited. Each side of the

crossing is excavated to accommodate the equipment (a boring auger). Sacrificial pipe, the same size as the pipe being installed, is typically used as a sleeve for the boring auger. This sleeve is pushed under the crossing as the auger drills through the soil. The permanent gas pipe is then pushed through, attached to the sacrificial pipe. The pipe is cut in short lengths to accommodate the limited excavation area, then welded to the inserted piece ahead of it and jacked in. If casing pipe is necessary, the same method is used. The casing pipe, sized larger than the carrier pipe, is installed as a sleeve for the boring auger. The gas pipe is then installed through the casing. Cased crossings have vent pipes and cathodic protection and are appropriately marked.

- **Directional Bore.** Longer distances can be bored using this method than using the jack and bore method. Directional boring is most often used to cross large waterways. No initial excavation is necessary; the tunnel is bored from surface to surface. A registered engineer determines the pipe's maximum angle of deflection. A boring machine is set up on one side of the crossing at the appropriate location. The auger drills at a predetermined angle from the surface elevation toward the crossing; the angle is prescribed to attain the correct depth below the feature being crossed. During boring, a mud solution, typically bentonite, is pumped into the tunnel to maintain its shape and integrity. This solution also reduces friction during installation of the pipeline. The pipeline is pulled through the tunnel by the boring machine. The mud solution is pumped into a truck as the pipeline displaces it. Once the pipeline is installed, both ends are excavated and cut off at the appropriate depth to match the rest of the pipeline. The mud solution is hauled off site and disposed of appropriately.
- **Microtunnel.** This method often is used in extremely wet conditions where it is necessary to control the amount of soil being removed as the boring head progresses. Each side of the crossing is excavated to accommodate the boring equipment (a jetting head and suction equipment). The jetting head is attached to the pipe being installed. The jetting head contains multiple high-pressure water jets. Water forced through these jets dislodges the soil as the head is pushed, and the pipe is installed behind it. Suction equipment controls the amount of soil being removed to accommodate the forward progress of the jetting head and pipeline. Only the amount of soil displaced by the pipeline is removed. Water used during this process is typically captured and disposed of according to regulatory requirements.
- **Open-Trench Waterway Crossings.** If the open-trench technique is used for river crossings, a trench is opened in the streambed using backhoes, backhoes on barges, clamshells, or draglines, depending on the streamflow characteristics. Flow is maintained at all water crossings during construction. At large rivers, spoil removed from the trench is stockpiled out of the water or on the downstream side of the trench. The pipeline is placed at least 6 feet below scour depth. A plug of unexcavated soils is left at each bank of the stream or river crossing to preserve the integrity of the streambank. These plugs are not removed until necessary for installation of the pipe. The entire length of pipe for the crossing is assembled as a unit, tested, then placed in the trench. After installation, the trench and the stream

bank are backfilled, stabilized, and restored to approximate preconstruction contours.

Crossing Types

- **River, Stream, Backwater, and Wash Crossings.** River crossing methods vary according to specific river characteristics, such as width, depth, flow, and riverbed geology. All construction is conducted in accordance with permits issued by USACE. Pipelines crossing major streams and rivers are coated with concrete to provide negative buoyancy and protection from erosion. Temporary vehicle crossings are installed for construction traffic only if an existing crossing, such as a bridge, is not available in the vicinity. Temporary vehicle crossings consist of clean rock fill, culvert bridges, flexi-float, or portable bridges.
- **Fault Crossings.** Where geologic studies suggest a high potential for ground rupture, the design of the fault crossing avoids overstressing the pipe in the event of differential movement. The designs of fault crossings vary, depending on the type of fault and the likelihood, amount, and potential consequences of expected fault displacement. For mitigating the effects of fault displacement, the pipeline trench is widened and deepened to accommodate the anticipated fault displacements. The pipeline in the fault zone is completely suspended in granular bedding material to minimize the resistance of the trench backfill to displacement of the pipe. The pipe is expected to remain fixed relative to movement of the trench as fault displacement takes place. If the axial component of the fault displacement is of concern, using minimum soil and loose, granular backfill over a few hundred feet on each side of the location of potential displacement may minimize axial restraint.
- **Road, Railroad, and Utility Crossings.** The open-trench method is used when crossing roads with light traffic and where permitted by local authorities or owners of private roads. A temporary road detour to the shoulder of the road, or a construction bridge consisting of plating, is provided for thoroughfares that are trenched. Underground utilities are generally crossed under by boring or by manually exposing the pipe or cable.
- **Aqueduct and Canal Crossings.** The construction method used for crossing aqueducts and canals is determined by the specific circumstances of each crossing. In most cases, boring is appropriate. Where required or necessary, an aerial suspension system is constructed for the pipeline.

Pipe Placement

Lengths of pipe, valves, and fittings are transported to the ROW or work area and unloaded. Sections of pipe requiring angle joints are typically assembled in the field using prefabricated elbow sections so that the pipe conforms to the contours of the terrain. The pipe joints are welded, X-rayed, inspected, and field-coated to prevent corrosion. The material used for field-coating depends on the location of the pipe. Mastic (or sometimes a sprayed-on substance) is used above ground, and tape or epoxy (sprayed or brushed) are typically used below ground.

The overall integrity of the pipeline depends on the welding process. Each weld must exhibit the same structural integrity (i.e., strength and ductility) as the pipe. In accordance with Caltrans regulations, quality-control personnel inspect welds to determine the grade of the weld. Welds on 6-inch-diameter or larger pipes are subject to radiographic inspection (X-raying). This is a nondestructive method of inspecting the internal structure of welds and determining or inferring the presence of defects. Defects are repaired or removed, as required by Caltrans. Each weld seam is protected from corrosion by field coating or fiber wrapping (as comparable to factory-applied coating materials).

Once the field-coating process or fiber wrapping of the weld is completed and inspected for defects, the pipeline is lowered into the trench. Rubber-tire or track-mounted equipment is used to lower the pipeline. The trench is then backfilled with the excavated material. If the excavated material has too much rock for placing around the pipe, a rock-free material is imported and placed around and over the pipe to a depth of 1 foot. Surplus material is used to form an earthen crown over the trench to allow for settlement of the backfill. Excavations and trenches are compacted to specific compaction requirements at each location. The minimum compaction requirement for ROWs is 85%.

Hydrostatic Testing

This process is described in *Methods and Techniques* above.

Corrosion Protection

Corrosion of underground steel pipes is a serious maintenance issue for gas system pipelines. As corrosion-cell current, generated or carried by the pipe, moves to the soil, pits can form in the pipe. These pits can lead to weak sections of pipe that could burst from the pressurized gas. Refer to *Cathodic Protection* above.

Pipeline Marking

Identifying markers are installed over the centerline of the pipeline. These markers show the general location of the pipeline, identify the owner of the pipeline, and convey emergency information in accordance with applicable regulations. Additional markers are placed at rivers, roads, fences, public access crossings, and edges of agricultural fields. Where the new/replacement pipeline is located immediately adjacent to an existing pipeline, the markers are installed near those for the existing pipeline. Special markers providing information and guidance to aerial patrol pilots also may be installed.

Erosion Control

For erosion control during and after O&M activities, refer to *Methods and Techniques* above.

Cleanup and Restoration

The final phase of pipeline installation involves cleanup and restoration of the ROW. The presence of the pipe displaces soil, resulting in surplus soil that cannot be returned to the trench. The surplus soil is normally distributed evenly over the ROW. If a property owner objects to this approach, the spoil is deposited at a local dumping site or another location in keeping with the property owner's request. Restoration of the ROW surface involves smoothing it with motor graders or disc harrows and stabilizing slopes (when necessary) using earth-filled sacks, rock riprap, or other materials. On cultivated or improved lands, measures are taken to remove rocks and leave the ground surface in a condition satisfactory to landowners. When needed, slope breakers and diversion ditches are installed on slopes after installation of the pipeline. These techniques stabilize the soil and channel runoff away from disturbed areas. After cleanup, disturbed areas are stabilized, smoothed, mulched, reseeded, and fertilized as required. Restoration and revegetation of the construction area are completed to the satisfaction of the landowner or jurisdictional authorities. Revegetation is conducted to achieve compatibility with preexisting vegetative conditions, in accordance with Title 18, Code of Federal Regulations (CFR), Part 2.69 and standard procedures approved by jurisdictional authorities, including DFG.

Electrical System

Description of Transmission and Distribution System

PG&E's electrical system consists of a transmission system and a distribution system. The electrical transmission system in the plan area consists of approximately 4,588 miles of transmission lines, typically carried on steel lattice. Bulk transmission voltages (230 kilovolt [kV] and 500 kV) are carried by conductors (wires) supported on steel-lattice towers or tubular steel poles. Conductors carrying subtransmission voltages (60 kV, 70 kV, and 115 kV) are supported by steel towers, tubular steel poles, or wood poles.

The in-line spacing of these structures varies. The height of conductors above the ground also varies according to topography and the design of the transmission system. Generally, conductors on 230-kV and 500-kV systems are designed to maintain a minimum of 30 feet above the ground. CPUC GO-95 dictates the design of electric facilities. Conductor sag is figured on the height of the towers/poles, the electric load, ambient temperature, conductor type, and span, and varies accordingly. Transmission ROWs are of varying width and generally occur within easements that are negotiated with private land owners or the

holders of public lands. The widths depend on the system voltage, number of lines per ROW, terrain, and other factors. Less than 1% of these ROWs is owned in fee title by PG&E; the remainder is in easements. There are 89 transmission substations in the plan area; power from high-voltage transmission lines is transformed to lower voltage at the substations.

PG&E's electrical distribution system provides links between most customers and the transmission system. Approximately 17,713 mapped miles of distribution lines are found within the plan area. Distribution conductors are supported on wood or tubular steel poles. The ROW widths vary according to the system voltage, terrain, and other factors. The distribution system includes primary and secondary distribution lines delivering electricity and distribution transformers that reduce voltage from distribution to utilization levels. *Primary distribution* lines carry three-phase AC power in the 2 kV–50 kV range to street rail and bus systems, as well as industrial and commercial customers. *Secondary distribution* lines serve most residential customers with 120/240-volt, single-phase, three-wire service, which provides electric power for most appliances. Secondary distribution transformers can further reduce voltage to the required secondary voltage at or near a customer's service connection.

Insulators are positioned between support structures and conductors to support the wires and isolate energized conductors from potential grounding. Insulators for transmission voltages are primarily ceramic; however, non-ceramic insulators, made of fiberglass rods and rubber shrouds, are also used. Contamination-induced electric faults can be caused by conductive airborne particles that settle on insulators, providing a path across the insulators. Ceramic insulators are periodically washed to reduce the risk of such faults. Non-ceramic insulators tend to perform better in contamination-prone areas.

The distribution system also includes components that regulate system voltage or protect the system from power irregularities. For example, circuit breakers disconnect major feeder lines when a system fault or overload occurs, and surge arresters divert high-voltage surges caused by lightning.

Methods and Techniques

In all cases, work is performed according to current federal, state, and local regulatory requirements and, where applicable, landowner agreements.

Access

Access to electric facilities is similar to gas facilities in that public and private existing roads are used to access the ROW to the maximum extent possible. However, because the length of electric facilities is greater than that of gas facilities and these facilities occur more frequently in remote areas, additional cross-country travel or construction of new temporary access roads may be necessary. No accurate information is available to estimate either the need for

construction of new temporary roads or the frequency of off-road or cross-country travel.

Clearing

Clearing for electric facilities begins by staking the construction ROW. Maintenance personnel then clear vegetation, remove obstacles, and grade to the extent necessary to allow safe work practices and access. In the event that minor clearing of privately owned commercial tree species is necessary, the trees are moved and stacked in accordance with the landowner's preference. Stump profiles are left as low as required for safe work practices and access. Stumps may be removed where appropriate. Debris generated during clearing of the ROW is disposed of appropriately.

Grading and Cut-and-Fill

Grading and cut-and-fill activities are implemented to allow for safe work practices and access as well as ensuring the proper installation of electric facilities. They can also be employed to maintain the structural integrity of an electric facility that is being impacted by soil movement.

Topsoil is preserved by segregating and windrowing (i.e., soil is stored near the site). Surface rocks, where present and useful for reclamation, are set aside. Graded areas are restored after construction to approximate preexisting topographic contours where possible.

Construction of temporary bridges or culverts across creeks in the ROW or access roads may be necessary to ensure safe access and to reduce environmental impacts.

Grading and cut-and-fill activities are designed to minimize effects on natural drainage and slope stability. On steep terrain where the ROW must be graded at two elevations (i.e., *two-toning*), such areas are restored after construction to approximate preexisting topographic contours.

Erosion Control

Erosion control techniques are employed to preclude impacts to towers and poles by soil movement, gully development, and sedimentation of local drainages. Erosion control measures may include grading, installation of water bars, diversion channels, terraces, ditch plugs, riprap, imprinting, and other soil stabilization practices.

O&M Activities for the Electrical System

E1. Patrols

Aerial Patrol

PG&E conducts aerial patrols of certain transmission lines, distribution lines, and associated facilities on both a scheduled and as-needed basis (emergency patrols) using helicopters.

Ground Patrol

Company personnel conduct ground patrols of the transmission lines and associated facilities on a quarterly to 18-month cycle, using either light trucks or ATVs on existing access and ROW patrol roads. Electrical distribution lines are typically patrolled for electric maintenance issues (not including vegetation issues) every 3 years. Vegetation management personnel conduct annual patrols of all transmission and distribution lines using vehicles and ground patrols. Electric meters are read during routine ground patrols.

E2. Inspections

Tower, Pole, and Equipment Inspection

Tower footings and poles are routinely inspected to verify stability, structural integrity, and equipment condition (e.g., fuses, breakers, relays, cutouts, switches, transformers, paint). Footings and poles are accessed by existing roads or cross-country in vehicles or on foot.

Outage Inspection

When outages and CPUC Reportable Incidents occur because of weather, accidents, equipment failure, or other reasons, PG&E inspects lines to determine the location and probable cause of the outage. Lines are accessed by existing roads or cross-country in vehicles or on foot.

Substation Inspection

All substations are inspected monthly. Equipment operation is verified and safety inspections conducted. Substations are accessed by existing roads in vehicles.

Telecommunication Sites

Routine inspections of telecommunication sites are conducted monthly unless problems are identified at specific sites. Access is by light truck on existing access and powerline right-of-way roads, or by helicopter.

Underground Sections of Line

The regular inspection of underground facilities, instrumentation and control, and support systems is critical for safe, efficient, and economical operation. All above ground components will be inspected at least annually for corrosion, equipment misalignment, loose fittings, or other common mechanical problems. The underground portion of the line will be inspected at vault locations on an annual basis. Inspections are performed using existing roads or cross-country in vehicles or on foot.

Land Surveys

PG&E staff periodically conduct land surveys of facilities and facility ROWs. Access is by light truck on existing roads and may include cross country or pedestrian travel of survey areas.

E3. Electrical Insulator Washing

Insulators are periodically washed to prevent faults. Faults result from the accumulation of conductive debris, such as airborne particles or bird contamination, on ceramic insulators. Insulators are washed using a truck- or trailer-mounted spray system or by helicopter. Washing is typically carried out during energized conditions (i.e., while the power lines are operating). Distilled water, typically from local sources, is used to wash the insulators; dry washing, using ground corn hulls, also is used. All activities involving water use and disposal are conducted in compliance with current regulatory requirements.

E4. Electric Substation Maintenance

Most of PG&E's substations are located near load centers, such as residential, commercial, and industrial areas. Typical major maintenance tasks at these substations include transformer, switch, fuse, cutout, meter, and insulator repair and replacement. Occasionally, maintenance of substation systems requires minor construction. Load demands may require modifications of station equipment or installation of new facilities. These activities could require use of station property or adjacent property for construction staging, materials storage, permanent facilities, or land management.

E5. Electrical System Outage Repair

Outage repair activities are necessary to maintain public safety as required by the CPUC. Outages are typically caused by weather, equipment failure, accidents, fire, or bird electrocution. When an outage is reported, the line is patrolled until the cause of the outage is determined. Access is primarily on existing roads, although some overland access with rubber-tired vehicles is expected. Depending on the cause of the outage, repair may entail anything from reclosing a switch to replacing a transformer or pole. The circuit is repaired and restored as quickly as possible or the CPUC can fine PG&E.

E6. Electrical System Tower Replacement or Repair (Including Telecommunication Attachments)

Tower replacement or repair typically involves raising towers or strengthening the foundations or superstructures of towers.

To strengthen tower foundations, concrete from the existing footings is broken away to expose the steel reinforcements. A new/replacement concrete footing, called a grade beam, is poured between each existing footing. Superstructures are typically strengthened by replacement, modification, or addition of pieces of steel lattice, as determined by engineering analysis specific to each tower. Telecommunications attachments are typically made by clamping apparatus and cables directly to the tower superstructure.

Two methods are used to raise towers:

- adding vertical leg extensions to the base of the tower on existing footings or foundations, or
- adding extensions just below the tower cross arms at the "cage" of the tower.

The first method requires lifting the tower. A tower lifter is driven beneath the tower, and its four arms are clamped to the tower legs. The legs are unbolted from the tower base, the tower is lifted, and leg extensions are installed. However, a tower lifter can be used only on level ground. Where a tower lifter cannot be used, a crane is used to hoist the tower. A level area of approximately 25 by 40 feet is graded immediately adjacent to the tower to serve as a crane pad. Temporary wood pole support(s) (shoo-fly) are constructed adjacent to the tower to support the conductors while the crane lifts the tower. The tower extension is then installed, the conductors replaced, and the temporary wood pole supports removed.

The second method entails installing the extension at the tower cage, using a crane to hoist the tower. The tower cage is near the top of the tower, just below the cross arms. A level area of about 25 by 40 feet is graded immediately adjacent to the tower to serve as a crane pad. Temporary wood pole supports are constructed adjacent to the tower to support the conductors while the crane lifts

the tower. The tower extension is then installed, the conductors replaced, and the temporary wood pole supports removed.

Other minor repairs include accessing facilities to replace fuses, breakers, relays, cutouts, switches, transformers, and paint.

E7. Facility Installations (Shoo-Flies)

Poles/towers and equipment (e.g., anchors, cross arms, insulators, wires, cables, guys, switches) need to be replaced or repaired when they fail or become unsafe. Installation of a temporary support system (shoo-fly) could be required for new additions to existing transmission line facilities or for tap lines from the old facilities.

Shoo-fly installations involve adding temporary poles or structures around existing permanent facilities to limit service interruptions until permanent repairs can be made. Shoo-flies consist of a number of poles and anchors supporting conductors to bypass facilities needing repairs or upgrades. In some cases, existing conductors can be removed from the old poles or structures and reattached to the shoo-fly structures. In most cases, this can be accomplished with one to two poles for every circuit attached to the structure being shoo-flied. For example, one double-circuit 115 kV tower (6 wires attached) would require a minimum of four poles installed. Shoo-fly supports are removed when complete.

Activities requiring shoo-flies are discussed in activities E8 and E9 below.

E8. Electrical System Pole and Equipment Replacement and Repair

Poles and equipment (e.g., cross arms, insulators, pins, transformers, wires, cables, guys, anchors, switches, fuses, paint) must be replaced or repaired when they fail, become unsafe, or are identified for replacement as part of PG&E's Migratory Bird Protection Program.

When pole replacement is warranted, the new pole is constructed adjacent to the existing pole to minimize ground disturbance. To replace a pole, the line is de-energized. The new pole is framed (i.e., cross arms, pins, insulators, grounds, bonding, markers, and any equipment are installed) before being set. A line truck augurs a hole; the pole is then set, the conductors moved to the new pole, and the old pole removed. In some grassland areas containing a high density of burrows the butt of the pole is left in place following input from a qualified professional.

Replacement and repair of equipment on the pole is typically performed with the pole in place, using a line truck.

E9. Electric Line Reconductoring

New conductors are installed by temporarily splicing them to the ends of the existing conductors and pulling them through travelers (pulleys) attached to the arms of the towers or pole cross arms. Travelers are installed at each tower or pole using a boom truck. Where a boom truck cannot be used, a winch is used to install the travelers. In some limited cases, the conductors are installed by helicopter.

Reconductoring is typically conducted in 2-mile sections, with a tension site and a pull site (each approximately 200 by 300 feet) for each section. At the pull sites, a truck- or trailer-mounted bull-wheel puller, a small truck- or trailer-mounted crane, and rewinders with collapsible reels are used to pull the conductors through the travelers. Truck-mounted tensioners, small cranes, conductor reel trailers, and conductor reels are used to tension the conductors. Historic pull and tension sites are utilized where possible.

Before pulling the conductor, clearance structures are installed at road crossings and other locations (where necessary) to prevent conductors from contacting existing electric or communication facilities or passing vehicles. These temporary structures consist of wood poles and, occasionally, a support net stretched beneath the conductors.

After the conductors are pulled into place, they are tensioned by pulling them to a predetermined sag and tension. The conductors are then permanently attached to the insulators and existing conductors.

E10. Vegetation Management and Access Road Maintenance

E10A. Routine Maintenance—Distribution and Transmission

PG&E performs routine vegetation management on its overhead distribution and transmission facilities in order to maintain compliance with Public Resource Code Section 4293 and CPUC General Order 95, Rule 35. These regulations identify, by voltage, specific clearance distances that must be maintained between vegetation and energized conductors. Clearance distances range from 4 feet to no less than 10 feet. Vegetation management activities include an annual patrol of all overhead facilities, trimming or removal of trees that will not remain in compliance until the next year's patrol, and trimming or removal of hazard trees as defined in the Public Resource Code. Removals for routine maintenance generally involve individual trees or small groups of trees encompassing less than 0.1 acre per event on an annual basis.

E10B. Pole Clearing—Distribution and Transmission

PG&E performs pole clearing around "subject" poles and towers on its overhead distribution and transmission facilities in order to maintain compliance with Public Resource Code Section 4292. Section 4292 requires that poles with nonexempt equipment (e.g., switches, lightening arrestors) be maintained clear of any vegetation that would propagate a fire for a radial distance of 10 feet from the pole/tower; all dead limbs and foliage in that cylinder must be cleared to the height of the conductor. Vegetation management activities include an annual patrol of overhead facilities and removal of all material capable of propagating a fire. In some cases, due to vegetation regrowth, it is necessary to clear a pole more than once during the current season.

E10C. Removal Projects—Distribution and Transmission

When appropriate, considering tree species, growth rates, site conditions, and landowner permission, PG&E conducts tree removal projects at overhead distribution and transmission facilities in conjunction with routine maintenance. Removals for this category generally are intended to minimize fire hazards and include removing more than 0.1 acre of trees.

E10D. Transmission Vegetation Projects/ROW Management, Road Access Maintenance, Footings Inspection

PG&E utilizes an Integrated Vegetation Management (IVM) program to manage incompatible vegetation associated with transmission ROWs. Properly maintained ROWs are essential for the safety of the public and workers, to minimize vegetation-related outages, to provide access for inspection and maintenance of facilities, and for the timely restoration of service during emergency conditions. Goals of transmission ROW vegetation projects also include protecting the transmission system in the event of a fire as well as preventing vegetation-caused fires.

The first step is to clear the ROW of incompatible vegetation. This is typically accomplished either mechanically or manually. However, because cutting or mowing can stimulate resprouting of incompatible vegetation, the ROW is monitored for resprouting and reinvasion by incompatible vegetation. When this occurs, the ROW is managed to achieve the desired outcome. A number of factors must be considered in selecting and implementing the appropriate management method or methods.

The long-term goal of a vegetation management program in the transmission ROW is to convert tall-growing plant communities to low-growing communities. Such conversion can be accomplished by selectively controlling incompatible plants while preserving low-growing grasses, herbs, and woody shrubs over a period of many years. With proper management, the low-growing vegetation can

eventually dominate the ROW and suppress the growth of the tall-growing vegetation, thereby reducing the need for future treatments.

ROW management is based on the concept of creating wire zones and border zones. The wire zone, which comprises the ROW area beneath the transmission wire plus 10 feet on either side, is managed for low-growing shrub-forb-grass plant communities (early successional). The border zone, which extends from the wire zone to the edge of the ROW, is managed for taller shrubs and brush communities (transition zone). This management concept is depicted in Figure 2-1.

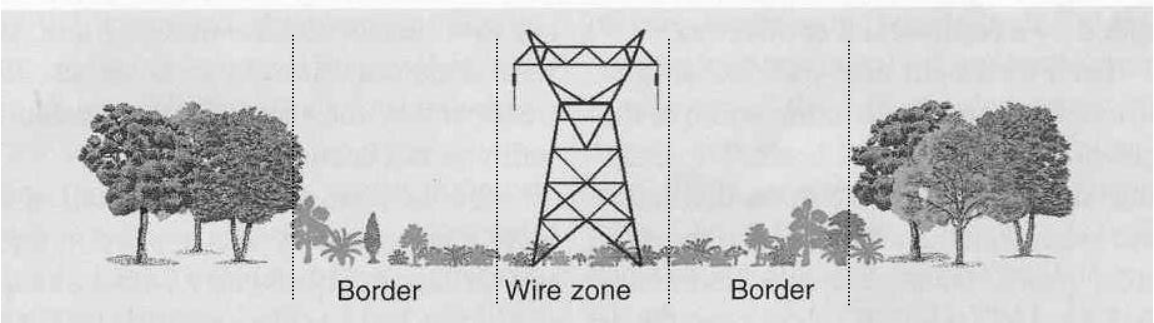


Figure 2-1
Wire Zone/Border Zone ROW Management Concept

E11. Wood Transmission Pole Test and Treat

All wood transmission poles that are 10 or more years old are evaluated to determine if they are suitable candidates for replacement, trussing, stubbing, or fiber wrapping. Transmission line segments are identified for testing based on age and condition.

Twenty inches of soil are excavated around the pole and a minimum of three 9/16-inch holes are bored at 45° angles to the axis of the pole. Each successive boring is 120° to the right and 12 inches above the previous bore. The shell thickness and circumference of the pole is used to determine if the pole is a candidate for replacement or trussing. After a review of all information, PG&E staff determines if the pole will be replaced, stubbed, or trussed. Stubbing or trussing activities are carried out after bore testing of a completed line segment is reviewed. (Stubbing and trussing entail driving or setting a short steel truss or wood pole into the ground and attaching it to the existing pole to provide the support originally afforded by the pole butt. Wrapping entails fiber wrapping the pole at or below ground level with a material impregnated with preservatives to retard external deterioration of the pole. Fiber wrapping is performed on all poles that are not candidates for trussing or replacement.)

Minor Construction Activities

E12. Wood Pole Line Construction/Relocation

To provide additional service to customers or to replace facilities, augmentation of distribution lines may be necessary. The extensions from existing distribution lines are supported by new wood poles. Each line requires:

- a new ROW (typically 50 feet wide) no longer than 1 mile;
- approximately 15 wood or direct-embedded steel or self-supporting tubular steel poles per mile;
- a pull site and tension site (each approximately 61 by 61 feet); and
- a lay-down area (approximately 71 by 71 feet), if necessary or as required.

Access to the new/replacement transmission/distribution section may require construction of a new 12-foot-wide unsurfaced access road.

Once the centerline for the new line is surveyed and staked, pole sites, pull sites, access roads, and lay-down areas are cleared, if necessary. Pole holes and any necessary anchor holes are excavated. Where possible, a machine auger is used to install poles. The width and depth of the setting hole depends on the size of the pole, soil type, span, and wind loading. Typically, minimum pole setting depths range from 4 to 14 feet.

Poles are framed (cross arms, pins, insulators, grounds, bonding, markers, and any equipment are installed) and any anchors and guys are installed before the pole is set. After setting the pole, conductors are strung (see activity E8 above).

E13. Electrical Tower Line Construction

To provide additional service to customers or to replace or upgrade facilities, an additional length of no more than 1 mile of new transmission lines supported by either steel-lattice towers or tubular steel poles may be constructed from existing transmission lines. Each line requires:

- a new ROW (typically 200 feet wide) no longer than 1 mile;
- approximately five towers or tubular steel poles per mile (each work site is approximately 25 by 100 feet);
- two pull site and a tension sites (average size 50 by 150 feet); and
- a lay-down area (approximately 100 by 100 feet).

Once the centerline for the new line is surveyed and staked, tower sites, pull sites, access roads, and lay-down areas are cleared, if necessary. Concrete footings are poured for the towers and the structures are erected using a crane. A

crane or helicopter is used to erect the tower, depending on tower type. After the tower is erected, conductors are strung (see activity E9 above).

E14. Minor Substation Expansion

Substations are typically constructed close to residential, commercial, or industrial development. The typical substation expansion encompasses from a quarter acre to 5 acres or more; this area may be required for additional transformers, fencing, and new distribution line outlets. The expansion area may also be used for setbacks, landscaping, and access. Substation sites are graded, paved, or surfaced, and the area is fenced for safety and security reasons.

E15. Electric Underground Line Construction

Underground line construction is almost exclusively conducted in urban settings. For both transmission and distribution lines, underground cable installation is accomplished using a cut-and-cover construction method (open trenching) for the underground powerline, duct banks, and splice vaults. For this activity, the specifications for a 115 kV transmission line were considered typical, however these dimensions vary with the kV capacity of the line and are frequently less than those for a 115 kV line. Typically, a minimum access width of 65 feet is required to allow for the trench excavation and construction of the duct bank, however this width varies. The project length varies based on the length of the line. During construction, spoil is removed during trench excavation and stored. If test results show no hazardous material is present, the spoil will be used to backfill the trench. If hazardous material is present, the material is hauled off-site and disposed of appropriately.

Duct Bank Installation

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

The typical trench dimensions for installation of a single circuit measures approximately 3 feet wide by 5 feet deep, however trench depths vary depending on soil stability and presence of existing substructures. Dewatering, if necessary, is conducted using a pump or well-pointing to remove water from the trench. The water is then pumped into containment tanks and hauled away for proper disposal.

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

Vault Installation

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

Cable Pulling, Splicing, and Termination

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

Special Construction Methods

Bores, either horizontal boring and directional drilling may be required (see description Minor Construction Activities, Crossing Techniques).

Other Covered Activities

Activities by Third Parties

The activities of all independent contractors or other third parties are covered by this HCP if the third party has executed a contract with PG&E that contains enforceable provisions committing the third party to comply with all provisions of this HCP. Since PG&E is the permit holder, they remain ultimately responsible for activities carried out by third parties. Documentation of the third party agreement is provided in Figure 2-2. This action would satisfy its compliance with ESA and CESA regulations with regard to PG&E's facilities in the Plan Area. Third parties that elect not to comply in this manner would remain subject to, and are expected to comply with, all applicable federal, state, and local regulations. Furthermore, third parties that do not comply with this HCP or federal, state and local regulations would be unqualified to do work for PG&E.

Sample Compliance Agreement

for

Incidental Take Coverage for Third-Party Activities Conducted as part of PG&E's San Joaquin Valley O&M HCP

The undersigned third party proposes to conduct activities within the area covered by two incidental take permits issued to PG&E: Incidental Take Permit # _____ issued by U.S. Fish and Wildlife Service (USFWS) and Incidental Take Permit # _____ issued by California Department of Fish and Game (CDFG). These activities are described in Exhibit A, which includes a map of the proposed activities. Exhibit A shows the locations of all activities that occur on areas covered by the HCP and any activities that may occur outside of the area. This Compliance Agreement authorizes the incidental take for those activities consistent with its terms and terms of the San Joaquin Valley O&M HCP. This agreement does not authorize the incidental take for activities outside of the area subject to the San Joaquin Valley O&M HCP. For activities that extend of the area covered by the San Joaquin Valley O&M, PG&E agrees to provide a copy of the Compliance Agreement, including Exhibit A, to USFWS and CDFG.

To obtain the benefits of the San Joaquin Valley O&M HCP, the undersigned third party attests that it:

1) Has received, read, and understands the applicable provisions of the San Joaquin Valley O&M.

2) Agrees to be bound by the requirements of the San Joaquin Valley O&M HCP and agrees to carry out the San Joaquin Valley O&M HCP's proposed avoidance and minimization measures (AMMs), and construction procedures and conservation provisions contained in the San Joaquin Valley O&M HCP applicable to its activities.

3) Agrees to fund all of the AMMs, and construction procedures and conservation provisions of the San Joaquin Valley O&M HCP applicable to its activities.

4) Agrees to indemnify, defend, and hold harmless PG&E from any proceeding, penalties, and remedial costs resulting from a violation by such undersigned third party of the requirements of the San Joaquin Valley O&M.

If the undersigned third party violates this Compliance Agreement, the San Joaquin Valley O&M HCP, the section (10) (a) (1) (B) permit, or the section 2081 (b) permit, then it shall bear responsibility for and the cost of remedying any injury to listed species caused by its actions. The undersigned third party shall be responsible to USFWS, CDFG, and PG&E for the performance of the remedial actions applicable to its activities. The undersigned third party shall be responsible under the terms of the Compliance Agreement for fully reimbursing PG&E for all costs associated with any and all remedial actions and related procedures that PG&E elects to carry out to address unmet obligations under the HCP that are the result of the third party's actions. PG&E will report any third party activities that are inconsistent with the HCP, the section (10) (a) (1) (B) permit, or the section 2081 (b) permit, to USFWS and CDFG.

Figure 2-2
Sample Compliance Agreement

Any remedial actions taken by the undersigned third party or PG&E shall be consistent with the requirements of the HCP. Remedial actions that occur subsequent to violations shall ensure that the biological functions and values for the listed species affected will be established to the same extent as would have been anticipated had full compliance with the HCP occurred.

Technical violations of the San Joaquin Valley O&M HCP, the section (10) (a) (1) (B) permit, or the section 2081 (b) permit, that do not impair biological function and values shall result in only nominal assessments, such as the assessment and revision of monitoring and reporting procedures between the third party, USFWS, CDFG, and PG&E. It is intended that remedial actions be implemented in a graduated fashion, with repeated violations which demonstrate a pattern and practice of purposeful noncompliance resulting in termination of this Agreement. However, significant violations by a third party, that puts successful implementation of the HCP by PG&E and other third parties at risk, may result in termination of this agreement thereby eliminating coverage of the third party's activities under either or both the section 10(a) (1) (B) permit of the section 2081 (b) permit.

The parties have executed this Compliance Agreement and it is in effect as of the date last signed below.

BY _____ _____

SIGNATURE DATE

Director
PG&E

BY _____ _____

NAME (Please Print) TITLE

_____ _____

SIGNATURE DATE

_____

ADDRESS

_____

Figure 2-2
Continued

Definition of Third Parties

Third parties who may be covered by this HCP include PG&E's contractors who conduct O&M work in the natural vegetation throughout the San Joaquin Valley. These contractors could carry out any of the covered activities, though the largest activities are typically conducted with PG&E oversight. Prior to initiating ground disturbing activities in habitat of covered species, PG&E will require these parties to:

- Enter into a new or revised contract with PG&E that contains enforceable provisions committing the third party to comply with all provisions of this HCP; or
- Provide PG&E with copies of the appropriate environmental documentation or other proof of authorization for take if in an area where take may occur.

The HCP administrator will maintain a record of all contractors working in the Plan Area, the status of whether and how they are covered by this HCP, and copies of any independent environmental documentation submitted by PG&E contractors. PG&E will add the list of contractors performing O&M work in the Plan Area to the annual reporting process.

Maintenance on Compensation Lands

This HCP identifies multiple ways that PG&E can achieve its compensation objectives. These mechanisms may be combined in various configurations, including purchase of compensation lands, purchase of mitigation credits from existing mitigation banks, placement of conservation easements on PG&E lands, and purchase of conservation easements. In the course of purchasing compensation lands, placing conservation easements on PG&E lands, or purchasing conservation easements, PG&E may have an ongoing obligation to maintain these parcels. In the course of conducting standard maintenance and monitoring of these lands (i.e., fencing, surveying, conducting biological surveys, conducting habitat enhancements, and driving on these lands) there is the remote possibility that take could occur. These activities and the potential for take are also covered by this HCP, including those management activities carried out by any independent land manager with whom PG&E has contracted to perform those activities on PG&E's behalf.

Chapter 3

Analysis of Habitat Disturbance for Covered Species

Temporary habitat disturbance and the associated potential for direct take of species are the primary potential impacts of PG&E's O&M activities. This chapter describes the approach used to estimate habitat disturbance for covered species, summarizes the habitat requirements of covered species, and estimates amounts of habitat to be disturbed by the covered activities. These estimates supported the development of the avoidance and minimization measures (AMMs)s and compensation described in Chapter 4 (*Conservation Strategy*) as well as the analysis of the effects (with implementation of AMMs) of O&M activities presented in Chapter 5 ("Effects Determination and Requested Take Authorization"). This chapter does not address potential injury or mortality to covered species; for this discussion, see Chapter 5.

Analysis of Habitat Disturbance Acreage

PG&E has developed a systematic approach to quantifying habitat disturbance from O&M activities. This approach addresses the gas and electric transmission and distribution systems and minor construction activities involving facilities within the plan area. It analyzes the effects of land-cover disturbance in areas potentially providing habitat for covered species. The impacts this approach has identified are the best available estimates of affected acreages; accordingly, the estimates developed through this approach have been used in preparation of this HCP.

For this HCP, quantifying activity effects entailed four steps:

1. describing O&M activities;
2. developing estimates of acreage disturbed for all O&M activities;
3. quantifying acreage disturbed for various land-cover types; and
4. evaluating the potential for activities to result in disturbance and loss of covered species habitat, based on the characteristics of disturbed areas and the distribution and habitat requirements of species.

The disturbance estimates will be used to anticipate the potential effects of PG&E covered activities, to ensure that mitigation precedes impacts, and to estimate effects of small activities. The actual acreage impacted will be verified through surveys associated with the covered activities >0.1 acre. Ongoing auditing and validation will also occur through the adaptive management program described in Chapter 6 ("Monitoring, Reporting, and Adaptive Management Program").

The process of estimating activity effects is described below.

Description of O&M Activities

PG&E assembled an HCP Advisory Group composed of its gas and electric transmission and distribution managers and PG&E experts throughout the San Joaquin Valley. This group prepared the initial activity descriptions that provided the basis for the descriptions of O&M activities presented in Chapter 2 ("Covered Activities"). These descriptions enabled PG&E to assess the extent of disturbances with some accuracy and ultimately to estimate the extent to which activities are likely to result in adverse effects on covered species.

Estimates of Acreage Disturbed by O&M Activities

Disturbances associated with O&M activities were categorized as causing permanent habitat loss or temporary habitat loss or as disturbances that do not cause habitat loss (i.e., other disturbances).

In general, disturbances cause permanent habitat loss through the placement of permanent aboveground facilities or construction of new roads, such as poles or substation expansions, in what was previously natural or agricultural land-cover. Permanent habitat loss can also occur through conversion to other natural land-cover types. However, with the exception of some disturbances in vernal pools, this is not a likely consequence of PG&E's O&M activities.

Temporary habitat loss is a result of temporary conversion of natural vegetation to disturbed land-cover through excavation, blading, crushing, or otherwise substantially altering the vegetation and soil surface. Such temporary conversions can substantially alter the habitat provided by that site, but habitat is expected to recover within 1 to 3 years.

Some disturbances do not cause habitat loss but could potentially contribute to other forms of take, particularly in the absence of AMMs[1]. For example, pruning

[1] It should be noted that PG&E has multiple existing environmental programs and practices, including Best Management Practices (BMPs) that are routinely implemented during PG&E's O&M and minor construction activities and will apply to all activities. These programs address land use and planning practices, visual resources, biological resources, geology and soils, water quality protection, cultural resources protection, transportation and

trees away from wires could destroy a nest of a listed bird species. These were classified as other disturbances (i.e., disturbances not causing habitat loss). Disturbances attributable to off-road travel by rubber-tired vehicles, during patrols and inspections for example, and to pruning and clearing of vegetation away from existing structures, were not considered sufficiently intense or concentrated spatially to cause habitat loss and were included in this category. In some cases (e.g., pruning and clearing vegetation) these activities recur annually or at other regular intervals on the same lands and maintain the vegetation in a relatively stable state. In addition to less-intensive disturbances, the other disturbance category included all disturbances in agricultural lands, other than the placement of permanent structures. Because it is regularly disturbed by standard agricultural practices, the habitat provided by agricultural fields is not substantially altered by PG&E's O&M activities (excluding the placement of permanent structures). Similarly, all disturbance in developed and disturbed lands was included in the other disturbance category because the habitat value of developed and disturbed lands is not substantially altered by PG&E's activities.

Estimates of the area disturbed by each type of O&M and minor construction activity were based on interviews and estimates provided by the HCP Advisory Group. The frequency, area disturbed per activity, total acreage disturbed by each activity type, and the sum of all disturbance acreages are presented in Table 3-1. These acreages represent direct effects. Because of the temporary nature, small or dispersed area, and often low intensity of the disturbances associated with O&M activities, indirect effects were considered to be generally insufficient to permanently, or temporarily, eliminate habitat in areas adjacent to disturbances. Indirect effects are further discussed in Chapter 5 ("Effects Determinations and Requested Take Authorization").

Total disturbance acreages are the product of the frequency of activities and their per-activity disturbance acreage. O&M and minor construction activities associated with electrical facilities will result in approximately three times greater temporary and permanent disturbance than gas facilities. Table 3-1 also indicates that medium- and large-disturbance activities (i.e., those typically disturbing ≥ 0.1 acre) account for the majority of total land disturbance. Table 3-2 shows the disturbance acreages by facility type: transmission or distribution.

The specific locations at which O&M activities will occur, and thus where impacts could occur, are not known; however, existing information is sufficient to estimate the overall effects on land-cover types as described below.

Disturbance of Land-Cover Types by County

For each land-cover type, estimates of the area disturbed were developed using a GIS database to integrate the estimates of acreages disturbed by O&M activities

circulation, hazardous materials, environmental justice, clean-up and restoration of work areas, and BMPs for vegetation management.

(described above) with information on facility locations and the distribution of land-cover types in counties within the plan area.

Determination of Facilities in Land-Cover Types

The GIS database assembled for this analysis consists of four primary data layers: the HCP plan area boundary, county boundaries, PG&E facilities, and land cover. PG&E intersected the locations of its transmission and distribution facilities with the land-cover data layer to determine the length of facilities located in each land-cover type, by county, in the plan area.

Gas distribution facility data are not available on GIS, and thus the distribution of these facilities among land-cover types was estimated using other information. According to three PG&E division managers, approximately 90% of gas distribution facilities are located within urban areas, and the remaining 10% of facilities are located within 5 miles of urban areas. Therefore, it was assumed that 90% of gas distribution facilities were in the urban land-cover category and that the remaining 10% of facilities were distributed among other land-cover types in proportion to the area they occupied within 5 miles of urban areas. For land within 5 miles of the San Joaquin Valley's largest urban areas, the GIS database was used to quantify the proportion of land area within each land-cover type. These proportions were used to partition 10% of the miles of gas distribution facilities among the non-urban land-cover types: miles of gas distribution facilities in a land-cover type was calculated as 10% of total gas distribution mileage multiplied by the proportion of land within 5 miles of an urban area in that land-cover type.

Tables 3-3 through 3-6 show the length of facilities and their breakdown by county and land-cover type. However, more detailed facility data, such as valve and pole locations, could not be incorporated into the GIS dataset because such information has not yet been collected. The total grid of facilities is expected to be mapped using global positioning system (GPS) technology within the next 5 years.

As indicated by Tables 3-3 through 3-6, most PG&E facilities are in agricultural, urban, and grassland land-cover types. Fifty percent of gas transmission facilities occur within agricultural areas, 23% within urban areas, and 22% within grassland areas (Table 3-3). Forty-seven percent of electric transmission facilities occur within agricultural areas, 34% within grassland areas, and 12% within urban areas (Table 3-4). Forty-one percent of electric distribution facilities occur within agricultural areas, 31% within urban areas, and 21% within grassland areas (Table 3-5). Gas distribution facilities occur primarily within urban areas (90%), with 7% in agricultural areas and 2% in grassland areas (Table 3-6).

The occurrence of facilities in some land-cover types may be overstated or understated because of the limitations of the GIS data used. For example, outside urban areas, roads are included in areas mapped as natural land cover. Because

Table 3-1. Estimated Annual Acreages of Disturbance for PG&E O&M Activities in the San Joaquin Valley HCP Area[1]

Activity	Frequency/ Year[2]	Area Disturbed/Event (acres)[3,4]			Acreage Affected in Plan Area (acres)[4]			Basis for Estimate
		Permanent Loss (PL)[5]	Temporary Loss (TL)[6]	Other Disturbance[7]	Permanent Loss (PL)[5]	Temporary Loss (TL)[6]	Other Disturbance[7]	
Gas								
G1. Patrols	1	–	–	89.8	–	–	89.9	*Other Disturbance* consists of off-road travel by light trucks or ATVs. Approximately 95% of system length is accessible by existing roads or is patrolled on foot or by fixed-wing aircraft or helicopters. The facility length is approximately 9,876.68 miles. Assumed an average width of 7.5 ft is disturbed by vehicles during off-road travel, and that one-fifth of system patrolled per year.
G2. Inspections	1	–	–	22.7	–	–	22.7	*Other Disturbance* consists of off-road travel by light trucks or ATVs. Approximately 95% of facilities are accessible by existing roads. The remaining 5% (493.8 miles) is patrolled 4 times per year in 15 areas. Assumed an average width of 7.5 ft is affected by vehicles during off-road travel, and that average distance of off-road travel is 1,000 ft.
G3. Remedial Maintenance	10	0.057	0.57	0.011	0.57	5.7	0.11	TL is for excavation of 0.57 acre area. PL per event represents 50-by-50-ft area lost in reinforcing facilities to protect against vandalism. *Other Disturbance* is attributable to off-road travel by light trucks required for about 5% of events, and it is assumed that a 10-ft-by-1,000-ft area is affected on average.
G4. Compressor Station Maintenance	0.2	–	–	–	–	–	–	Facilities are fenced and access is via existing roads. Thus, no disturbance of natural vegetation.
G5. Pipeline ETS	7	–	0.002	0.011		0.016	0.08	Each event involves surface disturbance of 10-by-10-ft area (100 square ft). *Other Disturbance* is the same as for activity G3.

Table 3-1. Continued

Activity	Frequency/ Year[2]	Area Disturbed/Event (acres)[3,4]			Acreage Affected in Plan Area (acres)[4]			Basis for Estimate
		Permanent Loss (PL)[5]	Temporary Loss (TL)[6]	Other Disturbance[7]	Permanent Loss (PL)[5]	Temporary Loss (TL)[6]	Other Disturbance[7]	
G6. Valve Recoating	2	–	0.115	0.011		0.23	0.02	TL attributable to excavation (50-by-50-ft) and laydown (50-by-50-ft) areas. *Other Disturbance* is the same as for activity G3.
G7. Valve Replacement	5	–	0.574	0.011	–	2.87	0.06	TL attributable to excavation (150-by-150-ft) and laydown (50-by-50-ft) areas. *Other Disturbance* is the same as for activity G3.
G8. Cathodic Protection	5	0.09	0.689	0.011	0.45	3.443	0.06	TL is for installation of cable from pipeline to anode bed, which affects a 30-ft-wide and 1000-ft-long corridor. PL is for 50-by-75-ft-fenced area above anode bed. *Other Disturbance* is the same as for activity G3.
G9. Pipeline Lowering	0.3	–	18.183	0.034	–	5.455	0.01	TL is for 1 mile of pipeline because of construction and access, which affects a 100-ft-wide corridor along pipeline. *Other Disturbance* is attributable to off-road travel required for about 5% of events, and it is assumed that a 10-ft-by-1,000-ft area is affected on average, and that a mile of pipeline lowering (one "event" in this table) typically involves three different locations.
G10. Pipeline Coating Replacement	0.2	–	12.121	0.034	–	2.424	0.01	TL is for 1 mile of pipeline because of construction and access, which affects a 100-ft-wide corridor along pipeline. The number of miles per year is based on field experience. *Other Disturbance* is the same as for activity G9.
G11. Pipeline Replacement	1	–	12.121	0.034	–	12.121	0.03	TL is for 1 mile of pipeline because of construction and access, which affects a 100-ft-wide corridor along pipeline. The number of miles per year is based on field experience. Other Disturbance*Other Disturbance* is the same as for activity G9.

Table 3-1. Continued

Activity	Frequency/ Year[2]	Area Disturbed/Event (acres)[3,4] Permanent Loss (PL)[5]	Temporary Loss (TL)[6]	Other Disturbance[7]	Acreage Affected in Plan Area (acres)[4] Permanent Loss (PL)[5]	Temporary Loss (TL)[6]	Other Disturbance[7]	Basis for Estimate
G12. Telecom Site Maintenance	1	–	0.23	–	–	0.23	–	TL is for 100-ft-by-100 ft work area. Access is via existing roads or helicopter.
G13. Vegetation Management	1.25	–	1.8	–	–	2.25	–	TL is for 1 mile of pipeline because of all vegetation management activities within (on average) a 25-ft-wide corridor of which 10 ft is occupied by a road. Frequency is based on an assumed return interval of 10 years within tree- and shrub-dominated cover types. Vegetation management of other land cover types was assumed negligible. Off-road access is within the disturbed area.
Gas Subtotals	–	–	–	–	1.02	34.74	113	
Electric								
E1. Patrols	1	–	–	338	–	–	338	*Other Disturbance* consists of off-road travel by light trucks, ATVs, or on foot. Approximately 95% of system length is accessible by existing roads or is patrolled on foot or by helicopter. It is assumed that an average width of 5 ft is disturbed by vehicles during off-road travel, and that 33.3% of distribution and 87.5% of transmission systems are patrolled per year.
E2. Inspections	1	–	–	338	–	–	338	*Other Disturbance* is the same as for activity E1.
E3. Insulator Washing	2	–	–	–	–	–	–	No disturbance of natural vegetation because insulators are washed from existing roads by a truck- or trailer-mounted spray system, or by helicopter.

Activity	Frequency/ Year[2]	Area Disturbed/Event (acres)[3,4]			Acreage Affected in Plan Area (acres)[4]			Basis for Estimate
		Permanent Loss (PL)[5]	Temporary Loss (TL)[6]	Other Disturbance[7]	Permanent Loss (PL)[5]	Temporary Loss (TL)[6]	Other Disturbance[7]	
E4. Substation Maintenance	1	–	–	–	–	–	–	No disturbance of natural vegetation because work occurs inside existing fences. Access is via existing roads.
E5. Outage Repair	4,000	–	0.0115	0.0115	–	45.92	45.9	TL for repairs based on assumption of 10-by-50-ft area affected on average. *Other Disturbance* is attributable to off-road travel by light trucks required for about 5% of events, and it is assumed that a 10-ft-by-1,000-ft area is affected on average.
E6. Tower Replacement or Repair	360	–	0.080	0.011	–	28.93	4.13	TL is for crane footprint (25-by-40-ft) and work (25-by-100-ft) areas. *Other Disturbance* is the same as for activity E5.
E7. Trans System Repair (Shoo-Fly)	100	–	0.057	0.011	–	5.74	1.15	TL is for a work area (25 by 100 ft) that is frequently required. *Other Disturbance* is the same as for activity E5.
E8. Pole & Equipment Repair or Replacement	1,000	–	0.032	0.011	–	32	11.48	Work affects a 20-ft-by-70 ft area adjacent to existing pole. *Other Disturbance* is the same as for activity E5.
E9. Electric Line Reconductoring	225	–	0.574	0.121	–	129.15	27.27	TL is for tension and pull sites. Approximately 1/3 of activities require 200-ft-by-300-ft tension and pull sites, and 2/3 require 50-ft-by-150-ft sites. *Other Disturbance* is attributable to off-road travel required for about 5% of events, and it is assumed that a 10-ft-by-2-mi area is affected on average.

Activity	Frequency/ Year[2]	Area Disturbed/Event (acres)[3,4]			Acreage Affected in Plan Area (acres)[4]			Basis for Estimate
		Permanent Loss (PL)[5]	Temporary Loss (TL)[6]	Other Disturbance[7]	Permanent Loss (PL)[5]	Temporary Loss (TL)[6]	Other Disturbance[7]	
E10. Vegetation Management								
E10a. Routine Maintenance	373	–	–	1.65	–	–	616	*Other Disturbance* is for access, and pruning trees and removal of hazard trees to maintain mandated clearances around lines (0.06 acre/mile access on average, 1.59 acres/mile tree pruning or removal). About 95% of system length is accessible from existing roads, and for remaining 5%, it is assumed that a 10-ft-wide corridor is crossed by trucks once every 3 years. Area of pruning is based on width and length of different line types in woody land cover, 3-year return interval, and assumption that 20% of land is covered by trees requiring pruning. Hazard tree removal is based on height and life span of dominant tree species, and assumption that no more than 25% of canopy dominants will ever be identified as hazardous during their lifetime. Pruning and hazard tree removal were not considered TL because returning regularly to prune sites maintains site conditions and recurring disturbance is of low intensity and diffuse.
E10b. Pole Clearing	100,000	–	–	0.023	–	–	2,252	*Other Disturbance* is for access and maintenance of 10 ft cleared zone around poles (0.0135 acres access, 0.009 acre vegetation clearing). About 95% of system length is accessible from existing roads, and for remaining 5%, it is assumed that a 10-ft-wide corridor is crossed by trucks annually. Clearing around poles was not considered TL because annual clearance of vegetation maintains site conditions, and disturbance is of low intensity and diffuse.

Activity	Frequency/ Year[2]	Area Disturbed/Event (acres)[3,4]			Acreage Affected in Plan Area (acres)[4]			Basis for Estimate
		Permanent Loss (PL)[5]	Temporary Loss (TL)[6]	Other Disturbance[7]	Permanent Loss (PL)[5]	Temporary Loss (TL)[6]	Other Disturbance[7]	
E10c. Removal Projects	30	–	0.1	0.011	–	3	0.34	TL is for hand crew removal of select trees. About 10% of vegetation is disturbed at a site. *Other Disturbance* is the same as for activity E5.
E10d. Transmission Vegetation/ROW Maintenance	30	–	2.12	0.011	–	63.6	0.34	TL is for hand crew removal of trees along overhead facilities. Assumed 50% of vegetation disturbed. *Other Disturbance* is the same as for activity E5.
E11. Test and Treat (Remedial Maintenance)	60,000	–	0.001	0.005	–	60	278	Work affects <10 square ft adjacent to existing pole. About 95% of transmission system length is accessible from existing roads, and for remaining 5% it is assumed that a 10-ft-wide corridor is crossed by light trucks.
Electric Subtotals	–	–	–	–	0	368.3	2,936[8]	
Minor Construction								
G14. Gas Pressure Limiting Station	0.2	0.57	0.517	0.011	0.114	0.10	0.002	TL is for lay down (100-by-100-ft) and construction corridor (100-by-125-ft) areas. PL for fenced facility (250-by-100-ft). *Other Disturbance* is the same as for activity G3.
G15. Gas Valve Installation	0.2	–	0.273	0.011	–	0.05	0.002	TL is for excavation (125-by-75-ft) and lay down (50-by-50-ft) areas. *Other Disturbance* is the same as for activity G3.
G16. Gas Pipeline Construction	5	–	12.121	0.034	–	60.6	0.172	TL for 1 mile of pipeline attributable to construction and access, which affects a 100-ft-wide corridor along pipeline. *Other Disturbance* is the same as for activity G9.

Activity	Frequency/ Year[2]	Area Disturbed/Event (acres)[3,4]			Acreage Affected in Plan Area (acres)[4]			Basis for Estimate
		Permanent Loss (PL)[5]	Temporary Loss (TL)[6]	Other Disturbance[7]	Permanent Loss (PL)[5]	Temporary Loss (TL)[6]	Other Disturbance[7]	
E12. Elec. Pole Line Construction	30	0.121	0.98	0.12	3.63	29.4	3.6	TL is for poles (39 by 39 ft each, 15 per mile), tension sites (61 by 61 ft), pull sites (61 by 61 ft), a lay down area (71 by 71 ft) and relocation activities (0.16 acres), associated with 1 mile of pole line construction. PL is for construction of new access road (10 ft wide), which was assumed necessary at 10% of sites. *Other Disturbance* is attributable to off-road travel required for about 10% of events, and it is assumed that a 10-ft-by-1,000-ft area is affected on average, and that a mile of pipeline construction (one "event" in this table) typically involves three different locations.
E13. Elec. Tower Line Construction	2	0.2	0.86	0.121	0.4	1.72	0.242	TL is for 1 mile of tower line because of towers (25 by 100 ft each, 5 per mile), tension and pull sites (50 by 150 ft), and a lay-down area (100 by 100 ft). *Other Disturbance* is attributable to off-road travel required for about 10% of events, and it is assumed that a 10-ft-by-1,000-ft area is affected on average.
E14. Elec. Substation Construction	1	0.25	–	–	0.25	–	–	PL is for substation expansion. This is anticipated to amount to approximately 7.5 acres over 30 years, which is 0.25 acre per year. Access is via existing roads.
E15. Elec. Underground Tower Line Construction	0.1	–	–	–	–	–	–	TL, PL and Other Disturbance are given as 0 acres because this infrequent activity is not anticipated outside of urban areas, and thus does not affect species' habitat.
Construction Subtotals	–	–	–	–	4.39	91.9	4.02	
Grand Totals:	–	–	–	–	5.41	495	3,052[8]	

Notes:

[1] Disturbance areas assumed to be distributed uniformly throughout PG&E facilities by facility type because exact work locations are unknown.

[2] Provided by PG&E staff unless otherwise noted in Basis for Estimate.

[3] Derived from Description of O&M Activities (Chapter 2), personal communications with PG&E staff, and assumptions noted in Basis for Estimate.

[4] Disturbances are classified on the basis of their predominant effect on natural land-cover resulting from their duration, intensity, and spatial concentration. However, in some cases, the disturbance resulting from a particular activity may have different effects depending on land-cover type (e.g., excavation causing temporary habitat loss in an upland grassland but permanent habitat loss in a vernal pool). These distinctions that are dependent on land-cover type are incorporated into and noted in subsequent tables.

[5] In this table, permanent losses result from disturbances causing permanent conversion to developed land-cover. In particular land-cover types, habitat for a species also can be permanently lost as a result of other effects (e.g., excavation through an intact soil restrictive layer underlying a vernal pool). These additional permanent losses are also incorporated into and noted in subsequent tables.

[6] In this table, temporary losses result from disturbances altering natural land-cover sufficiently to temporarily convert natural land-cover to disturbed land or otherwise cause an alteration of land-cover likely to have a measurable effect on habitat value for covered species . Because such disturbances generally do not substantially alter the land-cover and habitat attributes of agricultural fields, urban, other developed, and disturbed lands, they are not considered to cause temporary habitat loss in those land-cover types. This distinction is incorporated into and noted in subsequent tables.

[7] In this table, the Other Disturbance category includes areas directly affected by disturbances that are not sufficiently intense or concentrated spatially to cause temporary habitat loss, but that may contribute to other forms of take (e.g., nest destruction and access).

[8] *Other Disturbance* attributable to off-road travel associated with E1, E2, E10a and E11 take place within the same corridor disturbed by off-road travel associated with activity E10b (which is 1,352 acres in area), and thus is not included in the total to avoid double-counting. (Off-road travel associated with E10a is 22.6 acres.) Off-road travel associated with other activities is more likely to fall outside of this corridor and thus is included within the electric subtotal for Other Disturbance.

Table 3-2. Annual Disturbance Acreages by Facility Type[1]

	Total Acreage Affected (acres) [2]					Acreage Affected by Transmission O&M (acres)			Acreage Affected by Distribution O&M (acres)		
Activity	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance	Percentage Transmission (%)[3]	Percentage Distribution (%)[3]	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance
Gas											
G1. Patrols	–	–	89.9	90	10	–	–	80.81	–	–	8.98
G2. Inspections	–	–	22.7	100	0	–	–	22.67	–	–	0
G3. Remedial Maintenance	0.57	5.7	0.11	80	20	0.46	4.56	0.09	0.11	1.14	0.02
G4. Compressor Station Maintenance	–	–	–	100	0	–	–	–	–	–	–
G5. Pipeline ETS	–	0.02	0.08	80	20	–	0.01	0.06	–	<0.01	0.02
G6. Valve Recoating	–	0.23	0.02	100	0	–	0.23	0.02	–	0	0
G7. Valve Replacement	–	2.87	0.06	90	10	–	2.58	0.05	–	0.29	0.01
G8. Cathodic Protection	0.45	3.44	0.06	90	10	0.41	3.10	0.05	0.05	0.34	0.01
G9. Pipeline Lowering	–	5.46	0.01	100	0	–	5.46	0.01	–	0	0
G10. Pipeline Coating Replacement	–	2.42	0.01	100	0	–	2.42	0.01	–	0	0
G11. Pipeline Replacement	–	12.12	0.03	80	20	–	9.70	0.03	–	2.42	0.01
G12. Telecom Site Maintenance	–	0.23	–	80	20	–	0.18	–	–	0.05	–
G13. Vegetation Management	–	2.25	–	80	20	–	1.80	–	–	0.45	–

Table 3-2. Continued

	Total Acreage Affected (acres) [2]					Acreage Affected by Transmission O&M (acres)			Acreage Affected by Distribution O&M (acres)		
Activity	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance	Percentage Transmission (%)[3]	Percentage Distribution (%)[3]	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance
G14. Gas Pressure Limiting Station	0.11	0.10	<0.01	100	0	0.11	0.10	<0.01	0	0	<0.01
G15. Gas Valve Installation	–	0.05	<0.01	80	20	–	0.04	<0.01	–	0.01	<0.01
G16. Gas Pipeline Construction	–	60.6	0.17	80	20	–	48.48	0.14	–	12.12	0.03
Gas Subtotal—All Except Woody Vegetation Management	1.13	93.24	113	–	–	0.98	76.87	103.95	0.16	16.37	9.07
Woody Vegetation Management (G13)	–	2.25	–	–	–	–	1.8	–	–	0.45	–
Gas Totals	1	95	113	–	–	1	79	104	<1	17	9
Electric											
E1. Patrols	–	–	338	25	75	–	–	84.41	–	–	253.22
E2. Inspections	–	–	338	25	75	–	–	84.41	–	–	253.22
E3. Insulator Washing	–	–	–	90	10	–	–	–	–	–	–
E4. Substation Maintenance	–	–	–	30	70	–	–	–	–	–	–
E5. Outage Repair	–	45.92	45.9	30	70	–	13.77	13.77	–	32.14	32.14

Table 3-2. Continued

	Total Acreage Affected (acres) [2]					Acreage Affected by Transmission O&M (acres)			Acreage Affected by Distribution O&M (acres)		
Activity	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance	Percentage Transmission (%)[3]	Percentage Distribution (%)[3]	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance
E6. Tower Replacement or Repair	–	28.93	4.13	100	0	–	28.93	4.13	–	0	0
E7. Trans System Repair (Shoo-Fly)	–	5.74	1.15	100	0	–	5.74	1.15	–	0	0
E8. Pole and Equipment Repair or Replacement	–	32	11.48	0	100	–	0	0	–	32.00	11.48
E9. Electric Line Reconductoring	–	129.15	27.27	70	30	–	90.41	19.09	–	38.75	8.18
E10. Vegetation Management											
E10a. Routine Maintenance	–	–	616	25	75	–	–	153.92	–	–	461.76
E10b. Pole Clearing	–	–	2,252	25	75	–	–	562.89	–	–	1,688.68
E10c. Removal Projects	–	3	0.34	100	0	–	3	0.34	–	0	0
E10d. Transmission Vegetation/ROW Maintenance	–	63.6	0.34	100	0	–	63.6	0.34	–	0	0
E11. Test and Treat (Remedial Maintenance)	–	60	278	1	99	–	0.60	2.78	–	59.40	275.28
E12. Elec. Pole Line Construction	3.63	29.4	3.6	0	100	–	0	0	3.63	29.4	3.60

Table 3-2. Continued

	Total Acreage Affected (acres) [2]					Acreage Affected by Transmission O&M (acres)			Acreage Affected by Distribution O&M (acres)		
Activity	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance	Percentage Transmission (%)[3]	Percentage Distribution (%)[3]	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance
E13. Elec. Tower Line Construction	0.4	1.72	0.24	100	0	0.40	1.72	0.24	0	0	0
E14. Elec. Substation Construction	0.25	–	–	30	70	0.08	–	–	0.18	–	–
E15. Elec. Underground Tower Line Construction	–	–	–	50	50	–	–	–	–	–	–
Electric Subtotal—All Except Woody Vegetation Management (E10a, E10c and E10d)	4.28	332.50	2,345.37	–	–	0.48	140.81	601.28	3.81	191.69	1,744.084
Electric Subtotal—Woody Vegetation Management (E10a, E10c and E10d)	–	66.60	593.76	–	–	–	66.60	148.96	–	–	444.80
Electric Total	4.28	399	2,939	–	–	1	207	750	4	192	2,634

	Total Acreage Affected (acres) [2]					Acreage Affected by Transmission O&M (acres)			Acreage Affected by Distribution O&M (acres)		
Activity	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance	Percentage Transmission (%)[3]	Percentage Distribution (%)[3]	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance
Combined Gas and Electric Totals	5.28	494	3.052	–	–	2	286	854	5	209	2,643

Notes:

[1] Values in table may not sum to totals because of round-off error and overlap in areas affected by Other Disturbance (see Note 4 below). (Values were not rounded off during intermediate steps in calculations.)

[2] Basis for values given in Table 3-1.

[3] Based on information provided by PG&E staff.

[4] Other disturbance due to off-road travel associated with E1, E2, E10a and E11 take place within the same corridor disturbed by off-road travel associated with activity E10b (which is 1,352 acres in area), and thus is not included in the total to avoid double–counting. (Off-road travel associated with E10a is 22.6 acres.) Off-road travel associated with other activities is more likely to fall outside of this corridor and thus is included within the electric subtotal for other disturbance.

Table 3-3. Mapped Linear Miles of Gas Transmission Facilities by County by Land-Cover Type

Land Cover	County									Grand Total	Percent of Total
	Fresno	Kern	Kings	Madera	Mariposa	Merced	San Joaquin	Stanislaus	Tulare		
Agricultural Fields	298.06	106.70	23.06	51.70	0.00	65.26	170.16	60.33	0.00	775.28	50.01%
Blue Oak Woodland	1.45	0.06	1.01	0.00	0.00	0.42	1.41	0.14	0.00	4.49	0.29%
Blue Oak/Foothill Pine	1.76	0.00	0.00	0.00	0.00	0.07	0.29	0.32	0.00	2.43	0.16%
Coastal Oak Woodland	0.00	0.00	0.22	0.00	0.00	0.45	0.00	0.10	0.00	0.77	0.05%
Conifer	0.03	0.00	0.00	0.04	0.00	0.00	0.03	0.00	0.00	0.10	0.01%
Grassland	58.53	84.89	41.57	19.73	0.00	21.28	85.57	33.16	0.00	344.73	22.24%
Montane Hardwood	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.05	0.00%
Open Water	0.84	0.62	0.00	0.80	0.00	1.10	4.00	2.48	0.00	9.83	0.63%
Other Developed and Disturbed Land	4.20	0.62	2.26	5.69	0.00	12.15	10.16	15.53	0.00	50.60	3.26%
Permanent Freshwater Wetland	0.18	0.22	0.00	0.21	0.00	0.00	0.40	0.08	0.00	1.09	0.07%
Seasonal Wetland	0.62	0.35	0.00	0.20	0.00	0.60	0.25	0.10	0.00	2.12	0.14%
Upland Scrub	0.00	1.39	1.34	0.00	0.00	0.00	0.00	0.05	0.00	2.78	0.18%
Urban	89.38	35.88	5.47	29.11	0.00	35.08	85.05	74.82	0.00	354.77	22.88%
Valley Oak Woodland	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.01%
Woody Riparian Habitat	0.00	0.00	0.00	0.13	0.00	0.00	0.83	0.08	0.00	1.04	0.07%
Grand Total	**455.03**	**230.91**	**74.92**	**107.61**	**0.00**	**136.39**	**358.15**	**187.24**	**0.00**	**1,550.26**	**100.00%**

Table 3-4. Mapped Linear Miles of Electric Transmission Facilities by County by Land-Cover Type

Land Cover	County									Grand Total	Percent of Total
	Fresno	Kern	Kings	Madera	Mariposa	Merced	San Joaquin	Stanislaus	Tulare		
Agricultural Fields	809.42	447.77	160.26	125.41	0.46	167.74	279.15	130.31	45.72	2,166.24	47.22%
Blue Oak Woodland	42.89	4.42	3.40	8.59	11.53	7.73	3.92	2.19	8.78	93.45	2.04%
Blue Oak/Foothill Pine	15.88	0.00	2.49	12.01	8.33	3.16	1.65	0.74	0.00	44.24	0.96%
Coastal Oak Woodland	0.00	0.04	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.18	0.00%
Conifer	0.35	0.20	0.16	0.06	6.36	0.03	0.39	0.85	0.12	8.52	0.19%
Grassland	204.52	447.09	114.37	66.98	24.20	220.33	240.91	197.70	19.13	1,535.22	33.46%
Montane Hardwood	10.65	0.05	0.00	8.09	11.72	1.47	1.23	0.76	1.03	35.00	0.76%
Open Water	4.06	2.28	1.14	0.70	0.28	5.26	8.37	1.37	0.18	23.65	0.52%
Other Developed and Disturbed Land	4.72	3.70	1.56	2.21	0.00	14.10	11.23	4.43	5.14	47.10	1.03%
Permanent Freshwater Wetland	0.44	1.88	0.40	0.11	0.00	0.50	0.70	0.33	0.00	4.35	0.09%
Seasonal Wetland	0.47	0.65	0.14	0.00	0.00	0.37	0.70	0.59	0.12	3.04	0.07%
Upland Scrub	3.85	18.27	6.49	1.01	18.34	1.00	0.33	0.82	0.26	50.37	1.10%
Urban	110.06	127.51	37.03	23.78	0.26	35.75	164.29	26.57	2.42	527.68	11.50%
Valley Oak Woodland	0.00	43.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.20	0.94%
Woody Riparian Habitat	3.36	0.15	0.30	0.14	0.00	0.06	0.87	0.84	0.00	5.72	0.12%
Grand Total	**1,210.66**	**1,097.22**	**327.72**	**249.10**	**81.48**	**457.64**	**713.73**	**367.50**	**82.91**	**4,587.96**	**100.00%**

Table 3-5. Mapped Linear Miles of Electric Distribution Facilities by County and Land-Cover Type

	County										
Land Cover	Fresno	Kern	Kings	Madera	Mariposa	Merced	San Joaquin	Stanislaus	Tulare	Grand Total	Percent of Total
Agricultural Fields	32.77	2,284.92	685.14	900.30	0.95	1,120.51	1,332.41	336.78	518.23	7,212.01	40.72%
Blue Oak Woodland	70.70	7.82	0.03	89.04	68.69	16.74	10.70	13.32	24.16	301.18	1.70%
Blue Oak/Foothill Pine	29.81	0.00	0.28	73.06	55.82	0.37	1.46	10.41	0.00	171.22	0.97%
Coastal Oak Woodland	0.00	0.07	0.08	0.00	0.00	0.85	0.00	0.03	0.00	1.03	0.01%
Conifer	2.04	1.09	1.73	3.54	22.62	1.74	3.49	0.88	1.40	38.53	0.22%
Grassland	401.31	1,121.83	304.03	397.24	103.85	469.75	574.46	196.77	125.63	3,694.88	20.86%
Montane Hardwood	1.05	0.45	0.00	77.85	158.05	9.88	2.84	4.11	2.03	256.26	1.45%
Open Water	5.58	7.95	3.27	6.60	1.37	20.11	30.81	6.07	0.84	82.60	0.47%
Other Developed and Disturbed Land	23.61	11.15	6.04	19.87	0.00	88.53	59.08	27.68	2.10	238.07	1.34%
Permanent Freshwater Wetland	2.85	3.46	1.16	0.43	0.00	5.94	3.04	0.64	0.34	17.85	0.10%
Seasonal Wetland	4.46	3.25	0.05	0.11	0.00	7.19	2.46	0.73	0.57	18.82	0.11%
Upland Scrub	11.58	31.04	4.30	16.52	35.60	3.86	1.34	2.00	0.80	107.04	0.60%
Urban	1,080.95	1,453.83	166.95	478.22	24.47	542.95	1,365.35	240.67	99.61	5,453.00	30.79%
Valley Oak Woodland	0.00	99.93	0.00	0.00	0.00	0.00	0.00	0.03	0.00	99.96	0.56%
Woody Riparian Habitat	4.83	0.49	0.70	1.70	0.00	3.34	6.08	3.35	0.09	20.60	0.12%
Total by County	**1,671.55**	**5,027.29**	**1,173.75**	**2,064.49**	**471.42**	**2,291.76**	**3,393.53**	**843.49**	**775.80**	**17,713.07**	**100.00%**

Table 3-6. Linear Miles of Gas Distribution Facilities by County by Land-Cover Type

	County										
Land Cover	Fresno	Kern	Kings	Madera	Mariposa[b]	Merced	San Joaquin	Stanislaus	Tulare[b]	Total	Percent Total
Agricultural Fields	164.64	82.34	1.50	17.23		49.80	136.72	112.18		564.42	6.78%
Blue Oak Woodland	0.00	0.10	0.00	0.03		0.09	0.00	0.00		0.24	0.00%
Blue Oak/Foothill Pine	0.55	0.00	0.00	0.14		0.41	0.46	0.38		1.94	0.02%
Coastal Oak Woodland	0.00	0.06	0.00	0.00		0.00	0.00	0.00		0.06	0.00%
Conifer	0.19	48.72	0.89	0.00		0.01	0.16	0.13		50.11	0.60%
Grassland	67.62	0.12	0.00	5.07		14.66	56.15	46.07		189.68	2.28%
Montane Hardwood	0.00	0.30	0.01	0.04		0.12	0.00	0.00		0.46	0.01%
Open Water	3.26	0.24	0.00	0.10		0.29	2.71	2.22		8.82	0.11%
Other Developed and Disturbed Land	3.00	0.01	0.00	0.34		0.98	2.49	2.05		8.88	0.11%
Permanent Freshwater Wetland	0.64	0.05	0.00	0.02		0.05	0.53	0.43		1.73	0.02%
Seasonal Wetland	0.26	0.00	0.00	0.01		0.03	0.21	0.18		0.69	0.01%
Upland Scrub	0.00	1.97	0.03	0.01		0.02	0.00	0.00		2.03	0.02%
Urban	2,172.42	1,206.38	22.03	207.85		600.80	1,804.05	1,480.25		7,493.78	90.00%
Valley Oak Woodland	0.01	0.10	0.00	0.00		0.00	0.01	0.00		0.12	0.00%
Woody Riparian Habitat	1.21	0.02	0.00	0.10		0.29	1.01	0.83		3.46	0.04%
Grand Total[c]	**2,413.80**	**1,340.42**	**24.48**	**230.94**	**0.00**	**667.56**	**2,004.50**	**1,644.72**	**0.00**	**8,326.42**	**100.00%**

[a] Based on conversations with three PG&E district managers, 90% of gas distribution facilities were assumed to be in the urban land-cover category. Within each county, the remaining 10% of facility miles were distributed among non-urban land-cover types by multiplying 10% of gas distribution facility length in a county by the proportion of land within 1 mile of urban areas that is within each non-urban land-cover type. For land within 1 mile of urban areas, the proportion of area within each land cover type was calculated by GIS for the largest urban areas and used as an estimate of the proportions for all urban areas in the HCP Plan Area.

[b] Mariposa and Tulare Counties are outside PG&E's service area, and no gas distribution facilities occur there.

[c] Total linear miles of distribution facilities by county were provided by PG&E and are from the 2001 Franchise Mileage Report.

facilities are often located in roadside areas that may be disturbed by O&M activities, the area of disturbance attributed to natural land-cover types is likely overstated. Metadata for the land-cover layer are provided in Appendix A.

Calculation of Disturbance Acreages for Land-Cover Types

The acreage disturbed in each land-cover type was calculated by multiplying facility length in the land-cover type by the disturbance acreage per mile of facility. As described above, three GIS layers (county, facility, and land cover) were used to determine the length of facility types in each land-cover type by county (Figure 3-1, Tables 3-3 through 3-6). In calculating the disturbance acreage per mile of facility, with the exception of activity types E10a, E10c, E10d and G13, it was assumed that activities will be uniformly distributed throughout the plan area because the exact locations where activities might occur are unknown. Activities E10a, E10c and E10d are restricted to electric transmission facilities in land-cover types dominated by trees, and G13 is restricted to gas facilities in tree- or shrub-dominated land-cover types. Therefore, disturbance attributable to activities E10a, E10c, E10d, and G13 were distributed only among those land-cover types, and as a result disturbance per mile of PG&E electric transmission facility is greater in tree-dominated land-cover types, and disturbance per mile of gas facility is greater in tree- and shrub-dominated land-cover types.

This approach to estimating disturbance in land-cover types essentially distributes total disturbance across land-cover types in proportion to the mileage of each facility type in each land-cover type (i.e., disturbance of a land-cover type equals total disturbance times the proportion of all facilities that are in that land-cover type). For example, because 22% of gas transmission facilities were in grassland, 22% of all disturbances attributable to gas transmission were estimated to be in grassland.

The calculation of the acreage disturbed in each land-cover type was performed separately by facility type for permanent and temporary land-cover type conversion (i.e., permanent and temporary losses) and for other disturbances. For each facility type, Table 3-7 displays the annual acreage of temporary and permanent disturbance per mile of facility. Disturbance per mile was calculated by dividing total disturbance by total facility length. (As previously described, total disturbance is a sum of the products of activity type frequency and area disturbed per activity.) To provide the acreage disturbed annually in each land-cover type, for each facility type, the facility length in the land-cover type was multiplied by the disturbance acreage per mile of facility and the products (which represent the disturbance attributable to each facility type) were then summed. Table 3-8 shows the results of these calculations. This methodology provides the most accurate quantification of potential impacts based on available data. More accurate or detailed analysis would require more detailed spatial data on individual facility locations or impacts and on distributions of habitat; such data

are not readily available. Consequently, these estimates constitute the best available scientific data for summarizing the general impacts by land-cover type and county within the HCP plan area; this summary accordingly provides the basis for analyzing the effects of habitat disturbances on covered species. These estimates may be adjusted in the future as part of the adaptive management process (see Chapter 6, "Monitoring, Reporting, and Adaptive Management Program").

Analysis of Disturbance to Vernal Pools

To estimate potential direct disturbance of vernal pools, an additional GIS analysis was performed. Vernal pools, which provide important habitat for many covered species, occur as small areas within grassland and other land-cover types; consequently, vernal pools are not a separate category within the GIS data layer for land-cover and in the disturbance estimates based on that data layer (Table 3-8). Accordingly, other data regarding vernal pool distribution were used in an additional analysis to estimate the vernal pool acreage that could be disturbed in the absence of AMMs. Two GIS data layers—the PG&E facility layer and the Holland mapping of vernal pool densities in the Central Valley (Holland 1996)—formed the basis for this analysis. These data layers were intersected to determine the miles of PG&E facilities crossing areas of high, medium, and low vernal pool density. Because the locations of gas distribution facilities are not mapped, the length of these facilities crossing vernal pool areas was estimated by multiplying their length in each land cover type (estimated as described previously) by the proportion of each land cover type in each vernal pool density category.

To determine the acres of land disturbed within areas containing vernal pools, the facility length in areas of each vernal pool density class was multiplied by the acres of disturbance per mile for each facility type (Table 3-7). As previously described, the disturbance per mile was calculated for each facility type by dividing the total area disturbed by the system's O&M activities by the total length of the system's facilities. In these calculations, disturbances associated with activities G8, G14, G15, G16, E12, E13, and E14, and causing temporary losses in other natural land-cover types, were considered to cause permanent loss of vernal pools. These activities could involve excavation in pools not previously excavated and thus could cause permanent effects by damaging the restrictive soil layer underlying these pools.

To estimate the acreage of vernal pools disturbed, the acres of land disturbed within areas containing vernal pools was multiplied by the proportion of these areas occupied by vernal pools. Based on the description of each density class in Holland (1996), 1%, 5%, and 10% of the area in low-, medium-, and high-density classes, respectively, were considered to be occupied by vernal pools. The results of this analysis are summarized in Table 3-9. This information forms the basis for characterizing effects on vernal pool invertebrates and plants.

Table 3-7. Disturbance Acreage per Mile of Facility for the Four Facility Types

Facility Type	Permanent Loss (acres/yr)[1,2]	Temporary Loss (acres/yr)[1,2]	Other Disturbance (acres/yr)[1,2]	Facility Length (miles)[3]	Permanent Loss per Mile of Facility (acres/mile)	Temporary Loss per Mile of Facility (acres/mile)	Other Disturbance per Mile of Facility (acres/mile)
Gas Transmission							
Woody Vegetation Management (G13[4])	–	1.80	–	12[5]	–	0.151899	–
All Other O&M Activities	0.98	76.87	103.95	1,550	0.000632	0.049585	0.067053
Gas Distribution							
Woody Vegetation Management (G13[4])	–	0.45	–	58[5]	–	0.007705	–
All Other O&M Activities	0.16	16.37	9.07	8,326	0.000019	0.001966	0.001089
Electric Transmission							
Woody Vegetation Management (E10a, c, & d[6])	–	66.6	148.96	230[7]	–	0.289163	0.646752
All other O&M Activities[5]	0.48	140.81	601.28	4,588	0.000105	0.030691	0.131056
Electric Distribution							
Woody Vegetation Management (E10a, c, & d[6])	–	–	444.8	889[7]	–	–	0.500473
All Other O&M Activities	3.81	191.69	1,744.08	17,713	0.000215	0.010822	0.098463

Notes:

1 Based on values in Table 3-2.

2 In this table, disturbances were categorized as permanent loss, temporary loss, or other disturbance based on their typical effect on most natural land-cover types. Permanent loss of natural land-cover (and associated habitat) occurs primarily through permanent conversion to developed land-cover. Temporary loss of land-cover occurs primarily through temporary conversion to disturbed land-cover. Other disturbance includes all other disturbances that do not substantially alter land-cover but may contribute to other forms of take (e.g., nest destruction). The effects of disturbances in agricultural fields, urban and other developed lands, and vernal pools differ from the effects in other land-cover types, and these differences are incorporated into and noted in subsequent tables.

3 Values are from Tables 3-3 through 3-6.

[4] Activity G13 is largely restricted to tree- or shrub-dominated vegetation types (i.e., oak woodlands, riparian and conifer forests, and upland scrub); thus, in tree- or shrub-dominated land-cover types, disturbance per mile of gas facility is the sum of that attributable to G13 and all other activities, while in other land-cover types disturbance per mile is attributable only to other activities, not G13.

[5] Because activity G13 is restricted to tree- or shrub-dominated land-cover types (i.e., oak woodlands, riparian and conifer forests, upland scrub), disturbance attributable to this activity is only distributed across the miles of gas facilities in these land-cover types, which is the mileage given here (and this mileage is based on values in Tables 3-3 to 3-6).

[6] Activities E10a, c, and d are restricted to tree-dominated habitats (i.e., oak woodlands, riparian, and conifer); thus, in tree-dominated land-cover types disturbance per mile of electric transmission facility is the sum of that attributable to E10 and all other activities, while in other land-cover types disturbance per mile is attributable only to other activities, not E10.

[7] Because activities E10a, c, and d are restricted to tree-dominated land-cover types (i.e., oak woodlands, riparian, conifer), disturbance attributable to this activity is only distributed across the miles of electric transmission facilities in these land cover types, which is the mileage given here (and this mileage is based on values in Tables 3-3 to 3-6).

Table 3-8. Estimated Annual Land-Cover Type Effects by County (Acres)[1,2,3]

Land Cover	Disturbance Type	County									
		Fresno	Kern	Kings	Madera	Mariposa	Merced	San Joaquin	Stanislaus	Tulare	Grand Total
Agricultural Fields[4]	Permanent Loss	<1	1	<1	<1	0	<1	<1	<1	<1	2
	Temporary Loss	–	–	–	–	–	–	–	–	–	–
	Other Disturbance	170	335	103	125	<1	157	211	65	64	1,231
Blue Oak Woodland	Permanent Loss	<1	<1	<1	<1	<1	<1	<1	<1	<1	1
	Temporary Loss	15	2	1	4	4	3	2	1	3	34
	Other Disturbance	76	8	3	60	50	16	10	10	21	253
Blue Oak/Foothill Pine	Permanent Loss	<1	0	<1	<1	<1	<1	<1	<1	0	1
	Temporary Loss	6	0	1	5	3	1	1	<1	0	17
	Other Disturbance	30	0	2	53	40	3	2	7	0	137
Coastal Oak Woodland	Permanent Loss	0	<1	<1	0	0	<1	0	<1	0	<1
	Temporary Loss	0	<1	<1	0	0	<1	0	<1	0	<1
	Other Disturbance	0	<1	<1	0	0	1	0	<1	0	1
Conifer	Permanent Loss	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Temporary Loss	<1	1	<1	<1	2	<1	<1	<1	<1	4
	Other Disturbance	1	1	1	2	18	1	2	1	1	30
Grassland	Permanent Loss	<1	<1	<1	<1	<1	<1	<1	<1	<1	1
	Temporary Loss	14	30	9	7	2	13	18	10	2	105
	Other Disturbance	70	175	48	49	13	77	94	48	15	588
Montane Hardwood	Permanent Loss	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Temporary Loss	3	<1	<1	3	5	<1	<1	<1	<1	14
	Other Disturbance	9	<1	<1	53	104	7	3	3	2	181
Open Water	Permanent Loss	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Temporary Loss	<1	<1	<1	<1	<1	<1	1	<1	<1	2
	Other Disturbance	1	1	<1	1	<1	3	4	1	<1	12

Table 3-8. Continued

Land Cover	Disturbance Type	County									
		Fresno	Kern	Kings	Madera	Mariposa	Merced	San Joaquin	Stanislaus	Tulare	Grand Total
Other Developed and Disturbed Lands[5]	Permanent Loss	–	–	–	–	–	–	–	–	–	–
	Temporary Loss	–	–	–	–	–	–	–	–	–	–
	Other Disturbance	4	2	1	3	0	13	9	6	1	40
Permanent Freshwater Wetland	Permanent Loss	<1	<1	<1	<1	0	<1	<1	<1	<1	<1
	Temporary Loss	<1	<1	<1	<1	0	<1	<1	<1	<1	<1
	Other Disturbance	<1	1	<1	<1	0	1	<1	<1	<1	2
Seasonal Wetland (excluding vernal pools)	Permanent Loss	<1	<1	<1	<1	0	<1	<1	<1	<1	<1
	Temporary Loss	<1	<1	<1	<1	0	<1	<1	<1	<1	<1
	Other Disturbance	1	<1	<1	<1	0	1	<1	<1	<1	2
Upland Scrub	Permanent Loss	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Temporary Loss	<1	1	1	<1	1	<1	<1	<1	<1	3
	Other Disturbance	2	6	1	2	6	1	<1	<1	<1	17
Urban[5]	Permanent Loss	–	–	–	–	–	–	–	–	–	–
	Temporary Loss	–	–	–	–	–	–	–	–	–	–
	Other Disturbance	153	188	25	60	3	71	192	44	11	747
Valley Oak Woodland	Permanent Loss	<1	<1	0	0	0	0	<1	<1	0	<1
	Temporary Loss	<1	15	0	0	0	0	<1	<1	0	15
	Other Disturbance	<1	93	0	0	0	0	<1	<1	0	93
Woody Riparian	Permanent Loss	<1	<1	<1	<1	0	<1	<1	<1	<1	<1
	Temporary Loss	1	<1	<1	<1	0	<1	1	<1	<1	2
	Other Disturbance	6	<1	1	1	0	2	4	3	<1	17
Total Permanent Loss		<1	1	<1	<1	<1	<1	1	<1	<1	4
Total Temporary Loss		40	49	12	20	18	18	22	12	5	196

Land Cover	Disturbance Type	County									
		Fresno	Kern	Kings	Madera	Mariposa	Merced	San Joaquin	Stanislaus	Tulare	Grand Total
Total Other Disturbance		523	810	186	409	235	353	533	187	116	3,352
Permanent Loss of Natural Land-Cover		**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**1**
Temporary Loss of Natural Land -Cover		**40**	**49**	**12**	**20**	**18**	**18**	**22**	**12**	**5**	**196**
Other Disturbance of Natural Land-Cover		**196**	**286**	**56**	**221**	**232**	**111**	**120**	**73**	**39**	**1,334**

Notes:

[1] Totals may not sum because of rounding.

[2] Vernal pool data not included in this analysis.

[3] Values are the sum of the products of the miles of each facility in each county in each land-cover type (Tables 3-3 to 3-6) times the disturbance per mile of the facility type in the land-cover type (Table 3-7).

[4] Disturbances causing temporary conversion of natural land-cover to disturbed land (i.e., temporary loss) were not considered to cause temporary loss of agricultural fields. Therefore, the acreage affected by these disturbances is included in the other disturbance category for the agricultural land-cover type.

[5] Disturbances causing temporary and permanent loss of natural land-cover types were not considered to cause loss of urban and other developed and disturbed lands. Therefore, the acreage affected by these disturbances is included in the other disturbance category for these land-cover types.

Table 3-9. Estimated Annual Acreage of Vernal Pool Habitat Disturbed[1,2]

System	County									
	Fresno	Kern	Kings	Madera	Mariposa	Merced	San Joaquin	Stanislaus	Tulare	Total
Gas Transmission										
Permanent Loss[3]	<0.001	0	0	0.009	0	0.007	0.007	0.003	0	0.027
Temporary Loss	<0.001	0	0	0.004	0	0.003	0.004	0.001	0	0.013
Other Disturbance	<0.001	0	0	0.018	0	0.013	0.015	0.006	0	0.052
Gas Distribution										
Permanent Loss[3]	0.011	0.006	<0.001	0.001	0	0.003	0.009	0.007	0	0.038
Temporary Loss	0.003	0.002	<0.001	0.010	0	0.028	0.084	0.069	0	0.348
Other Disturbance	0.008	0.004	<0.001	0.001	0	0.002	0.006	0.005	0	0.027
Electric Transmission										
Permanent Loss[3]	<0.001	<0.001	<0.001	0.001	<0.001	0.001	0.001	<0.001	<0.001	0.004
Temporary Loss	0.021	0.001	0.026	0.047	0.002	0.083	0.058	0.019	0.013	0.270
Other Disturbance	0.089	0.005	0.113	0.203	0.008	0.357	0.250	0.083	0.057	1.164
Electric Distribution										
Permanent Loss[3]	0.003	<0.001	0.002	0.006	<0.001	0.016	0.004	0.001	0.003	0.036
Temporary Loss	0.014	0.001	0.011	0.031	0.001	0.077	0.021	0.007	0.016	0.178
Other Disturbance	0.149	0.011	0.112	0.333	0.016	0.825	0.224	0.072	0.172	1.914
Total										
Permanent Loss[3]	0.014	0.006	0.003	0.017	<0.001	0.026	0.021	0.0120	0.003	0.104
Temporary Loss	0.038	0.004	0.037	0.083	0.003	0.164	0.085	0.030	0.029	0.473
Other Disturbance[4]	0.247	0.020	0.225	0.555	0.023	1.197	0.495	0.167	0.229	3.16

Notes:

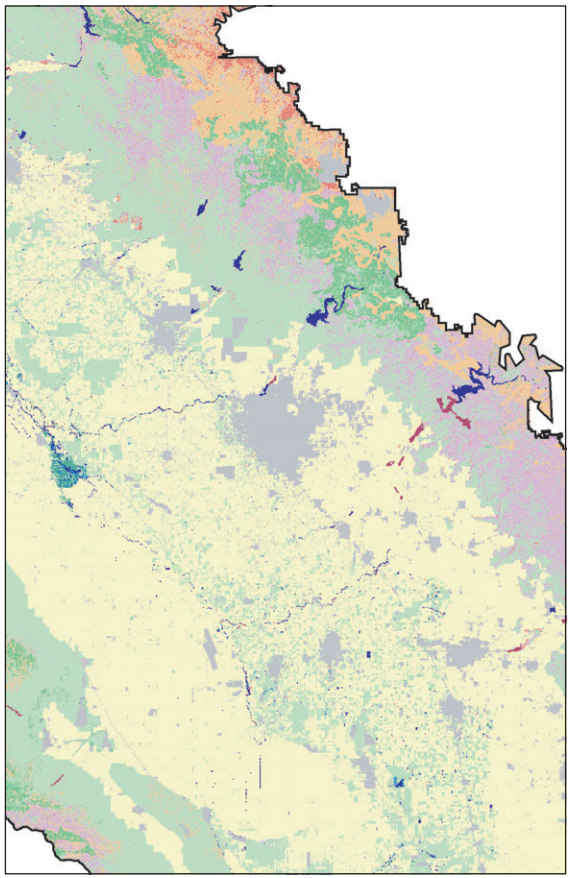
[1] Acreages are for vernal pool areas within worksites (including access corridors) but not their surrounding watersheds.

[2] Values may not sum exactly to totals because of round-off error. (Values were not rounded off during intermediate steps in calculations.)

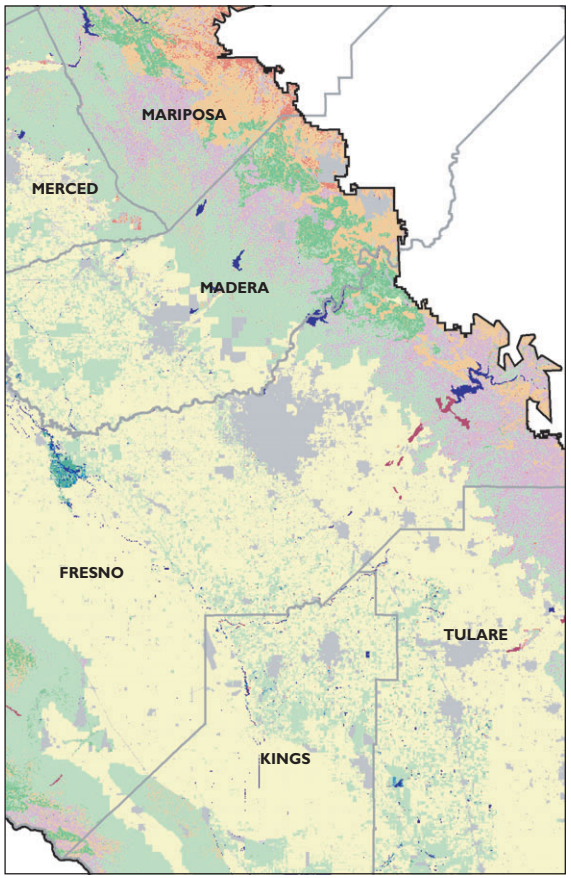
[3] O&M activities potentially excavating areas not previously excavated were considered to permanently alter vernal pools. Consequently, disturbance associated with activities G8, G14, G15, G16, E12, E13, and E14 was considered to cause permanent loss of vernal pools (i.e., for these activities disturbance temporarily altering other land-cover types was considered to permanently alter vernal pools).

[4] Other disturbance is non-compensable because it does not result in habitat loss. Avoidance and minimization measures and permanent mitigation for temporary effects offset these potential effects.

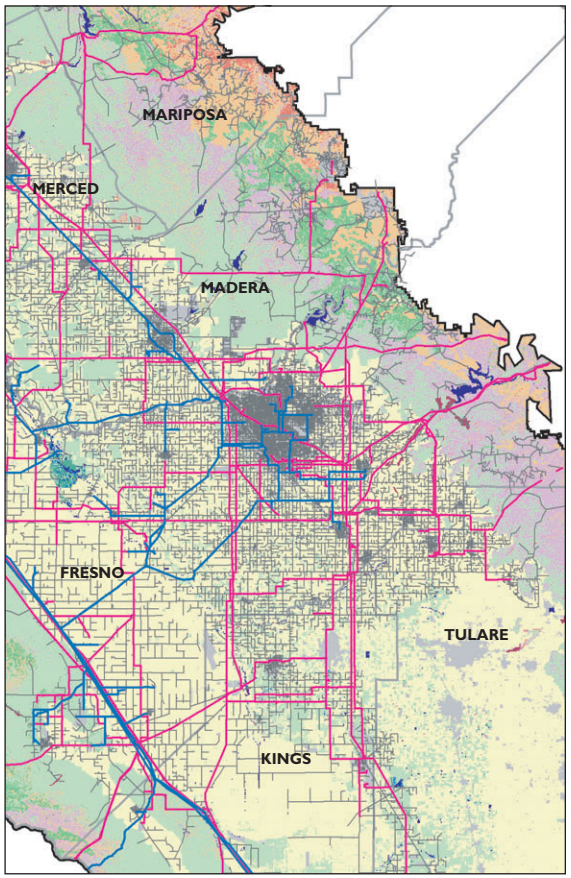
GIS Overlays



Land-Cover Layer



Land-Cover Layer + County Layer



Land-Cover Layer + County Layer + Facility Layer

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Jones & Stokes

Figure 3-1
Example Land-Cover Type
Facility Analysis

These estimates are of the area within worksites of activities causing permanent or temporary losses or other disturbance to vernal pools. However, at some sites, additional hydrologically connected areas also will be affected. These indirect effects are expected to be less than the direct effects because of the temporary nature and often low intensity of the disturbances, the small dispersal areas affected by disturbances, and PG&E's implementation of best management practices.

Summary of Land-Cover Type Effects

An estimate of the potential land-cover type disturbance associated with PG&E's O&M in the San Joaquin Valley for all activities is provided in Table 3-8 (except for estimated disturbance of vernal pools, which is shown in Table 3-9). More than 90% of existing facilities are located in agricultural, urban, or grassland land-cover types—the most common types in the plan area; consequently, almost all O&M effects occur in these land-cover types. Although relatively little disturbance occurs in riparian vegetation, both streams and PG&E facilities are linear features on the landscape, and thus the disturbance to woody riparian vegetation could involve 5–15 stream-crossings per year, affecting approximately 0.1 to 0.5 acre each. Compensation for these effects is outlined in Chapter 4 ("Conservation Strategy").

It is possible that limited land-cover type conversions due to O&M activities could occur through the introduction of invasive weeds. However, PG&E's existing biological resource protection program and the AMMs proposed later in this HCP include measures to minimize the spread of invasive weeds. Also, because most O&M activities have been occurring for years on previously disturbed sites, and because most O&M activities occur on a landscape populated with non-native and invasive plants, very small and few land-cover type conversions are expected due to continued O&M.

Other disturbances could similarly result in direct effects to covered species; however, the habitat effects associated with these activities are not sufficiently intense or concentrated spatially to cause habitat loss and PG&E's existing biological resource protection program and the AMMs proposed later in this HCP include measures to help avoid and minimize these effects.

Estimation of Habitat Disturbance for Covered Wildlife Species

This section describes the methodology for using land-cover disturbance estimates and species information to estimate the extent of O&M–related habitat disturbance and loss for covered wildlife species.

Percent of Land-Cover Types Considered Habitat for Covered Species

The acreage of a species' habitat disturbed by O&M activities is the product of the acreage disturbed within each land-cover type and the portion of each land-cover type that provides habitat for that species. The estimated disturbance of land-cover types described in the preceding section, and shown in Table 3-9, was used in these calculations. However, the monitoring program and the AMMs outlined in Chapter 4 ("Conservation Strategy") are designed to reduce habitat losses to less than these estimates. The portion of each land-cover type considered likely to provide suitable habitat was based on the literature and professional judgment regarding the distribution of the covered species and their habitat requirements (Appendices B and C). For each species, the specific rationale used to estimate the percent of land area suitable for occupancy within each land-cover type is described in the following sections. The resulting determinations of the percent of habitat considered suitable for occupancy for each wildlife species are provided in Table 3-10. To calculate the estimated annual disturbance of a given species' habitat in each land-cover type in each county, the percentage of a land-cover type that provides suitable habitat for that species (Table 3-10) was multiplied by the area disturbed annually within that land-cover type (Table 3-8). To provide the estimate of total annual disturbance of the species habitat, these estimates of habitat disturbance in each land-cover type were summed. The estimates of annual disturbance of habitat for each covered species (by county) are presented in Table 3-11.

For species with designated (or proposed) critical habitat, the acreage of disturbance in critical habitat also was estimated through a GIS-based analysis. Data layers of the location of PG&E facilities, land-cover, and geographic boundaries of critical habitat were combined to determine the length of PG&E facilities inside critical habitat boundaries and in natural land-cover types. (Agricultural, urban, and other developed and disturbed lands were not considered suitable habitat for these species and thus were excluded from the analysis.) These facility lengths were then multiplied by the appropriate disturbance area per mile as described previously for the overall analysis of habitat effects. The results of these calculations are presented in Table 3-12.

Vernal Pool and Midvalley Fairy Shrimp and Vernal Pool Tadpole Shrimp

These species occur mainly in vernal pools and swales in grassland habitats that pond for a sufficient period of time to enable the shrimp to complete their life cycle. Only a small percentage of grassland habitats (1–10%) contains vernal pools. Moreover, only a percentage of the area of vernal pools in the plan area is occupied by these species. For vernal pool and midvalley fairy shrimp, and vernal pool tadpole shrimp, a total of <1 acre of habitat would be temporarily lost, and <1 acre permanently lost, annually; in addition to these habitat losses,

Table 3–10. Estimate of Percentage of Habitat Considered Suitable for Occupancy [a, b]

Species Name	Legal Status[c]		Land Cover Type[d]													
	Federal	State	Agricultural Fields	Blue Oak Woodland	Blue Oak/ Foothill Pine	Coastal Oak Woodland	Conifer	Grassland	Montane Hardwood	Open Water	Other Developed and Disturbed Lands	Permanent Freshwater Wetland	Seasonal Wetland (including vernal pools)	Upland Scrub	Valley Oak Woodland	Woody Riparian
Vernal pool fairy shrimp[e] *Branchinecta lynchi*	T	–	–	–	–	–	–	–	–	–	–	–	30%	–	–	–
Midvalley fairy shrimp[e] *Branchinecta mesovallensis*	–	–	–	–	–	–	–	–	–	–	–	–	20%	–	–	–
Vernal pool tadpole shrimp[e] *Lepidurus packardi*	E	–	–	–	–	–	–	–	–	–	–	–	20%	–	–	–
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T	–	–	5%	5%	–	–	–	–	–	5%	–	–	–	5%	50%
California tiger salamander *Ambystoma californiense (A. tigrinum californiense)*	C	SSC	–	2%	–	2%	–	30%	–	5%	2%	10%	10%	–	2%	–
Limestone salamander *Hydromantes brunus*	SC	T	–	5%	5%	–	5%	–	5%	–	–	–	–	5%	–	–
California red–legged frog *Rana aurora draytoni*	T	SSC	–	5%	5%	5%	–	5%	–	5%	–	10%	–	–	–	–
Blunt–nosed leopard lizard *Gambelia (Crotaphytus) silus*	E	E	–	–	–	–	–	30%	–	–	–	–	–	10%	–	–
Giant garter snake *Thamnophis gigas*	T	T	5%	–	–	–	–	5%	–	5%	–	10%	–	–	–	–
Swainson's hawk *Buteo swainsoni*	–	T	25%	2%	–	–	–	25%	–	–	–	–	25%	–	2%	50%
White–tailed kite *Elanus caeruleus*	–	FP	10%	10%	–	–	–	10%	–	–	–	–	10%	–	10%	15%
Golden eagle *Aquila chrysaetos*	–	SSC	_	10%	_	_	_	10%	_	_	_	_	_	5%[f]	10%	_
Bald eagle *Pandion haliaetus*	FPD	SE	_	2%	2%	2%	2%	5%	_	10%	_	10%	5%	2%	2%	2%
Western burrowing owl *Athene cunicularia hypugea*	SC	SSC	1%	–	–	–	–	5%	–	–	1%	–	5%	5%	–	–
Bank swallow *Riparia riparia*	–	T	–	–	–	–	–	–	–	1%	–	–	–	–	–	2%
Tricolored blackbird *Agelaius tricolor*	SC	SSC	1%	5%	–	–	–	2%	–	–	–	5%	5%	–	–	–
Buena Vista Lake shrew *Sorex ornatus relictus*	E	SSC	–	–	–	–	–	–	–	–	–	5%	–	–	–	5%
Riparian brush rabbit *Sylvilagus bachmani riparius*	E	E	–	–	–	–	–	–	–	–	–	–	–	–	–	5%
Riparian (San Joaquin Valley) woodrat *Neotoma fuscipes riparia*	E	SSC	–	–	–	–	–	–	–	–	–	–	–	–	–	5%

Species Name	Legal Status[c]		Land Cover Type[d]													
	Federal	State	Agricultural Fields	Blue Oak Woodland	Blue Oak/ Foothill Pine	Coastal Oak Woodland	Conifer	Grassland	Montane Hardwood	Open Water	Other Developed and Disturbed Lands	Permanent Freshwater Wetland	Seasonal Wetland (including vernal pools)	Upland Scrub	Valley Oak Woodland	Woody Riparian
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	E	E	–	–	–	–	–	10%	–	–	–	–	–	–	–	10%
Giant kangaroo rat *Dipodomys ingens*	E	E	–	–	–	–	–	10%	–	–	–	–	–	–	–	10%
San Joaquin (Nelson's) antelope squirrel *Ammospermophilus nelsoni*	SC	T	–	–	–	–	–	50%	–	–	–	–	–	10%	–	–
San Joaquin kit fox *Vulpes macrotis mutica*	E	T	2%	2%	–	–	–	70%	–	–	–	–	20%	10%	2%	–

Notes:

[a] This table includes only covered species that may occur within the PG&E's San Joaquin Valley Habitat Conservation Plan area boundary. Estimate of percent suitable was based on information from Appendices B and C, discussion with Gary Burton of USFWS, and professional judgments of the following Jones & Stokes' senior wildlife biologists: Steve Avery, Stephanie Myers, Dan Airola, and Edward West.

[b] Sources of information for county distribution include the following:

- California Department of Fish and Games Natural Diversity Database (CNDDB 2001);
- Jennings and Hayes 1994 (Amphibian and Reptile Species of Special Concern in California);
- Jennings 1996 (Sierra Nevada Ecosystem Project: Status of Amphibians);
- USFWS 1998. Recovery Plan for Upland Species of the San Joaquin Valley, California;
- C. H. Erickson and B. Denton. 1999. Fairy Shrimps of California's Puddles, Pools, and Playas. Mad River Press, Inc. Eureka, California. 196 pp.; and
- Partners in Flight

[c] Status explanations:

Federal

E = Listed as endangered under the federal Endangered Species Act.
T = Listed as threatened under the federal Endangered Species Act.
C = Species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list.
SC = Species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.
P = Petitioned for listing as threatened or endangered under the federal Endangered Species Act.
FPD = Federally proposed for delisting.
– = No status.

State

E = Listed as endangered under the California Endangered Species Act.
T = Listed as threatened under the California Endangered Species Act.
FP = Fully protected under the California Fish and Game Code.
SSC = Species of special concern in California.
– = No status.

[d] This table includes land cover types that were mapped within the Plan Area

e For vernal pool fairy shrimp and vernal pool tadpole shrimp, 50% and 30% of vernal pools, respectively, were also considered suitable. (Vernal pool effects are summarized in Table 3–9)

f Under the Upland Shrub land cover type, this species is limited to alkali desert scrub habitat associations.

Table 3-11. Estimate of Acres of Habitat for Each Wildlife Species Disturbed Annually[1,2,3]

Species Common Name	Disturbance Type	County									
		Fresno	Kern	Kings	Madera	Mariposa	Merced	San Joaquin	Stanislaus	Tulare	Grand Total
Vernal pool fairy shrimp	Permanent Loss	<1	0	<1	<1	0	<1	<1	<1	<1	<0.1
	Temporary Loss	<1	0	<1	<1	0	<1	<1	1	<1	<0.5
	Other Disturbance	<1	0	<1	<1	0	1	<1	<1	<1	2
Midvalley fairy shrimp	Permanent Loss	<1	0	0	<1	0	<1	<1	0	0	<0.1
	Temporary Loss	<1	0	0	<1	0	<1	<1	0	0	<0.5
	Other Disturbance	<1	0	0	<1	0	1	<1	0	0	1
Vernal pool tadpole shrimp	Permanent Loss	<1	0	<1	<1	0	<1	0	<1	<1	<0.1
	Temporary Loss	<1	0	<1	<1	0	<1	0	<1	<1	<0.6
	Other Disturbance	<1	0	<1	<1	0	1	0	<1	<1	1
Valley elderberry longhorn beetle	Permanent Loss	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.01
	Temporary Loss	2	1	<1	<1	<1	<1	<1	<1	<1	4
	Other Disturbance	8	5	1	6	5	2	3	2	1	33
California tiger salamander	Permanent Loss	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.4
	Temporary Loss	4	9	3	2	1	4	5	3	1	33
	Other Disturbance	23	55	14	16	5	24	29	15	5	185
Limestone salamander	Permanent Loss	0	0	0	0	<1	0	0	0	0	<0.01
	Temporary Loss	0	0	0	0	1	0	0	0	0	1
	Other Disturbance	0	0	0	0	11	0	0	0	0	11
California red-legged frog	Permanent Loss	<1	<1	0	0	0	<1	<1	<1	0	<0.05
	Temporary Loss	2	2	0	0	0	1	1	1	0	6
	Other Disturbance	9	9	0	0	0	5	6	3	0	32
Blunt-nosed leopard lizard	Permanent Loss	<1	<1	<1	<1	0	<1	0	0	<1	<0.3
	Temporary Loss	4	9	3	2	0	4	0	0	1	23
	Other Disturbance	21	53	14	15	0	23	0	0	4	131
Giant garter snake	Permanent Loss	<1	0	0	<1	0	<1	<1	<1	0	<0.1
	Temporary Loss	1	0	0	<1	0	1	1	1	0	3
	Other Disturbance	12	0	0	9	0	12	16	6	0	54

Table 3-11. Continued

Species Common Name	Disturbance Type	County									
		Fresno	Kern	Kings	Madera	Mariposa	Merced	San Joaquin	Stanislaus	Tulare	Grand Total
Swainson's hawk	Permanent Loss	<1	<1	<1	<1	0	<1	<1	<1	<1	<1
	Temporary Loss	4	8	2	2	0	3	5	3	1	28
	Other Disturbance	64	130	38	45	0	60	79	30	20	466
White-tailed kite	Permanent Loss	<1	<1	<1	<1	0	<1	<1	<1	<1	<0.4
	Temporary Loss	3	5	1	1	0	2	2	1	1	15
	Other Disturbance	32	61	15	24	0	25	32	13	10	213
Golden eagle	Permanent Loss	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.2
	Temporary Loss	3	5	1	1	1	2	2	1	1	16
	Other Disturbance	15	28	5	11	7	9	10	6	4	94
Bald eagle	Permanent Loss	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.1
	Temporary Loss	1	2	1	1	<1	1	1	1	<1	7
	Other Disturbance	6	11	3	5	3	5	6	3	1	42
Western burrowing owl	Permanent Loss	<1	<1	<1	<1	0	<1	<1	<1	<1	<0.1
	Temporary Loss	1	2	<1	<1	0	1	1	1	<1	5
	Other Disturbance	5	12	4	4	<1	6	7	3	1	42
Bank swallow	Permanent Loss	0	0	0	0	0	0	<1	0	0	<0.01
	Temporary Loss	0	0	0	0	0	0	<1	0	0	<1
	Other Disturbance	0	0	0	0	0	0	<1	0	0	<1
Tricolored blackbird	Permanent Loss	<1	<1	<1	<1	0	<1	<1	<1	<1	<0.1
	Temporary Loss	1	1	<1	<1	0	<1	<1	<1	<1	4
	Other Disturbance	7	7	2	5	0	4	5	2	2	34
Buena Vista Lake shrew	Permanent Loss	0	<1	0	0	0	0	0	0	<1	<0.01
	Temporary Loss	0	<1	0	0	0	0	0	0	<1	<0.01
	Other Disturbance	0	<1	0	0	0	0	0	0	<1	<1
Riparian brush rabbit	Permanent Loss	0	0	0	0	0	0	<1	<1	0	<0.01
	Temporary Loss	0	0	0	0	0	0	<1	<1	0	<0.05
	Other Disturbance	0	0	0	0	0	0	<1	<1	0	<1
Riparian (San Joaquin Valley) woodrat	Permanent Loss	0	0	0	0	0	0	<1	<1	0	<0.01

Table 3-11. Continued

Species Common Name	Disturbance Type	County									
		Fresno	Kern	Kings	Madera	Mariposa	Merced	San Joaquin	Stanislaus	Tulare	Grand Total
	Temporary Loss	0	0	0	0	0	0	<1	<1	0	<0.05
	Other Disturbance	0	0	0	0	0	0	<1	<1	0	<1
Tipton kangaroo rat	Permanent Loss	0	<1	<1	0	0	0	0	0	<1	<0.1
	Temporary Loss	0	3	1	0	0	0	0	0	<1	4
	Other Disturbance	0	18	5	0	0	0	0	0	1	24
Giant kangaroo rat	Permanent Loss	<1	<1	<1	0	0	0	0	0	0	<0.1
	Temporary Loss	1	3	1	0	0	0	0	0	0	5
	Other Disturbance	7	18	5	0	0	0	0	0	0	30
San Joaquin (Nelson's) antelope squirrel	Permanent Loss	<1	<1	<1	<1	0	<1	0	0	<1	<0.5
	Temporary Loss	7	15	4	4	0	6	0	0	1	38
	Other Disturbance	35	88	24	25	0	38	0	0	7	218
San Joaquin kit fox	Permanent Loss	<1	<1	<1	<1	0	<1	<1	<1	<1	<1
	Temporary Loss	10	21	6	5	0	9	13	7	1	73
	Other Disturbance	54	130	36	38	0	57	70	35	12	433

Notes:

[1] Acres should not be summed across species as adding the above acreages would result in the impact acreage and species effects totaling more than 100% of the area disturbed.

[2] Acreages are the product of the acres disturbed in land cover types in a species' range (Table 3-8, and for vernal pool invertebrates Table 3-9 as well), and the percent of that land cover suitable as habitat (Table 3-10). Acreages are shown in terms of whole acres or less than 1 acre. Tenths of acres are shown in the grand total column to indicate the fraction of effects estimated.

[3] Other disturbance is non-compensable because it does not result in habitat loss. Avoidance and minimization measures and permanent mitigation for temporary effects offset these potential effects.

Table 3-12. Acreage of Critical Habitat Disturbed Annually by O&M Activities

Species	Total Area of Critical Habitat in Acres[1]	Disturbance Type[2]		
		Permanent Loss in Acres (%)[3]	Temporary Loss in Acres (%)[3]	Other Disturbance in Acres (%)[3]
Vernal pool fairy shrimp	70,218	0.01 (<0.01%)	2.22 (<0.01%)	10.92 (0.02%)
Vernal pool tadpole shrimp	42,819	0.00 (<0.01%)	0.59 (<0.01%)	2.94 (0.01%)
California tiger salamander	140,336	0.02 (<0.01%)	2.50 (<0.01%)	15.19 (0.01%)
California red-legged frog	330,358	0.02 (<0.01%)	4.90 (<0.01%)	19.77 (0.01%)
Buena Vista Lake shrew	4,657	0.00 (<0.01%)	0.28 (0.01%)	1.23 (<0.03%)
Fresno kangaroo rat	889	0.00 (<0.01%)	0.00 (<0.01%)	0.05 (0.01%)
Succulent owl's-clover	75,319	0.01 (<0.01%)	0.92 (<0.01%)	6.14 (0.01%)
Hoover's spurge	77,430	0.00 (<0.01%)	0.23 (<0.01%)	3.52 (<0.01%)
San Joaquin Valley Orcutt grass	3,5591	0.00 (<0.01%)	0.60 (<0.01%)	3.60 (0.01%)
Hairy Orcutt grass	18,182	0.00 (<0.01%)	0.00 (<0.01%)	0.02 (<0.01%)
Keck's checker-mallow	1,083	0.00 (<0.01%)	0.40 (0.04%)	1.14 (0.11%)
Greene's tuctoria	89,580	0.01 (<0.01%)	1.51 (<0.01%)	7.84 (0.01%)

[1] Area within the plan area.

[2] Acres of critical habitat affected (3 different columns) are the acres of natural vegetation affected within the critical habitat boundaries.

[3] The percent is the percent of the area within critical habitat that is represented by those affected.

other, less intensive, disturbances also would occur on an additional 2 acres of potentially suitable habitat (Table 3-11).

Valley Elderberry Longhorn Beetle

Elderberry shrubs, the host plant of valley elderberry longhorn beetle, occupy a small proportion of the area within oak and riparian woodland cover types; they occupy even less area in developed or disturbed lands. Although the shrubs occur most frequently in the drier areas of woody riparian habitat (U.S. Fish and Wildlife Service 1984), they are not usually dominant species but rather occupy a secondary layer in forest edges, openings, and the understory areas of dominant growth. Accordingly, it is estimated that 5% of blue oak woodland, blue oak/foothill pine, and valley oak woodland could be suitable for occupancy, and 50% of woody riparian habitat could be suitable for occupancy. Based on the amount of disturbance, linear miles of facilities in these habitats, and percent of habitat considered suitable for occupancy, this methodology indicates that <1 acre of habitat considered suitable for occupancy by valley elderberry longhorn beetle would be permanently lost as a result of O&M activities, and about 4 acres would be temporarily lost annually (Table 3-11). In addition to these habitat losses, other, less intensive, disturbances also would occur on 33 acres of potentially suitable habitat (Table 3-11). PG&E staff working on the VELB Conservation Program indicate that approximately 107 plants were affected in the San Joaquin Valley in 2002–2003.

Because the BO for VELB analyzes and mitigates for the potential effects from all routine operations and maintenance activities throughout PG&E's service territory, including the Plan Area, it is most germane to derive within the HCP a disturbance estimate only for the minor new construction activities that are not covered by the BO. PG&E summed the disturbance of the new construction activities for gas and electric (G14-16 and E12-15 from Table 3-2) and divided this total by the total disturbance of all activities (Table 3-2) to arrive at a relative percentage of disturbance due to new construction. This percentage was then multiplied by the species habitat effect numbers in Table 3-11 to arrive at an estimate of acres of habitat disturbed. 0.7 acres of VELB habitat could be temporarily affected annually and 0.01 acres permanently affected annually from minor new construction.

California Tiger Salamander

California Tiger Salamander (CTS) is found primarily in grassland areas; the species is less frequently associated with woodland habitats. CTS is dependent on seasonal aquatic habitat for breeding, particularly vernal pools and stock ponds that retain water for sufficient duration. Permanent ponds that support competing fish are not suitable. Adults spend considerable time in underground refugia, such as rodent burrows or soil cracks. Individuals may move up to 1 mile from aquatic habitat, but the density of individuals and potential for

occurrence at any site decreases with increasing distance from breeding sites. The availability of suitable aquatic breeding habitat is likely a factor limiting occupancy in otherwise suitable upland habitat. Accordingly, it is estimated that 30% of grassland, 2% of woodland, 5% of open water, and 10% of permanent freshwater and seasonal wetland habitats are potentially suitable habitat for the species (Table 3-10). A total of 33 acres of habitat throughout the plan area is expected to be temporarily lost and <1 acre permanently lost annually (Table 3-11). In addition to these habitat losses, other, less intensive, disturbances also would occur on an additional 185 acres of potentially suitable habitat (Table 3-11).

Limestone Salamander

This species has a very localized distribution in Mariposa County, where it is restricted to limestone outcrops on north-facing slopes. Suitable limestone microhabitat occupies a small proportion of the upland woodland, conifer, and shrub land-cover types in this county (Table 3-10). Based on the limited area of cover types that may support suitable microhabitat in Mariposa County and the low proportion of land within these cover types that provide the microhabitat required by the species (5%) (Table 3-10), it is predicted that only about 1 acre of suitable habitat would be temporarily lost and <1 acre would be permanently lost annually (Table 3-11). In addition to these habitat losses, other, less intensive, disturbances also would occur on an additional 11 acres of potentially suitable habitat (Table 3-11).

California Red-Legged Frog

California red-legged frogs may occupy a variety of habitats, but they are necessarily restricted to the vicinity of aquatic habitat within grassland and woodland habitats that is suitable for breeding. Suitable aquatic habitats support emergent and riparian vegetation and lack substantial populations of competing and predatory fish and bullfrogs. Because of the introduction of such species, most of the permanent wetland habitat and much of the seasonal wetland habitat in the plan area no longer support red-legged frogs. Although red-legged frogs may disperse into upland habitat during periods of soaking rains, they generally remain within 300 feet of aquatic habitat. Accordingly, upland areas more than 300 feet from suitable aquatic sites are not considered preferred habitat. O&M activities are not expected to disrupt dispersal; therefore, the proportion of grassland and oak woodland cover types considered suitable for this species (i.e., with unmapped area of suitable aquatic habitat) make up 5% of the total mapped land-cover type (Table 3-10). The 10% estimate of suitable permanent freshwater wetland shown in Table 3-10 is likely overstated in view of the limitations on suitability discussed above. Overall, about 6 acres of suitable habitat is expected to be temporarily lost and <1 acre permanently lost annually (Table 3-11). In addition to these habitat losses, other, less intensive,

disturbances also would occur on an additional 32 acres of potentially suitable habitat (Table 3-11).

Blunt-Nosed Leopard Lizard

Blunt-nosed leopard lizards are found throughout much of the grassland cover type in the southern portion of the plan area; 30% of this land-cover type could be suitable for occupancy. The species also occurs in valley sink scrub and valley saltbush scrub habitats. These habitats, however, make up only a small percentage of the shrub cover type within the plan area boundary and an even smaller percentage of cover type that intersects with PG&E facilities; 10% of shrub cover types were considered suitable. A total of about 23 acres of suitable habitat is expected to be temporarily lost and <1 acre permanently lost annually (Table 3-11). In addition to these habitat losses, other, less intensive, disturbances also would occur on an additional 131 acres of potentially suitable habitat (Table 3-11).

Giant Garter Snake

Giant garter snakes occupy freshwater marshes, ditches, and canals that support dense emergent vegetation; they use upland areas adjacent to suitable aquatic areas for basking and aestivation. They do not occur in areas of dense riparian vegetation. Only a small proportion of the permanent freshwater marsh (10%), open water (5%), grassland (5%), and agricultural (5%) cover types may support areas of emergent marsh that provide the necessary aquatic components for giant garter snake (Table 3-9). A total of about 3 acres of suitable habitat is expected to be temporarily lost and <1 acre permanently lost annually (Table 3-11). In addition to these habitat losses, other, less intensive, disturbances also would occur on an additional 54 acres of potentially suitable habitat (Table 3-11).

Swainson's Hawk

Swainson's hawks forage in agricultural lands, grasslands, and seasonal wetlands within 10 miles of suitable nesting habitat. Such conditions are lacking in some areas of the central and southern San Joaquin Valley. The hawks forage in row crops, alfalfa and hay fields, pastures, and open, flat grasslands, but they avoid orchards, vineyards, and cotton fields. Twenty-five percent of agricultural and grassland cover types, respectively, are considered suitable by the species (Table 3-10). A total of about 28 acres of suitable grassland habitat is estimated to be temporarily lost and <1 acre permanently lost each year (Table 3-11). In addition to these habitat losses, other, less intensive, disturbances also would occur on an additional 466 acres of potentially suitable habitat (Table 3-11).

White-Tailed Kite

White-tailed kites nest in isolated trees, stands, and woodlands that are associated with grassland, row crop, and pasture habitats. Suitable nesting habitat is therefore scattered throughout grassland and agricultural land-cover types. This species occurs in low densities in drier foothill annual grasslands and in oak woodlands. Suitable land-cover types within the plan area were estimated at 10% (Table 3-10). A total of about 15 acres of suitable habitat is expected to be temporarily lost and <1 acre permanently lost annually (Table 3-11). In addition to these habitat losses, other, less intensive, disturbances also would occur on an additional 213 acres of potentially suitable habitat (Table 3-11).

Golden Eagle

Golden eagles forage in grasslands, oak woodlands, and shrub habitats. They nest in prominent structures, large trees, and cliffs near suitable foraging habitat; these conditions are most common in the inner Coast Ranges or foothills. Because of fragmentation of habitat in the San Joaquin Valley, only a small proportion of the grassland cover type is considered suitable for occupancy by the species (Table 3-10). A total of 16 acres of grassland foraging habitat would be temporarily lost and <1 acre permanently lost per year (Table 3-11). In addition to these habitat losses, other, less intensive, disturbances also would occur on an additional 94 acres of potentially suitable habitat (Table 3-11).

Bald Eagle

Bald eagles typically forage over large open water areas, including rivers, lakes, or reservoirs that support abundant fish or waterbird prey, and nest within 1 mile of large water bodies. These conditions are lacking in large areas of the central and southern San Joaquin Valley. Because of specific habitat requirements and overall species population size, only a small proportion of the suitable land-cover types is considered suitable for occupancy by the species (Table 3-10). A total of 7 acres of grassland foraging habitat is expected to be temporarily lost and <1 acre permanently lost per year (Table 3-11). In addition to these habitat losses, other, less intensive, disturbances also would occur on an additional 42 acres of potentially suitable habitat (Table 3-11).

Western Burrowing Owl

Western burrowing owl occurs sporadically in the grassland cover type, in weedy habitats within grassland areas, and at the edges of developed areas. Burrowing owls sometimes use edges of croplands, but they are absent from most agricultural habitats (e.g., vineyards, orchards, rice, row crops), presumably because of rodenticide use, ground disturbance, and other human activities that disrupt habitat. Western burrowing owls make sporadic use of valley scrub

habitats. They are absent from chaparral and other dense or moderately dense shrub habitat. Suitable land cover types are estimated at 1–5% (Table 3-10). A total of about 5 acres of suitable habitat would be temporarily lost and <1 acre permanently lost per year (Table 3-11). In addition to these habitat losses, other, less intensive, disturbances also would occur on an additional 42 acres of potentially suitable habitat (Table 3-11).

Bank Swallow

Bank swallow occurrence is highly localized, presumably because of the lack of suitable eroded vertical bank habitat with sandy substrate along most San Joaquin Valley rivers and streams. This species has a low potential to occur at the edges of areas mapped as open water and riparian woodland, but the availability of suitable bank habitat is extremely limited within these areas. Suitable land-cover types are estimated at 1–2%. Substantially less than 1 acre of suitable habitat would be temporarily lost and much less than an acre permanently lost annually (Table 3-11). Other, less intensive, disturbances also would occur on <1 acre of suitable habitat (Table 3-11).

Tricolored Blackbird

Tricolored blackbirds nest in highly localized colonies in emergent wetland, wet Himalaya blackberry patches in irrigated pastures, and grainfields; therefore, only a small proportion (1–5%) of agricultural, grassland, blue oak woodland, permanent freshwater wetland, and seasonal wetland cover types is considered suitable for occupancy (Table 3-10). Tricolored blackbirds may use open grasslands for foraging during breeding season, but use is limited to areas within approximately 1 mile of nest sites. More widespread winter use of agricultural habitats was not considered in determining the percentage of suitable habitat because O&M disturbance of agricultural habitats was not considered sufficient to reduce the habitat value of these lands. An estimated 4 acres of suitable habitat would be temporarily lost and <1 acre permanently lost per year (including (Table 3-11). In addition to these habitat losses, other, less intensive, disturbances also would occur on an additional 34 acres of potentially suitable habitat (Table 3-11). (These estimates include potential foraging habitat during the nesting season.)

Buena Vista Lake Shrew

Buena Vista Lake shrew is known only from the Kern Lake Preserve area. It exhibits a preference for woody riparian habitat and the edges of freshwater marsh habitats. The percent of habitat considered suitable for occupancy is considered low (5%) where it occurs because of the limited extent of riparian and marsh cover types in the Buena Vista Lake Basin. Substantially less than 1 acre of suitable habitat would be temporarily or permanently lost per year (Table 3-

11). Other, less intensive, disturbances to potentially suitable habitat also occur on <1 acre per year (Table 3-11).

Riparian (San Joaquin Valley) Woodrat and Riparian Brush Rabbit

These species have very localized distributions within San Joaquin and Stanislaus Counties, the only counties where they are known to occur. They are restricted to larger remnants of dense riparian woodlands, which represent a very low proportion of the mapped occurrences of the riparian cover type. Accordingly, only 5% of the woody riparian cover type is considered suitable (Table 3-10). Much less than an acre of suitable habitat would be temporarily or permanently lost or otherwise disturbed per year (Table 3-11).

Tipton and Giant Kangaroo Rats

The distribution of both these kangaroo rat species is very localized, primarily as a result of habitat fragmentation of remnant suitable habitat by agricultural development. Tipton kangaroo rat has a very localized distribution in the western portion of Tulare and Kern Counties and the southern portion of Kings County. Giant kangaroo rat also has a very localized distribution in intact grassland areas on the western portions of the study area. This species occurs only on the west side of the valley; occurrences are concentrated in two main populations located in Madera/Fresno Counties and Kern County. There are only scattered occurrences in the area between the two population centers.

Because of habitat fragmentation, limited dispersal distances, and small population size, only a small proportion of the land-cover types is considered suitable for occupancy by these two species (Table 3-10). For Tipton and giant kangaroo rats, 4 and 5 acres, respectively, of potentially suitable habitat would be temporarily lost annually, and for each species <1 acre would be permanently lost annually (Table 3-11). In addition to these habitat losses, other, less intensive, disturbances to potentially suitable Tipton and Giant kangaroo habitats would occur on 24 and 30 acres per year (Table 3-11).

San Joaquin (Nelson's) Antelope Squirrel

San Joaquin antelope squirrels occur in grassland and shrub cover types in the southwestern portion of the plan area. Substantial portions of these habitats are fragmented and isolated by agricultural development. This fragmentation has led to local extirpation in some remnants of suitable habitat. Consequently, only 50% of grassland areas within the species' historic range are considered suitable for occupancy (Table 3-10). A total of 38 acres of potentially suitable habitat would be temporarily lost and <1 acre would be permanently lost each year (Table 3-11). In addition to these habitat losses, other, less intensive,

disturbances also would occur on an additional 218 acres of potentially suitable habitat (Table 3-11).

San Joaquin Kit Fox

The distribution of San Joaquin kit fox is widely discontinuous within the plan area. Because of habitat fragmentation resulting from urbanization and agricultural development, portions of suitable habitat are not occupied by the species. Only small proportions of agricultural and valley oak woodland cover types provide habitat for kit foxes (Table 3-10). The grassland land cover type was estimated at 70% suitable for occupancy. A total of 73 acres of potentially suitable habitat would be temporarily lost and <1 acre permanently lost each year (Table 3-11). In addition to these habitat losses, other, less intensive, disturbances also would occur on an additional 433 acres of potentially suitable habitat (Table 3-11).

Summary of Wildlife Habitat Disturbance

Table 3-11 summarizes species habitat effects by land-cover type and county. The table indicates that nearly all effects are temporary and that grassland species have the highest potential to be affected by O&M activities. In the absence of AMMs, suitable habitat would likely be disturbed by O&M activities over the 30-year term of the HCP. Species effects were estimated according to the methodology described on the bottom of page 3-7 and reiterated here using kit fox as an example. Potential kit fox effects were estimated by taking the amount of grassland temporarily disturbed by PG&E's O&M activities (105 acres annually [Table 3-8]) and multiplying it by the amount of grassland that is suitable for occupancy by the kit fox (estimated at 70% [Table 3-10]) to arrive at an estimate of 73 acres of kit fox habitat disturbance per year (Table 3-11) (totals were not rounded until the last step). This was done for each land-cover type suitable for each species.

Very small amounts of suitable habitat are likely to be permanently or temporarily lost for 9 species (limestone salamander, bank swallow, golden eagle, bald eagle, Buena Vista Lake shrew, riparian brush rabbit, riparian woodrat, giant kangaroo rat, Tipton kangaroo rat) during the 30-year term of the HCP. These species have localized occurrences that in most instances do not coincide with PG&E facilities. However, they are included for coverage because there is a chance that individuals could be encountered during O&M activities.

A small area of suitable habitat for six species (vernal pool fairy shrimp, Midvalley fairy shrimp, vernal pool tadpole shrimp, California red-legged frog, giant garter snake, and tricolored blackbird,) is likely to be permanently or temporarily lost during the 30-year term of the HCP, particularly if O&M activities are performed in the vicinity of riparian areas or vernal pools.

A larger area of suitable habitat for eight species (valley elderberry longhorn beetle, California tiger salamander, blunt-nosed leopard lizard, Swainson's hawk, white-tailed kite, western burrowing owl, San Joaquin antelope squirrel, and San Joaquin kit fox) is expected to be temporarily or permanently lost during the 30-year term of the HCP. Because seven of these eight covered species (all but valley elderberry longhorn beetle) are grassland species that share similar habitat requirements, the compensation package will focus on providing grassland mitigation measures to ensure that the compensation is regionally and species-appropriate. The approach to addressing mitigation for these effects is discussed in Chapter 4 ("Conservation Strategy").

Effects on covered grassland species are expected to be distributed fairly uniformly throughout the plan area; approximately 27% of the species effects occur in the northern San Joaquin Valley (San Joaquin, Stanislaus, and Mariposa Counties), 38% occur in the central San Joaquin Valley (Merced, Madera, and Fresno Counties), and 35% occur in the southern San Joaquin Valley (Kings, Kern, and Tulare Counties).

Wetland species effects are assumed to be distributed where the majority of vernal pools are located, predominantly in the northern and central San Joaquin Valley; approximately 27% occur in the northern San Joaquin Valley, 63% occur in the central San Joaquin Valley, and 10% occur in the southern San Joaquin Valley.

Estimated Disturbance of Occupied Habitat for Covered Plant Species

Determining the effects of O&M activities on covered plant species is complicated by the limited information regarding the exact locations both of O&M activities and of sensitive plant populations near PG&E facilities. Overall, habitat disturbance and loss can be estimated, however, on the basis of known habitat attributes of covered species, the distribution of documented populations and PG&E facilities, and the total area to be temporarily or permanently lost as a result of disturbances. This analysis was restricted to disturbances causing temporary or permanent habitat loss because other disturbances were either concentrated in land-cover types not providing habitat for most of these plant species (e.g., most vegetation management), or were dispersed and of low intensity (e.g., off-road travel during patrols) and thus unlikely to cause substantial effects.

This information was used to simulate (i.e., statistically model) the total acreage of habitat occupied by covered plant species that would be disturbed over the 30-year term of this HCP, and to develop several range-based indicators of the likelihood of affecting particular species. These indicators are:

- the potential geographic range of a species within the study area,

- the abundance of a species within its potential geographic range,
- the portion of a species' potential geographic range that will be disturbed by PG&E activities, and
- the proximity of documented populations to PG&E facilities.

The statistical modeling consisted of simulations based on the size distribution of documented populations, the number of documented populations within 200 meters of PG&E facilities, and assumed numbers of undocumented populations. To quantify the area affected by O&M activities, the model randomly located populations of different sizes (i.e., different acreages) along PG&E facilities, and then tallied the fraction of their area within a potential work zone. Estimates of total disturbance of occupied habitat were based on sets of 1,000 simulations.

The range-based indicators were constructed from the locations, elevations, and soil map units of sites where the species occurs and that were in natural land-cover types. The land-cover layer (described in Appendix A), the State Soil Geographic Data Base (STATSGO) (Natural Resources Conservation Service 1995) and the CNDDB (2003) were the sources of this information. These indicators (particularly the portion of a species' range that will be disturbed and the abundance of a species within its range) quantify factors that determine the likelihood of O&M activities affecting a species. These indicators, in concert with CNDDB records of populations near PG&E facilities, ensure that the analysis of effects is based on the best scientific information currently available.

The development of the statistical model, the indicators and the analyses based on them are described in detail in Appendix F, and the results of the analyses are summarized in the following paragraphs.

In the absence of AMMs, 7–50 acres of occupied habitat could be disturbed by O&M activities over the 30-year term of the HCP. AMMs are expected to reduce this acreage considerably but are unlikely to avoid all effects. Therefore, it is prudent to estimate that AMMs would reduce the effects by half (i.e., 4–25 acres would be disturbed), even though the implementation of AMMs could prevent most effects.

Even in the absence of AMMs, 10 species are unlikely to have occupied habitat disturbed during the 30-year term of the HCP. These species are *Caulanthus californicus, Clarkia temblorensis* ssp. *calientensis, Gratiola heterosepala, Lepidium jaredii* ssp.*album , Lewisia congdonii, Malacothamnus hallii, Navarretia myersii, Orcuttia pilosa, Stylocline citroleum*, and *Tuctoria greenei*. No documented occurrences within 200 meters of a PG&E facility are known, <0.05% of the species' ranges will be disturbed by O&M activities, and O&M activities would be conducted in <0.1% of the species' geographic ranges (Table 3-13, Appendix F).

In the absence of AMMs, 29 species have an intermediate (moderate) likelihood of having occupied habitat disturbed: *Amsinckia grandiflora, Atriplex*

minuscula, A. tularensis, Blepharizonia plumosa ssp. *plumosa, Calyptridium pulchellum, Carpenteria californica, Chamaesyce hooveri, Cirsium crassicaule, Clarkia biloba* ssp. *australis, Clarkia lingulata, Clarkia springvillensis, Cordylanthus mollis* ssp. *hispidus, Cordylanthus palmatus, Eremalche kernensis, Eriophyllum congdonii, Eryngium racemosum, Fritillaria striata, Layia heterotricha, L. leucopappa, Legenere limosa, Lupinus citrinus* var. *deflexus, Madia radiata, Monolopia congdonii, Neostafia colusana, Orcuttia inaequalis, Pseudobahia bahiifolia, P. peirsonii*, *Sidalcea keckii* and *Twisselmannia californica*. These species have either at least one documented occurrence or a moderate likelihood of having an undocumented population within 200 meters of a facility (Table 3-13, Appendix F). Disturbance of occupied habitat of most of these species will not occur during the 30-year term of the HCP. However, several species may have some habitat disturbance. Current information is insufficient to determine the exact acreage that will be disturbed for each species; however, PG&E estimates disturbance of 0–1 acre of occupied habitat at zero to two sites for each species over the 30-year term of the HCP. The approach to addressing this uncertainty is provided in Chapter 4 ("Conservation Strategy").

Disturbance of occupied habitat of three species is likely to occur during the 30-year term of the HCP: *Castilleja campestris* ssp. *succulenta*, *Lilaeopsis masonii*, and *Opuntia basilaris* var. *treleasei*. These species each have 9–15 occurrences within 200 meters of a PG&E facility. In addition, a somewhat larger portion of these species' geographic ranges will be disturbed by O&M activities (Table 3-13, Appendix F). For *Lilaeopsis masonii*, which occurs in numerous small areas in intertidal wetlands, several patches of occupied habitat could be disturbed during the 30-year term of the HCP, and their combined area is anticipated to be less than 1–2 acres. For *Castilleja campestris* ssp. *succulenta*, which occurs in vernal pools and at some sites can be found in scattered pools over a large area, portions of several occupied sites could be disturbed, and their combined area is anticipated to be less than 1–4 acres. For *Opuntia basilaris* var. *treleasei*, which is an upland species that is dispersed over wide areas at some sites, portions of several occupied sites could be disturbed, and their combined area is anticipated to be less than 2–8 acres. The approach to addressing these effects is discussed in Chapter 4 ("Conservation Strategy").

Table 3-13. Distribution of Plant Species Proposed for Coverage and as No Take Species and Likelihood of Effects

Common and Scientific Name	Status[1]			Documented Extant Occurrences[2]		Likelihood of Effect[4]
	Federal	State	CNPS	San Joaquin Valley[3]	Within 200 m of Facilities	
Large-flowered fiddleneck *Amsinckia grandiflora*	E	R	1B	3	–	Moderate
Lesser saltscale *Atriplex minuscula*	–	E	1B	7	–	Moderate
Bakersfield smallscale *Atriplex tularensis*	SC	T	1B	1	–	Moderate
Big tarplant *Blepharizonia plumosa* ssp. *plumosa*	–	E	1B	17	4	Moderate
Mariposa pussypaws *Calyptridium pulchellum*	T	–	1B	6	3	Moderate
Tree-anemone *Carpenteria californica*	SC	–	1B	4	1	Moderate
Succulent owl's-clover *Castilleja campestris* ssp. *succulenta*	T	–	1B	62	9	High
California jewelflower *Caulanthus californicus*	E	–	1B	20	–	Low
Hoover's spurge *Chamaesyce hooveri*	T	R	1B	8	2	Moderate
Slough thistle *Cirsium crassicaule*	SC	R	1B	17	4	Moderate
Mariposa clarkia *Clarkia biloba* ssp. *australis*	–	T	1B	13	6	Moderate
Merced clarkia *Clarkia lingulata*	SC	–	1B	2	2	Moderate
Springville clarkia *Clarkia springvillensis*	T	–	1B	10	1	Moderate
Vasek's clarkia *Clarkia tembloriensis* ssp. *calientensis*	SC	–	1B	3	–	Low
Hispid bird's-beak *Cordylanthus mollis* ssp. *hispidus*	SC	–	1B	23	–	Moderate
Palmate-bracted bird's-beak *Cordylanthus palmatus*	E	E	1B	8	3	Moderate
Kern mallow *Eremalche parryi* ssp. *kernensis*	E	E	1B	13	2	Moderate
Congdon's woolly sunflower *Eriophyllum congdonii*	–	E	1B	2	–	Moderate

Common and Scientific Name	Status[1]			Documented Extant Occurrences[2]		Likelihood of Effect[4]
	Federal	State	CNPS	San Joaquin Valley[3]	Within 200 m of Facilities	
Delta button-celery *Eryngium racemosum*	SC	E	1B	19	1	Moderate
Striped adobe-lily *Fritillaria striata*	SC	E	1B	18	2	Moderate
Bogg's Lake hedge-hyssop *Gratiola heterosepala*	–	E	1B	11	–	Low
Pale-yellow layia *Layia heterotricha*	SC	–	1B	7	2	Moderate
Comanche Point layia *Layia leucopappa*	SC	–	1B	8	–	Moderate
Legenere *Legenere limosa*	SC	R	1B	1	–	Moderate
Panoche pepper-grass *Lepidium jaredii* ssp. *album*	SC	–	1B	3	–	Low
Congdon's lewisia *Lewisia congdonii*	–	R	1B	2	–	Low
Mason's lilaeopsis *Lilaeopsis masonii*	SC	R	1B	44	15	High
Mariposa lupine *Lupinus citrinus* var. *deflexus*	SC	T	1B	6	–	Moderate
Showy madia *Madia radiata*	–	–	1B	12	–	Moderate
Hall's bush mallow *Malacothamnus hallii*	–	–	1B	4	–	Low
San Joaquin woollythreads *Monolopia (Lembertia) congdonii*	E	–	1B	46	6	Moderate
Pincushion navarretia *Navarretia myersii* (a.k.a. *N.m.*ssp. *m.*)	–	–	1B	3	–	Low
Colusa grass *Neostapfia colusana*	T	E	1B	44	1	Moderate
Bakersfield cactus *Opuntia basilaris* var. *treleasei*	E	E	1B	34	10	High
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	T	E	1B	28	2	Moderate
Hairy Orcutt grass *Orcuttia pilosa*	E	E	1B	8	–	Low
Hartweg's golden sunburst *Pseudobahia bahiifolia*	E	E	1B	15	1	Moderate
San Joaquin adobe sunburst *Pseudobahia peirsonii*	T	E	1B	32	4	Moderate

Common and Scientific Name	Status[1]			Documented Extant Occurrences[2]		Likelihood of Effect[4]
	Federal	State	CNPS	San Joaquin Valley[3]	Within 200 m of Facilities	
Keck's checkerbloom *Sidalcea keckii*	E	–	1B	2	1	Moderate
Oil neststraw *Stylocline citroleum*	–	–	1B	8	–	Low
Greene's tuctoria *Tuctoria greenei*	E	R	1B	9	–	Low
Kings gold *Twisselmannia californica*	-	-	1B	1	1	Moderate

Notes:

[1] Status explanations:

Federal

E = listed as endangered under the federal Endangered Species Act.

T = listed as threatened under the federal Endangered Species Act.

– = no status.

State

E = listed as endangered under the California Endangered Species Act.

T = listed as threatened under the California Endangered Species Act.

R = listed as rare under the California Native Plant Protection Act. Thus category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.

– = no status.

CNPS = California Native Plant Society

1A = List 1A species: plants presumed extinct in California.

1B = List 1B species: rare, threatened, or endangered in California and elsewhere.

4 = List species 4: plants of limited distribution.

[2] Based on California Natural Diversity Data Base (2002).

[3] Area within plan area boundary.

[4] Based on number of occurrences in vicinity of facilities and results of range-based analyses and statistical modeling in Appendix G; assumes avoidance and minimization is not implemented.

[5] Insufficient information available for range-based analysis.

Chapter 4
Conservation Strategy

Introduction

The conservation strategy utilizes three mechanisms to eliminate, reduce or compensate for potential impacts on sensitive habitats and species populations: general AMMs, species surveys to trigger additional AMMs, and compensation for unavoidable impacts. The implementation of this three-pronged approach should result in long-term benefits to a wide range of species. Development of the overall strategy proceeded in keeping with eight guiding principles:

1. Avoidance and minimization of effects are of the highest priority; AMMs should be implemented to the fullest extent practicable before undertaking compensation. General AMMs are implemented on all projects and additional AMMs are identified by surveys.
2. Compensation should be coordinated with and incorporated into other regional conservation efforts.
3. Preserving habitat on site and in kind is preferable to mitigating or preserving habitat off site.
4. Preserving fewer, larger, contiguous areas of habitat is preferable to preserving a larger number of smaller areas. Habitat should be preserved at sites that are surrounded by compatible land uses.
5. Compensation measures should satisfy applicable state and federal wetland goals, policies, and standards.
6. Land-management activities must maintain habitat quality for covered species.
7. Monitoring provides the feedback loop to support the adaptive-management component of the conservation strategy.
8. Adaptive management continually assesses, evaluates, and adapts management prescriptions to achieve the biological goals and objectives for the HCP.

Biological Goals and Objectives

The principal biological goal for the San Joaquin Valley O&M HCP is to contribute to the conservation of natural communities and their associated covered species in the Plan Area. The natural communities for the plan area can be further generalized:

- **Wetlands**: seasonal wetland, permanent freshwater wetland, open water
- **Woodland**: blue oak, blue oak/foothill, coastal oak, conifer, montane hardwood, valley oak
- **Grassland**: grassland
- **Woody Riparian**: woody riparian
- **Upland Scrub**: upland shrub

Conservation of natural communities will be achieved by implementing the following three objectives for each natural-community type:

Objective1: Acquire, protect, manage, and maintain lands for the benefit of covered species to achieve compensation for project habitat effects.

Objective 2: Locate compensation lands with the plan regions (north, central, and south San Joaquin Valley) where project effects occur.

Objective 3: Purchase or dedicate land near other preserved areas to maximize the conservation values of the land and assist in meeting land protection goals of existing recovery plans.

A list of species associated with each community type is depicted in Table 4-1.

Estimation of Levels of Disturbance

Surveys are required for activities impacting more than 0.1 acre in natural vegetation, and in limited circumstances where less than 0.1 acre will be impacted. These surveys will provide information on the habitat type and number of acres affected such that PG&E can compensate accordingly. However, an understanding of the potential future impacts is necessary so PG&E can budget for the HCP and meet stay-ahead requirements and so the USFWS and CDFG can issue a permit on a known quantity of disturbance. The estimation of levels of disturbance (discussed below) will be used to provide compensation before impacts take place. Once pre-activity surveys have been conducted, and the work is complete, compensation will be adjusted to reflect the true size and nature of the impact.

O&M activities may result in one of four disturbance categories, as defined below, based on the level of habitat disturbance that results from implementing an activity:

Table 4-1. Covered Species Associated with Each of the Five General Habitat Types that Occur in the Plan Area

Wetlands

Vernal pool fairy shrimp
Midvalley fairy shrimp
Vernal pool tadpole shrimp
California tiger salamander
California red-legged frog
Giant garter snake
Bald eagle
Tricolored blackbird
[Buena Vista Lake Shrew]
[Tipton kangaroo rat]
Hispid's bird's-beak
Palmate-bracted bird's-beak
Bogg's Lake hedge-hyssop
Legenere
[Mason's lileopsis]
Succulent owl's clover
Pincussion navarretia
Colusa grass
San Joaquin Valley Orcutt grass
Hairy Orcutt grass
Greene's tuctoria

Woodland

Limestone Salamander
[White-tailed kite]
Golden eagle
[Swainson's hawk]
[Mariposa pussypaws]
[Tree-anemone]
[Merced clarkia]
[Springville clarkia]
[Congdon's wooly sunflower]
Striped adobe lilly
Pale-yellow layia
[Mariposa lupine]
Showy madia
[San Joaquin Adobe sunburst]
Keck's checkerbloom
[Congdon's lewisia]

Grassland

Blunt-nosed leopard lizard
White-tailed kite
[Golden eagle]
Swainson's hawk
Western burrowing owl
Tipton kangaroo rat
Giant kangaroo rat
San Joaquin (Nelson's) antelope squirrel
Large-flowered fiddleneck
[Lesser saltscale]
Big tarplant
[Springville clarkia]
Vasek's clarkia
[Hispid's bird's-beak]
[Kern mallow]
[Striped adobe lilly]

San Joaquin kit fox	[Pale-yellow layia]
	[Comanche point layia]
	Panoche peppergrass
	[San Joaquin woolythreads]
	Hartweg's golden sunburst
	San Joaquin Adobe sunburst
	[Keck's checkerbloom]
	[Oil nestraw]
	{Showy madia}

Woody Riparian

Valley elderberry longhorn beetle	Delta button-celery
Swainson's hawk	Mason's lileopsis
Bald Eagle	
Bank swallow	
Buena Vista Lake Shrew	
Riparian brush rabbit	
Riparian (San Joaquin Valley) woodrat	

Shrub

[Limestone salamander]	Lesser saltscale
[Tipton kangaroo rat]	Mariposa pussypaws
[Giant kangaroo rat]	Tree-anemone
	Merced clarkia
	Springville clarkia
	Congdon's wooly sunflower
	Bakersfield smallscale
	Kern mallow
	Comanche point layia
	Congdon's lewisia
	Mariposa lupine
	Hall's bush mallow
	San Joaquin woolythreads
	Oil nestraw
	Bakersfiled cactus

- ***Small disturbance*** results from activities that typically disturb less than 0.1 acre per event and that are considered to have a very low potential for effects or very limited effects (Table 3-1). A set of AMMs will be consistently applied to these activities, but pre-activity surveys will not be conducted for the majority of these actions (Table 4-2, AMMs 1–11). Rather, compensation will be provided based on a presumption of take. Surveys for these numerous small activities are relatively ineffective at reducing take, and they are cost-prohibitive.
- ***Medium disturbance*** results from activities that typically disturb more than 0.1 acre and less than 0.5 acre and that are considered to have a potential for minor or greater effects (Table 3-1). Preactivity surveys will take place for these activities, a set of AMMs will be consistently applied (Table 4-2, AMMs 1–11), and additional AMMs will be identified and followed (AMMs 12–22). Compensation will be provided for effects associated with these activities.
- ***Large disturbance*** could result from activities that typically disturb 0.5 acre or more and that are considered to have a potential for greater effects (Table 3-1). Preactivity surveys and AMMs are the same as for activities with medium disturbance. Compensation will be provided for the effects associated with these activities.
- ***Other disturbance*** results from activities that do not cause habitat loss (e.g., driving patrol vehicles) and therefore do not require preactivity surveys or compensation, but for which AMMs (Table 4-2) will help minimize and avoid effects.

In preparing early drafts of this HCP, PG&E identified AMMs that are commonly implemented to reduce take of covered species during performance of O&M activities. These AMMs apply to all covered activities, regardless of size (Table 4-2, AMMs 1–11). PG&E also established measures to minimize take of certain covered species during O&M activities, proposing to apply these measures primarily to activities that typically disturb more than 0.1 acre of ground (Table 4-2, AMMs 12–22).

Many of PG&E's O&M activities involve disturbance of less than 0.1 acre of habitat. The effects of such a small amount of habitat disturbance, and associated potential for take of covered species, are considered to have only temporary and minimal impact on most species populations. In addition, applying certain species-specific AMMs (e.g., pre-activity surveys and seasonal restrictions) on these smaller-disturbance O&M activities would be extremely costly, and thereby not practicable. As a result, PG&E initially proposed not to apply any AMMs to small-disturbance activities, and only to apply AMMs to medium- or large-disturbance activities.

During review of the early drafts of this HCP, USFWS and DFG expressed concern regarding the proposed treatment of small-disturbance activities. The primary concerns identified were that:

- some species with small populations and limited distribution could be substantially affected by small disturbances, and
- species designated as Fully Protected by the State of California cannot be authorized for take, regardless of the size of area disturbed or the ultimate effect on species populations.

One suggested approach to address small-disturbance activities was to request that the agencies map areas of important concern for key species, and apply AMMs to small-disturbance activities in these areas. PG&E subsequently determined that this option could lead to inconsistent treatment of species. Therefore, PG&E has developed a process that is intended to systematically identify the species for which the application of AMMs is warranted for small-disturbance activities. The following discussion describes the process and factors used in developing the process and its outcome.

Development of the Screening Process to Identify Applicable Species

Species that warranted implementation of AMMs for small-disturbance activities were identified by a sequential application of the screening criteria, which are summarized in Figure 4-1. Each of these criteria is described below, along with the rationale and a general summary of the results of its application. The specific application of criteria to covered species is documented separately for two general categories of classes of O&M activities, ground-disturbing activities and vegetation management, because of the different potential effects on species. Detailed results stemming from the screening process are presented in Table 4-3 and Table 4-4 for ground-disturbing activities and vegetation management, respectively.

Criterion 1. Potential for Take from the Activities. All covered species were first evaluated for the potential of take during vegetation management and small ground-disturbing activities. Those species for which it was determined that take would not occur by these activities were eliminated from further consideration.

Criterion 2. Biological Susceptibility. Biological susceptibility assessed the potential for small-disturbance activities to result in longer-term (i.e., beyond 3 years) substantial effects on regional populations of each covered species.

PG&E defined biological susceptibility using the following subcriteria:

- when a species is exceedingly rare, and /or localized in the plan area (e.g., riparian brush rabbit)**,** and, although unlikely, a small disturbance could result in a detrimental long-term effect on the species as a whole in the regional population;
- when a species' local distribution is highly clumped (e.g., colonial birds, including the bank swallow and tricolored blackbird) and, although unlikely,

Table 4-2. Avoidance and Minimization Measures to Reduce Impacts on Covered Species

Note: When working in areas of natural vegetation, these avoidance and minimization measures (AMMs) will be implemented where practicable. Measures are practicable where physically possible and not conflicting with other regulatory obligations or safety considerations. Avoidance is always preferable to minimization, and avoidance is required for fully protected species. AMMs 1–11will be implemented for all O&M activities. AMMs 12–21 will be implemented as needed to minimize or avoid effects on species as identified by surveys for activities disturbing >0.1 acre. AMMs 22–30 will be implemented as needed to minimize or avoid effects on species as identified by surveys for small-, medium-, and large-disturbance activities.

Code	Avoidance and Minimization Measure
AMM 1	Employees and contractors performing O&M activities will receive ongoing environmental education. Training will include review of environmental laws and guidelines that must be followed by all personnel to reduce or avoid effects on covered species during O&M activities.
AMM 2	Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas to the extent practicable.
AMM 3	The development of new access and ROW roads by PG&E will be minimized, and clearing vegetation and blading for temporary vehicle access will be avoided to the extent practicable.
AMM 4	Vehicles will not exceed a speed limit of 15 mph in the ROWs or on unpaved roads within sensitive land-cover types.
AMM 5	Trash dumping, firearms, open fires (such as barbecues) not required by the O&M activity, hunting, and pets (except for safety in remote locations) will be prohibited in O&M work activity sites.
AMM 6	No vehicles will be refueled within 100 feet of a wetland, stream, or other waterway unless a bermed and lined refueling area is constructed.
AMM 7	During any reconstruction of existing overhead electric facilities in areas with a high risk of wildlife electrocution (e.g., nut/fruit orchards, riparian corridors, areas along canal or creek banks, PG&E's raptor concentration zone [RCZ]), PG&E will use insulated jumper wires and bird/animal guards for equipment insulator bushings or will construct lines to conform to the latest revision of PG&E's Bird and Wildlife Protection Standards.
AMM 8	During fire season in designated State Responsibility Areas (SRAs), all motorized equipment will have federal or state approved spark arrestors; a backpack pump filled with water and a shovel will be carried on all vehicles; and fire-resistant mats and/or windscreens will be used when welding. In addition, during "red flag" conditions as determined by California Department of Forestry (CDF), welding will be curtailed, each fuel truck will carry a large fire extinguisher with a minimum rating of 40 B:C, and all equipment parking and storage areas will be cleared of all flammable materials.
AMM 9	Erosion control measures will be implemented where necessary to reduce erosion and sedimentation in wetlands, waters of the United States, and waters of the state, and habitat occupied by covered animal and plant species when O&M activities are the source of potential erosion problems.
AMM 10	If an activity disturbs more than 0.25 acre in a previously undisturbed natural vegetation, and the landowner approves or it is within PG&E rights and standard practices, the area should be returned to pre-existing conditions and broadcast-seeded using a commercial seed mix. Seed mixtures/straw used for erosion control on projects of all sizes within sensitive land-cover types will be certified weed-free.
AMM 11	When routine O&M activities are conducted in an area of potential VELB habitat, a qualified individual will survey for the presence of elderberry plants within a minimum of 20 feet from the

Code	Avoidance and Minimization Measure
	worksite. If elderberry plants have one or more stems measuring 1 inch or more in diameter at ground level are present, the qualified individual will flag those areas to avoid or minimize potential impacts on elderberry plants. If impacts (pruning/trimming, removal, ground disturbance or damage) are unavoidable or occur, then additional measures identified in the VELB conservation plan and compliance brochure will be implemented. The VELB compliance brochure must be carried in all vehicles performing O&M activities within the potential range of VELB.
AMM 12	If a covered plant species is present, a qualified biologist will stake and flag exclusion zones of the maximum practicable distance up to 100 feet around individuals of the covered species prior to O&M activities*. (Note: AMM 11 addresses elderberry plants and valley elderberry longhorn beetle.)
AMM 13	If a covered annual plant species is present, O&M activities will occur after plant senescence and prior to the first significant rain to the extent practicable.
AMM 14	If a covered plant species is present, the upper 4 inches of topsoil will be stockpiled separately during excavations. When this topsoil is replaced, compaction will be minimized to the extent consistent with utility standards.
AMM 15	If vernal pools are present, a qualified biologist will stake and flag an exclusion zone prior to O&M activities. The exclusion zone will encompass the maximum practicable distance from the worksite up to 100 feet where pools are upslope from the worksite and 250 feet where the pools are downslope from the worksite.* Work will be avoided after the first significant rain until June 1, or until pools remain dry for 72 hours.
AMM 16	If suitable habitat for giant garter snake or California red-legged frog is present and protocol-level surveys have not been conducted, a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 250 feet around the habitat prior to O&M activities.* Work will be avoided within this zone from October 1 to May 1 for giant garter snake and from the first significant rain to May 1 for California red-legged frog.
AMM 17	If suitable habitat for covered amphibians and reptiles is present and protocol-level surveys have not been conducted, a qualified biologist will conduct preconstruction surveys prior to O&M activities involving excavation. If necessary, barrier fencing will be constructed around the worksite to prevent reentry by the covered amphibians and reptiles. A qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 50 feet around the potentially occupied habitat.* No monofilament plastic will be used for erosion control in the vicinity of listed amphibians and reptiles. Barrier fencing will be removed upon completion of work. Crews will also inspect trenches left open for more than 24 hours for trapped amphibians and reptiles. A qualified biologist will be contacted before trapped amphibians or reptiles (excluding blunt nosed leopard lizard and limestone salamander) are moved to nearby suitable habitat.
AMM 18	If western burrowing owls are present at the site, a qualified biologist will work with O&M staff to determine whether an exclusion zone of 160 feet during the non-nesting season and 250 feet during the nesting season can be established. If it cannot, an experienced burrowing owl biologist will develop a site-specific plan (i.e., a plan that considers the type and extent of the proposed activity, the duration and timing of the activity, the sensitivity and habituation of the owls, and the dissimilarity of the proposed activity with background activities) to minimize the potential to affect the reproductive success of the owls.
AMM 19	If a Swainson's hawk nest or white-tailed kite nest is known to be within 0.25 mile of a planned worksite, a qualified biologist will evaluate the effects of the planned O&M activity. If the biologist determines that the activity would significantly disrupt nesting, a buffer and limited operation period (LOP) during the nesting season (March 15–June 30) will be implemented.

Code	Avoidance and Minimization Measure
	Evaluations will be performed in consultation with the local DFG representative.
AMM 20	If potential active burrows for San Joaquin antelope squirrel or giant or Tipton kangaroo rat are present, a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 30 feet around the burrows prior to O&M activities at the job site.*
AMM 21	If potentially occupied San Joaquin kit fox dens are present, their disturbance and destruction will be avoided where possible. However, if potentially occupied dens are located within the proposed work area and cannot be avoided during construction, qualified biologists will determine if the dens are occupied. If unoccupied, the qualified biologist will remove these dens by hand excavating them in accordance with USFWS procedures (U.S. Fish and Wildlife Service 1999). Exclusion zones will be implemented following USFWS procedures (U.S. Fish and Wildlife Service 1999) or the latest USFWS procedures. The radius of these zones will follow current standards or will be as follows: Potential Den—50 feet; Known Den—100 feet; Natal or Pupping Den—to be determined on a case-by-case basis in coordination with USFWS and DFG. Pipes will be capped and exit ramps will also be installed in these areas to avoid direct mortality.
AMM 22	All vegetation management activities will implement the nest protection program to avoid and minimize effects on Swainson's hawk, white-tailed kite, golden eagle, bald eagle, and other nesting birds. Additionally, trained pre-inspectors will use data from DFG and CNDDB from the past 5 years to determine whether active Swainson's hawk, golden eagle, or bald eagle nests are located near proposed work. If pre-inspectors identify an active nest near a proposed work area, they will prescribe measures to avoid nest abandonment, including working the line another time of year, maintaining a 500-foot setback, or if the line is in need of emergency pruning, contacting HCP Administrator.
AMM 23	If activities take place in at a previously known or current breeding colony of tricolored blackbirds or bank swallows a qualified biologist will evaluate the site prior to work during the breeding season (April 1-July 31). If and active colony of either species is present, the biologist will stake and flag an exclusion zone of the maximum practicable distance up to 350 feet around the colony prior to O&M activities at the site. Work will be avoided in this zone during April 1–July 31.*
AMM 24	If activities take place in blunt-nosed leopard lizard habitat and outside the road ROW, PG&E staff will identify if burrows are present and if work can avoid burrows. If work cannot avoid the burrows, a qualified biologist will evaluate the site for occupancy and stake and flag an exclusion zone of the maximum practicable distance up to 50 feet around the burrows prior to O&M activities at the job site.*
AMM 25	If activities take place in designated occupied habitat[1] of Buena Vista Lake shrew, a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 100 feet, and PG&E staff will minimize the use of mechanical equipment and the area of ground disturbance.
AMM 26	If activities take place in designated occupied habitat[1] of the riparian brush rabbit, a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 100 feet, and PG&E staff will minimize the use of mechanical equipment and the area of ground disturbance. Work will be avoided during the reproductive period (January 1 to May 31).
AMM 27	If activities take place in designated occupied habitat[1] of the riparian woodrat, a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 100 feet around the habitat, and PG&E staff will minimize the use of mechanical equipment and the area of ground disturbance.

Code	Avoidance and Minimization Measure
AMM 28	If activities take place in designated occupied habitat[1] of the limestone salamander, a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 100 feet around the habitat, and PG&E staff will minimize the use of mechanical equipment and minimize the area of ground disturbance.
AMM 29	No herbicide will be applied within 100 feet of exclusion zones, except when applied to cut stumps or frilled stems or injected into stems.
AMM 30	Trees being felled in the vicinity of an exclusion zone will be directionally felled away from the zone, where possible. If this is not feasible, the tree will be removed in sections.

* If an exclusion zone cannot extend the specified distance from the habitat, the biologist will stake and flag a restricted activity zone of the maximum practicable distance from the exclusion zone around the habitat. This exclusion zone distance is a guideline that may be modified by a qualified biologist, based on site specific conditions (including habituation by of the species to background disturbance levels). Measures are practicable where physically possible and not conflicting with other regulatory obligations or safety considerations; O&M activities will be prohibited or greatly restricted within restricted activity zones. However, vehicle operation on existing roads and foot travel will be permitted. A qualified biologist will monitor O&M activities near flagged exclusion and restricted activity zones. Within 60 days after O&M activities have been completed at a given worksite, all staking and flagging will be removed.

[1] Designated occupied habitat is defined as all land within 2 miles of a CNDDB occurrence and suitable land within 5 miles of a CNDDB occurrence.

Table 4-3. Evaluation of Potential Need to Apply Avoidance and Minimization Measures (AMMs) to Covered Species for Small (<0.1 acre) Ground-Disturbing HCP Activities

Species	1. Small Activities Could Result in Take	2. Biological Susceptibility				3. Fully Protected?	4. Avoidance and Minimization Measures Effective?		Recommendation to Apply AMMs to Small Activities?	AMM Measure
		Regional Species Population Is Small Relative to Potentially Affected Component	Species Distribution Clumped or Concentrated within Occupied Habitat	Losses during Certain Life Stages Could Have Disproportionate Effects*	Overall Biologically Susceptible		Seasonal Restrictions Effective in Reducing Impact?	Exclusion Zones Effective in Reducing Impact?		
Vernal pool fairy shrimp	Y	N	N	N	N	N	–	–	N	
Midvalley fairy shrimp	Y	N	N	N	N	N	–	–	N	
Valley elderberry longhorn beetle	Y	N	N	N	N	N	–	–	N	
California tiger salamander	Y	N	N	N	N	N	–	–	N	
Limestone salamander	Y	Y	N	N	Y	Y	N	Y	Y	AMM 17, 28
California red-legged frog	Y	N	N	N	N	N	–	–	N	
Blunt-nosed leopard lizard	Y	N	N	N	N	Y	–	–	Y**	AMM 17, 24
Giant garter snake	Y	N	N	N	N	N	–		N	
Swainson's hawk	N	–	–	–	–	N	–	–	N	
White-tailed kite	N	–	–	–	–	Y	–	–	N	
Golden eagle	N	–	–	–	–	Y	–	–	N	
Bald eagle (nesting only)	Y	N	N	Y	Y	Y	Y	–	Y	AMM 20, 22
Western burrowing owl	Y	N	N	N	N	N	Y	–	Y	AMM 18
Bank swallow	Y	Y?	Y	Y?	Y	N	Y	Y	Y	AMM 23
Tricolored blackbird	Y	Y	Y	Y	Y	N	Y	–	Y	AMM 23
Buena Vista Lake shrew	Y	Y	N	N	N	N	-	Y	Y	AMM 25
Riparian brush rabbit	Y	Y	N	N	Y	N	Y	Y	Y	AMM 26
Riparian woodrat	Y	Y	N	N	Y	N	N	Y	Y	AMM 27

Species	1. Small Activities Could Result in Take	2. Biological Susceptibility				3. Fully Protected?	4. Avoidance and Minimization Measures Effective?		Recommendation to Apply AMMs to Small Activities?	AMM Measure
		Regional Species Population Is Small Relative to Potentially Affected Component	Species Distribution Clumped or Concentrated within Occupied Habitat	Losses during Certain Life Stages Could Have Disproportionate Effects*	Overall Biologically Susceptible		Seasonal Restrictions Effective in Reducing Impact?	Exclusion Zones Effective in Reducing Impact?		
Tipton kangaroo rat	Y	N	N	N	N	N	–	–	N	
Giant kangaroo rat	Y	N	N	N	N	N	–	–	N	
San Joaquin antelope squirrel	Y	N	N	N	N	N	–	–	N	
San Joaquin kit fox	Y	N	N	N	N	N	–	–	N	
Relatively abundant plant species	Y	N	N	N	N	–	–	–	N	
Rarer plant species	Y	Y	Y	Y	Y	–	Y	Y	Y	AMM 12, 13, 14

Notes:

* Disproportionate effects include effects that could go beyond effects of losses of individuals and their immediate reproductive efforts. Examples include potential for localized disturbance to cause population abandonment of a site during the nesting season or long-term abandonment of a site.

** Included solely based on status as fully protected species.

Table 4-4. Evaluation of Potential Need to Apply Avoidance and Minimization Measures (AMMs) to Covered Species for Small (<0.1 acre) Vegetation Management HCP Activities

Species	1. Small Activities Could Result in Take	2. Biological Susceptibility				3. Fully Protected?	4. Avoidance and Minimization Measures Effective		Recommendation: Apply AMMs to Small Activities	AMM Measures Required
		Regional Species Population Is Small Relative to Potentially Affected Component	Species Distribution Clumped or Concentrated within Suitable Habitat	Losses during Certain Life Stages Could Have Disproportionate Effects*	Overall Biologically Susceptible		Seasonal Restrictions Effective	Exclusion Zones Effective		
Vernal pool fairy shrimp	N	–	–	–	–	N	–	–	N	
Midvalley fairy shrimp	N	–	–	–	–	N	–	–	N	
Valley elderberry longhorn beetle	Y	N	N	N	N	N	–	–	N	
California tiger salamander	N	–	–	–	–	N	–	–	N	
Limestone salamander	N	–	–	–	–	Y	–	–	N	
California red-legged frog	N	–	–	–	–	N	–	–	N	
Blunt-nosed leopard lizard	N	–	–	–	–	Y	–	–	N	
Giant garter snake	N	–	–	–	–	N	–	–	N	
Swainson's hawk	Y	N	Y	N	Y	N	Y	Y	Y	AMM 19, 22
White-tailed kite	Y	N	N	N	N	Y	–	–	Y	AMM 19, 22
Golden eagle	Y	N	N	N	N	Y	–	–	Y	AMM 22
Bald eagle (nesting only)	Y	N	N	Y	Y	Y	Y	Y	Y	AMM 22
Western burrowing owl	N	–	–	–	–	N	–	–	N	
Bank swallow	Y	Y	Y	Y	Y	N	Y	Y	Y	AMM 23

Table 4-4. Continued

Species	1. Small Activities Could Result in Take	2. Biological Susceptibility				3. Fully Protected?	4. Avoidance and Minimization Measures Effective		Recommendation: Apply AMMs to Small Activities	AMM Measures Required
		Regional Species Population Is Small Relative to Potentially Affected Component	Species Distribution Clumped or Concentrated within Suitable Habitat	Losses during Certain Life Stages Could Have Disproportionate Effects*	Overall Biologically Susceptible		Seasonal Restrictions Effective	Exclusion Zones Effective		
Tricolored blackbird	N	–	–	–	–	N	–	–	N	
Buena Vista Lake shrew	N	Y	N	N	Y	N	N	Y	Y	AMM 25
Riparian brush rabbit	Y	Y	N	N	Y	N	Y	Y	Y	AMM 26
Riparian woodrat	Y	Y	N	N	Y	N	N	Y	Y	AMM 27
Tipton kangaroo rat	N	–	–	–	–	N	–	–	N	
Giant kangaroo rat	N	–	–	–	–	N	–	–	N	
San Joaquin antelope squirrel	N	–	–	–	–	N	–	–	N	
San Joaquin kit fox	N	–	–	–	–	N	–	–	N	
Relatively abundant plant species	N	–	–	–	–	–	–	–	N	
Rarer plant species	N	–	–	–	–	–	–	–	N	

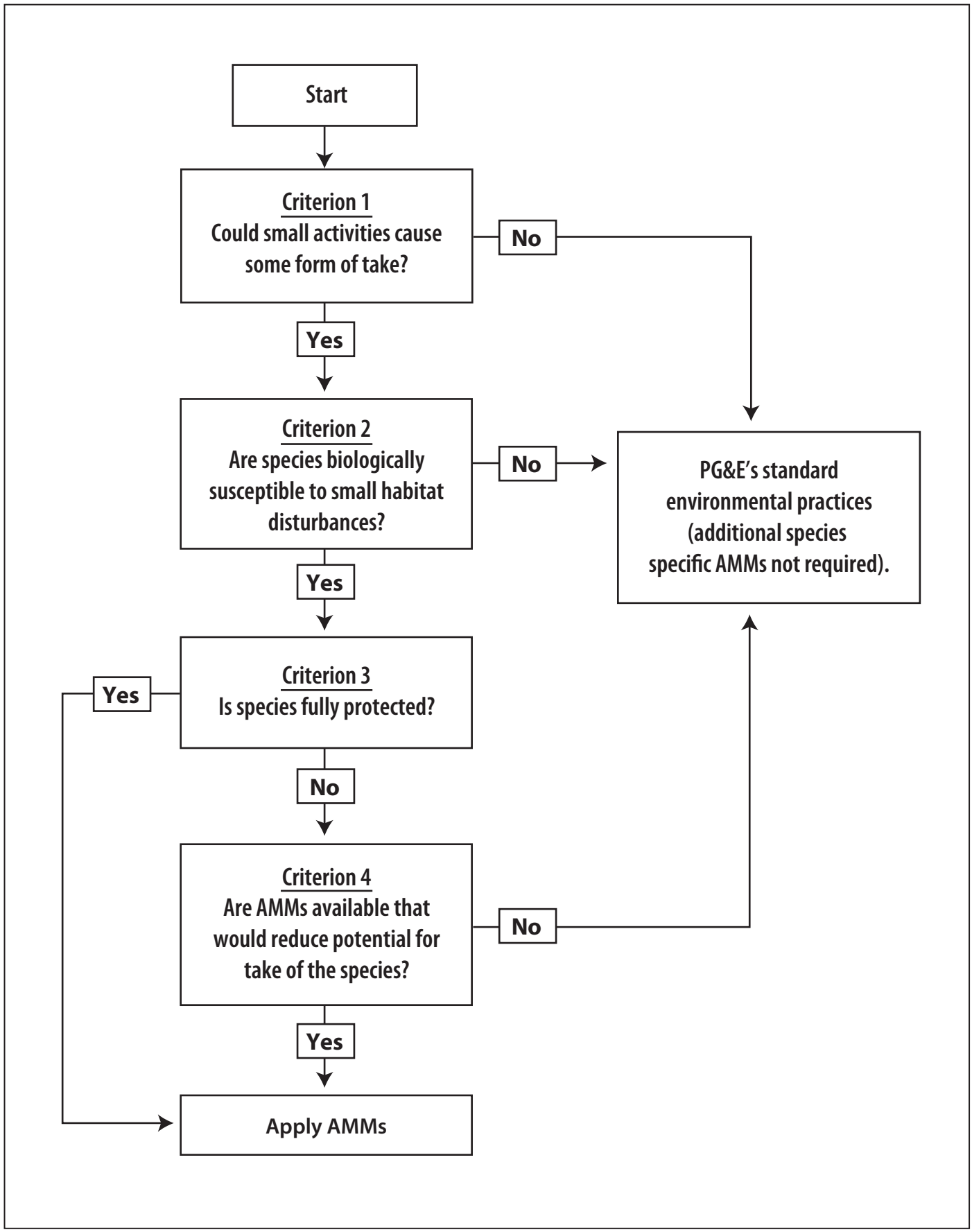

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Figure 4-1
Process Used to Identify Species that Warrant Application of Avoidance and Minimization Measures (AMMs) for Small Disturbance Activities (<0.1 acre)

a small activity could affect a large proportion of the population in the plan area; or

- when a take occurs at certain times of the year (i.e., during certain life stages or reproductive periods) that could result in disproportionately negative effects (e.g., rarer covered plant species).

Species that met any one of the subcriteria identified above were retained for further evaluation.,

Criterion 3. Fully Protected Species. Species identified as fully protected under the California Fish and Game Code were identified. These species require application of AMMs in situations where any direct take could occur. Take must be avoided because no mechanism exists for DFG to authorize take of these species. Therefore, all activities with the potential to affect fully protected species (i.e., blunt-nosed leopard lizard, golden eagle, bald eagle, limestone salamander, and white-tailed kite) were identified as requiring AMMs.

Criterion 4. Effectiveness of AMMs in Reducing Take. Under this final criterion, the effectiveness of AMMs was evaluated for reducing take on the remaining species. Evaluation included the following potential AMMs: pre-activity surveys, seasonal restrictions, and other measures. AMMs will be applied to the final subset of screened species where it is determined that these measures could, in fact, prevent take.

The species for which AMMs are proposed during small-disturbance activities are identified in Tables 4-3 and 4-4, along with references to the applicable AMMs.

Implementation Process for Applying AMMs to Small-Disturbance Activities

The preceding process identified the species that warrant application of AMMs for small ground-disturbing and vegetation-management activities (Table 4-2, AMM 22–30), but the mode by which these measures are applied is also important. Some locations of species that warrant AMMs for small activities are known, but others are not. Also, it is impracticable to presurvey all work activity sites for these species. Therefore, AMMs will be applied to species for small disturbance activities depending on the practicability of various approaches for each species. Take avoidance and minimization will be achieved through three basic approaches. Each is described below and summarized in Table 4-5.

Apply AMMs to All Activities. AMM 22 will be applied throughout the plan area for nest protection of covered raptors (and other bird species) under the vegetation-management program and includes the recently adopted nest-protection program (Appendix E). The program involves systematic evaluation of nest occurrence during pre-activity surveys and during vegetation-management work. To further avoid and minimize the potential take of Swainson's hawks, pre-inspectors will use data from DFG and CNDDB from the

past 5 years to determine whether active Swainson's hawk nests are located near proposed work. A pre-inspector is a trained vegetation management specialist, typically an arborist. If pre-inspectors identify an active nest near a proposed work area, they will prescribe measures to avoid nest abandonment, including working the line another time of year, maintaining a 500-foot setback, or, if the line is in need of emergency pruning, contacting the HCP Administrator. The HCP program training will also provide appropriate guidance on nest discovery and avoidance.

AMMs will also be applied to the blunt-nosed leopard lizard because its fully protected status precludes take authorization for this species (AMM 24). Specifically, construction tailboards will include information on blunt-nosed leopard lizard when work is being conducted within its range. Crews will avoid burrows that could contain blunt-nosed leopard lizards and call in a biologist if necessary. Subsequent AMMs may also be required. Figure 4-2 illustrates this process. The HCP program training will also provide appropriate guidance on burrow discovery and avoidance.

Apply AMMs in All Designated Occupied Habitat. This approach applies solely to species that have small ranges and populations and therefore could be affected by small activities (Table 4-5). Under this approach, pre-activity survey, buffer establishment, and seasonal restriction would be applied to activities within the defined ranges of these species (including the Buena Vista Lake shrew [AMM 25], riparian brush rabbit [AMM 26], riparian woodrat [AMM 27], and limestone salamander [AMM 28]). Designated occupied habitat ranges are defined for limestone salamander, Buena Vista Lake shrew, riparian woodrat, and riparian brush rabbit and presented in Appendix I. Application of AMMs 25, 26, 27, and 28 to ground-disturbing activities within designated occupied habitat will avoid take of this species. The AMM would be applied by querying GIS layers for the location of suitable habitat within proposed work areas.

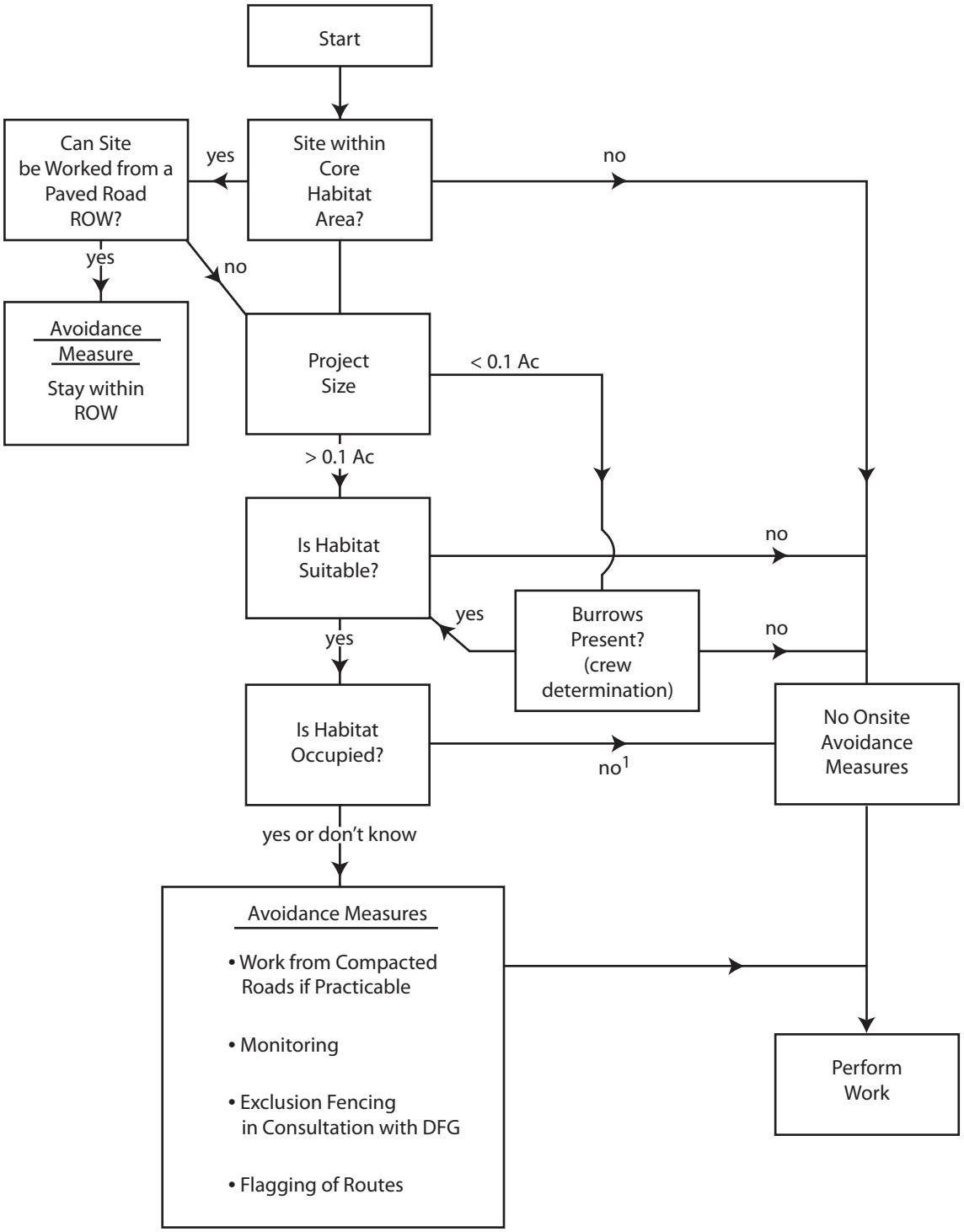
Apply AMMs in Areas with Known Occurrences of Species. This approach will be applied for species for which the geographic extent of suitable habitat cannot be defined in a predictable manner and, therefore, for which pre-activity surveys are impracticable. The approach involves querying the CNDDB for known occurrences in proposed work areas and applying seasonal restrictions and other measures where overlap occurs within approximately 100m of a specific occurrence that was documented within the past 5 years. This method does not eliminate all potential for take but reduces it substantially to levels that are not considered likely to cause harm to regional populations of the covered species to which it applies. For ground-disturbing activities, these species include the following: western burrowing owl (AMM 18), bank swallow (AMM 23), tricolored blackbird (AMM 23), and rarer plant species (AMMs 12, 13, and 14).

For the rarer plant species, AMMs would be applied to work areas for ground-disturbing activities that are 1) within 200m of the boundaries of all CNDDB specific occurrences (CNDDB accuracy classes 1 and 2) and non-specific occurrences mapped as bounded features (CNDDB accuracy class 3) that are presumed extant; or 2) within the zone associated with a CNDDB non-specific

Table 4-5. Location Criteria Used to Trigger AMMs for Species That Are Biologically Susceptible to Activities <0.01 acre[1]

Species	Location Criteria		
	All Facility Locations Where Work Is Being Conducted	Designated Occupied Habitat	Known Locations
Ground-disturbing Activities			
Limestone Salamander		X	
Blunt-Nosed Leopard Lizard	X		
Bald Eagle			X
Western Burrowing Owl			X
Bank Swallow			X
Tricolored Blackbird			X
Buena Vista Lake Shrew		X	
Riparian Brush Rabbit		X	
Riparian Woodrat		X	
"No Take" Plant Species (see Chapter 5, page 5-35)			X
Vegetation –management Activities			
Limestone Salamander		X	
Swainson's Hawk	X		X
White-Tailed Kite	X		
Golden Eagle	X		
Bald Eagle	X		
Bank Swallow			X
Tricolored Blackbird			X
Riparian Brush Rabbit		X	
Riparian Woodrat		X	

[1] The process for determining which species are biologically susceptible to activities <0.1 acre is described in the text and in Tables 4-3 and 4-4.



Note: An educational brochure and brief tailboards will be provided to crews in core habitat areas.

[1] Determination to be made if no burrows are present or protocol surveys are conducted.

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Figure 4-2
Decision Process for Identifying Blunt-nosed Leopard Lizard Habitat Protection for PG&E Operations and Maintenance Activities in the San Joaquin Valley

occurrences mapped as circular feature with an accuracy of 1 km or less (CNDDB accuracy classes 4-7). These AMMs would not be applied in zones associated with occurrences whose locations have been poorly documented (i.e., CNDDB accuracy classes 8-10) (see Appendix F for definition of CNDDB accuracy classes).

Non-specific occurrences mapped as circular features are treated differently because their location has not been accurately documented, and the probability of an O&M activity affecting occupied habitat in the vicinity of these occurrences is much lower than in the vicinity of specific occurrences and of those non-specific occurrences that can be mapped as bounded features. For occurrences mapped as circular features, the circle's centroid represents the best estimate of the plant population's (i.e., the occurrence's) location and the circle's radius defines a zone in which the occurrence may be located. These zones range in size from 18 to over 50,000 acres (i.e., circles with radii of 150-8000 m) depending on the accuracy class to which the occurrence has been assigned. Because most occurrences occupy small areas (i.e., typically much less than 1 acre), there is only a low likelihood of encountering occupied habitat within the zones associated with the less accurately documented occurrences. (Also, many occurrences with poorly documented locations are older records that have not been relocated in recent decades and may in fact be extirpated.)

The minimization measures described above will be applied only to areas where the likelihood of encountering occupied habitat is substantially greater than in natural vegetation elsewhere in the plan area. Therefore, PG&E will still apply the minimization measures described above to occurrences whose location is considered to be within a 1 km radius because there is still an intermediate to low probability that a ground-disturbing activity could affect occupied habitat in these zones. However, the probability of affecting occupied habitat at the most poorly documented occurrences (i.e., CNDDB accuracy classes 8-10) is very low and not substantially greater than elsewhere within the plan area. Thus, the additional measures described above will not be applied within zones associated with these occurrences.

Avoid All Ground-Disturbing Activities in Occupied Habitat for "No Take" Plant Species. This approach will be applied for plant species currently known from less than 10 locations and that could be biologically sensitive to small-disturbance activities. These species are: Large-flowered fiddleneck (*Amsinckia grandiflora*), Bakersfield smallscale (*Atriplex tularensis*), Mariposa pussypaws (*Calyptridium pulchellum*), Tree-anemone (*Carpenteria californica*), Merced clarkia (*Clarkia lingulata*), Vasek's clarkia (*Clarkia tembloriensis ssp. calientensis*), Pale-yellow layia (*Layia heterotricha*), Comanche Point layia (*Layia leucopappa*), Panoche pepper-grass (*Lepidium jaredii ssp. album*), Congdon's lewisia (*Lewisia congdonii*), Mariposa lupine (*Lupinus citrinus var. deflexus*), Showy madia (*Madia radiata*), Hall's bush mallow *Malacothamnus hallii,* Pincushion navarretia (*Navarretia myersii, a.k.a. N.m.*ssp. *m*.), Keck's checkerbloom *Sidalcea keckii*, and Kings gold (*Twisselmannia californica*). All non-emergency, ground-disturbing activities will avoid all habitat known to be occupied by these species. All other activities will apply seasonal restrictions

and other AMMs as described in the preceding section *Apply AMMs in Areas with Known Occurrences of Species.*

Overview of HCP Implementation

A cornerstone of the conservation strategy is the full integration of the HCP into PG&E's operations. The implementation of the HCP begins with approval of the IA by the Management Committee, which reports to the Board of Directors. The Environmental Affairs Department will administer the HCP. A utility standard will document the process of implementing provisions of the HCP; this utility standard is intended to detail the responsibilities of the electric and gas transmission and distribution operating departments' responsibilities. An organizational responsibility flow chart is provided in Figure 4-3.

The Environmental Affairs Department will be responsible for administering the HCP and will retain all program records. The specific individuals responsible for implementing the HCP include an HCP administrator, division managers, field supervisors, field crews, and PG&E or contract biologists. The roles of these individuals are briefly described below; the interaction among the HCP administrator, the field supervisor, and a proposed data tracking system is shown in Figure 4-4. Detailed information on the database and data-tracking systems is provided later in this chapter.

HCP Administrator

A PG&E HCP administrator will manage the implementation of the HCP and will oversee the monitoring, reporting, and adaptive management program. The HCP administrator will be responsible for:

- answering internal HCP-related questions;
- maintaining the HCP data management and reporting systems;
- coordinating wildlife and plant surveys;
- serving as a point of contact for USFWS and DFG;
- tracking compensation acquisitions;
- coordinating audit activities for compliance with the HCP;
- evaluating the effectiveness of the program, including AMMs; and
- preparing reports documenting HCP compliance.

Monitoring will be conducted for several key elements of the HCP. These elements include implementation of AMMs, overall O&M effects, fulfillment of compensation obligations, and effectiveness of compensation. The HCP administrator will maintain monitoring and survey data reports and archives and will prepare an annual HCP Monitoring Report. Based on the information

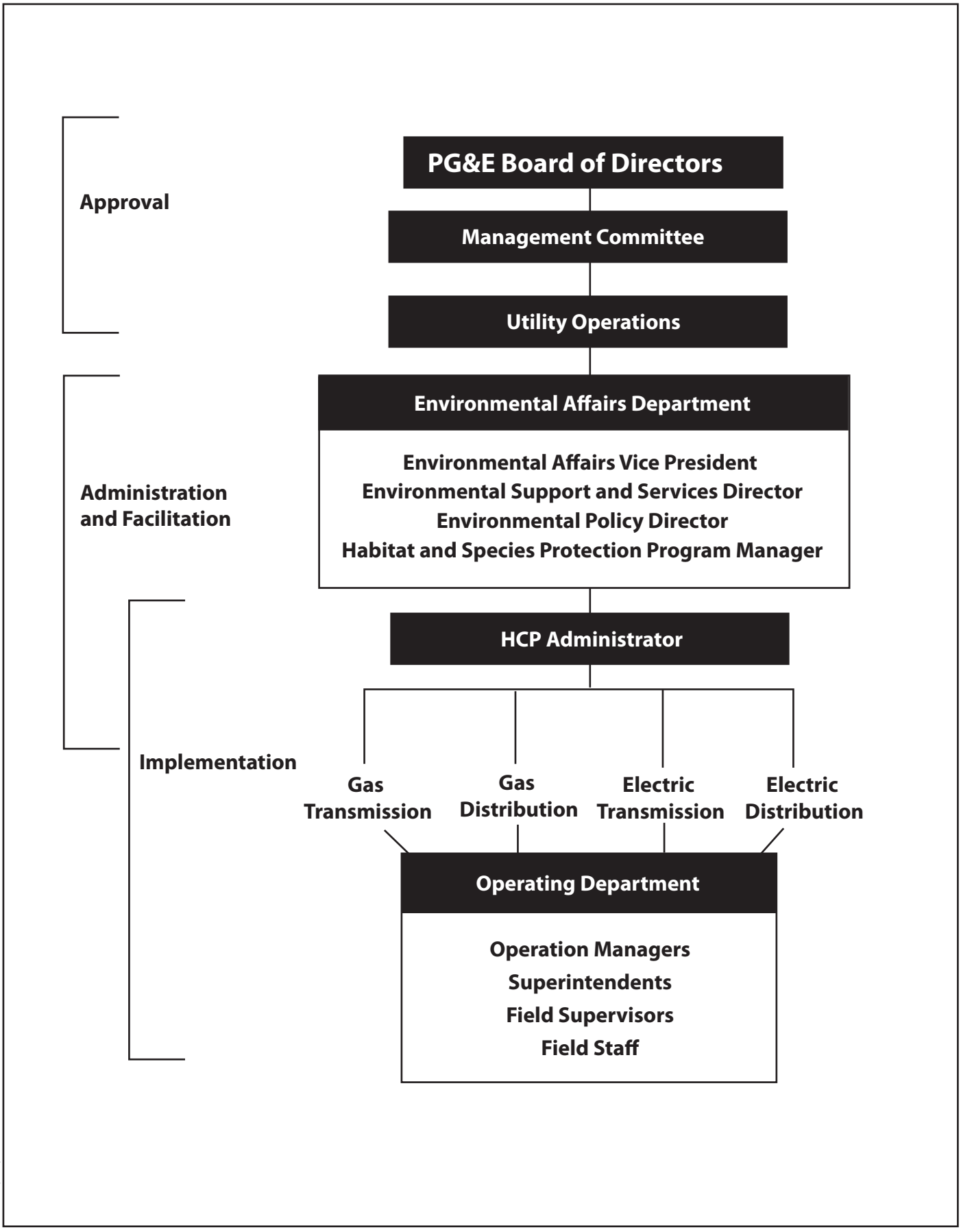

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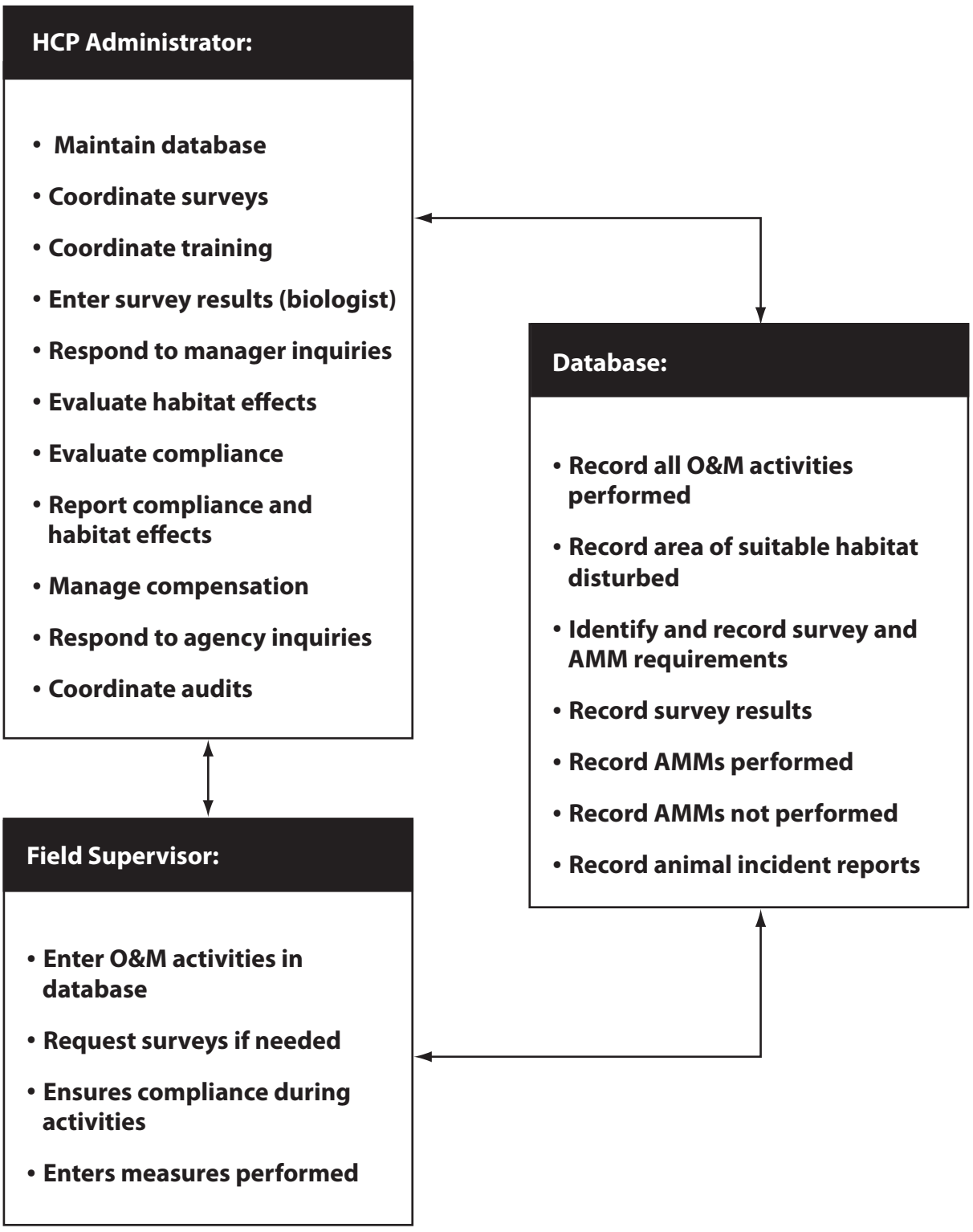
Figure 4-3
HCP Organizational Responsibility Flowchart



Note: Not all HCP functions are illustrated on this figure. The HCP administrator and field supervisor will also coordinate with biological, auditing, real estate, and legal staff. Similar databases are associated with the migratory bird protection program and the VELB conservation program.

AMMS = Avoidance and minimumization measures

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Figure 4-4
Key Conceptual HCP Implementation Responsibilities and Relationships

collected through these monitoring efforts, PG&E will employ adaptive management techniques to modify or revise its conservation strategy to improve its effectiveness. The specific elements of the monitoring, reporting, and adaptive management program are described later in this chapter.

Operation Managers

PG&E's operation managers will ensure that all appropriate field supervisors and crews receive training to implement the terms of the HCP. The operation manager will also be responsible for annual forecasting of O&M work.

Field Supervisors

PG&E's field supervisors will ensure that appropriate field crews are trained in implementing the terms of the HCP. The field supervisors will also be responsible for entering data into the database (or for delegating this responsibility to staff), requesting surveys if needed, and ensuring compliance during activities. Field supervisors will assist with annual forecasting of O&M work.

Field Crews

PG&E's field crews will implement the HCP by attending environmental training and adhering to the AMMs specified for each job.

Environmental Affairs Field Specialists

Environmental affairs field specialists will deliver suitable environmental training to all appropriate personnel. Training will be coordinated with the HCP administration.

Biologists

PG&E or contract biologists will survey work areas and estimate habitat effects. They will coordinate with the HCP administrator.

Surveys to Avoid and Minimize Effects

Approach

Preactivity surveys will be conducted in sensitive land-cover types prior to medium- and large-disturbance activities (i.e., activities of types typically affecting more than 0.1 acre). These activities are listed in Table 4-6.

Preactivity surveys or other AMMs will also precede small-disturbance activities where there are known populations of biologically susceptible covered species or designated occupied habitat. Specific species and measures are identified in Table 4-2 (AMMs 22–30).

Preactivity surveys will not be done for small-disturbance activities outside these designated sensitive areas because the overall acreage of effects for most species is small and surveys for the thousands of small activities would be unlikely to yield information that would reduce take to any appreciable degree. Furthermore, surveys for all small-disturbance activities would increase HCP implementation costs by more than 70% per year.

Survey Methods

Preactivity Surveys

Preactivity surveys for activities that could result in minor effects will be conducted at O&M activity sites. The surveys will be conducted by a qualified biologist and the design of these surveys will be determined based on the ranges and habitats of covered wildlife and plant species. Tables in Appendix B summarize the distribution of wildlife species by county, and Appendix F describes the geographic range of each plant species and how the ranges were determined.

Preactivity surveys will be sufficient to

- document the percentage of the site suitable for covered wildlife and plant species,
- identify when appropriate AMMs will be implemented, and
- quantify expected habitat losses.

Avoidance and Minimization Measures

AMMs are intended to reduce effects on covered species. Table 4-2 lists the measures that were developed with input from PG&E's Advisory Group. The

Table 4-6. O&M Activities Requiring Surveys

Activity	Pre-Activity Surveys
Gas	
G1. Patrols	None—no habitat loss
G2. Inspections	None—no habitat loss
G3. Remedial Maintenance	Required—likely to affect habitat
G4. Compressor Station Maintenance	None[1]—no habitat loss
G5. Pipeline Electric Test System (ETS)	None[1]—negligible to minor habitat loss
G6. Pipeline Valve Recoating	Required—likely to affect habitat
G7. Pipeline Valve Replacement	Required—likely to affect habitat
G8. Pipeline Cathodic Protection	Required—likely to affect habitat
G9. Pipeline Lowering	Required—likely to affect habitat
G10. Pipeline Coating Replacement	Required—likely to affect habitat
G11. Pipeline Replacement	Required—likely to affect habitat
G12. Telecommunication Site Maintenance	Required—likely to affect habitat
G13. Vegetation Management	None[1]—negligible to minor habitat loss
G14. Pipeline Pressure Limiting Station	Required—likely to affect habitat
G15. Pipeline Valve Installation	Required—likely to affect habitat
G16. New/Replacement Pipeline Construction	Required—likely to affect habitat
Electric	
E1. Patrols	None—no habitat loss
E2. Inspections	None—no habitat loss
E3. Electric Insulator Washing	None[1]—no habitat loss
E4. Electric Substation Maintenance	None[1]—no habitat loss
E5. Electric System Outage Repair	None—emergency activity
E6. Tower Replacement/Repair	None[1]—negligible to minor habitat loss
E7. Transmission System Repair	None[1]—negligible to minor habitat loss
E8. Pole/Equipment Repair/Replacement	None[1]—no habitat loss
E9. Electric Line Reconductoring	Required—likely to affect habitat
E10. Vegetation Management	
E10a. Routine Maintenance	None[2]—no habitat loss
E10b. Pole Clearing	None[2]—no habitat loss
E10c. Removal Projects	None—BMPs are implemented to minimize effects
E10d. Transmission Vegetation/ROW Maintenance	None—BMPs are implemented to minimize effects

Activity	Pre-Activity Surveys
E11. Test and Treat (Remedial Maintenance)	None[1]—negligible to minor habitat loss
E12. Electric Pole Line Construction/Relocation	Required—likely to affect habitat
E13. Tower Line Construction	Required—likely to affect habitat
E14. Substation Expansion	Required—likely to affect habitat

[1] Except in areas with designated occupied habitat.

[2] BMPs identified in Table 4-6 through 4-8 will be implemented in areas with designated occupied habitat.

implementation of AMMs will be documented for O&M activities that are performed in areas of natural vegetation.

AMMs 1–11 will be implemented for all activities. Depending on preactivity survey results, described below in Survey Methodology, and other measures shown Table 4-2 (e.g., the establishment of exclusion zones) also may be implemented for activities that could result in minor effects on covered species.

Except for activities causing negligible effects, each O&M activity will be assigned a unique identification number before the activity is performed so that compliance with AMMs can be tracked.

As part of HCP implementation, PG&E will expand its database to track implementation of AMMs. Standard information to be documented for each O&M activity includes:

- identification number of the activity;
- the responsible manager;
- type and location of the activity;
- AMMs that were implemented; and
- pertinent notes regarding site conditions, project effects, or variations in adherence to the AMMs.

Preactivity surveys will determine a work site's potential suitability for covered species occupancy. This information will allow PG&E staff not only to document compliance with AMMs but also to use acquired information in subsequent planning and implementation of work activities. Activity surveys and construction monitoring will be conducted when a work site is identified as having a high potential for species occupancy.

Best management practices (BMPs) associated with vegetation management activities near electrical facilities are operational guidelines to assist in the planning and implementation of successful vegetation management programs. The BMPs are designed to protect wildlife, groundwater, surface water, soils, utility customers, utility workers, and the general public, while facilitating safe and reliable electrical transmission operations.

Vegetation management BMPs are presented in Tables 4-7 and 4-8. Specifically, these tables list overall BMPs and ROW clearing BMPs. The use of herbicides and pesticides is not a covered activity under this HCP.

Wildlife Species

Preactivity surveys will determine the suitability of each site for covered wildlife species and will estimate the area of expected habitat disturbance or loss. These surveys can, for the most part, be conducted year-round. In most instances the surveys will be conducted within 30 days prior to the work activity. Based on the

results, applicable AMMs (from Table 4-2) will be recommended, and additional construction monitoring may be required . The survey approach and timing for each wildlife species are provided in Table 4-9. Survey requirements for valley elderberry longhorn beetle are described in AMM 11 and Appendix D.

For example, when PG&E prepares to implement a cathodic protection O&M activity (activity G8, the typical size of which is 0.69 acres), the field supervisor or other staff person would create a work order that would check to ensure the activity is within the HCP plan area and in natural vegetation; the proximity of habitat indicated by CNDDB records or other nearby designated occupied habitat would also be checked. If the activity is in the plan area and in natural vegetation, it would require a preactivity survey by a qualified biologist. Thirty days prior to the activity commencement, a wildlife biologist would survey the work area and record pertinent information (data) on the data sheet (Figure 4-4). The biologist would enter the survey results and if AMMs are prescribed, based on the site conditions, the specific measures will be printed out on the crews' respective shop papers.

In instances where a small-disturbance activity, such as a pipeline ETS job (activity G5, the typical size of which is 0.002 acres), indicates the job is in designated occupied habitat, a preactivity survey would be warranted. The biologist would enter the survey results, and additional AMMs may be prescribed.

Plant Species

Preactivity surveys will help determine the suitability of each site for covered plant species and estimate the area of expected losses. A qualified botanist will conduct surveys for covered plant species in accordance with USFWS Guidelines (USFWS 1996) at an appropriate time of year for reliable identification (Table 4-10). However, not all scheduling of work activities is predictable, and not all plant surveys can be performed during appropriate seasons. If scheduling is not possible, PG&E will assume that the effect on covered plants is proportionate to the percentage of occupied habitat identified in those surveys that are conducted during the appropriate seasonal window. If no other surveys have been conducted for the plant in the appropriate seasonal window, the entire potentially suitable area will be considered occupied and affected.

When a covered plant species is found, occupied habitat will be mapped using a GPS unit, and AMMs (Table 4-2) will be recommended. If not all occupied habitat can be avoided, the disturbed area will also be mapped. If the landowner provides written permission to PG&E, the pertinent information will be submitted to the CNDDB.

Using the example described above under wildlife species, a plant biologist will survey the site if the activity is in the appropriate survey window or if the work area shows nearby CNDDB records or other designated sensitive habitat. Additional AMMs may be prescribed based on the results of the survey. In

Table 4-7. General Best Management Practices (BMPs) for PG&E Vegetation Management Activities

The following BMPs shall be implemented for all vegetation management activities.

1. PG&E Employees and Vegetation Management (VM) contractors performing VM activities shall receive ongoing environmental orientation. Orientation shall include review of environmental laws and guidelines that must be followed by all PG&E employees and VM Contractor personnel to reduce or avoid effects on covered species during VM activities.
2. Notify federal and state land managers of pending work, and schedule annual meetings with these land managers, as requested. Notify local agency land managers of pending work as requested, or as sensitive issues arise.
3. Vehicles and equipment shall be parked on pavement, existing roads, and previously disturbed areas to the extent practicable.
4. Vehicles shall not exceed a speed limit of 15 mph on low-use unpaved roads such as agricultural field roads, transmission ROW roads, non-system numbered USFS roads with locked gates. Travel on high-use unpaved roads such as USFS logging roads shall be as slow as local traffic conditions allow.
5. No vehicles or equipment shall be refueled within 100 feet of a stream with a defined stream channel or bank, a wetland, or a pond unless a bermed and lined refueling area is constructed. Any vehicles driven and/or operated within or adjacent to streams shall be checked and maintained daily to prevent leaks of materials that, if introduced to the water, could be deleterious to aquatic life.
6. Hunting, firearms, open fires (such as barbecues) not required by the VM activity, and pets (except for safety in remote locations) shall be prohibited in VM work activity sites. All trash, food items, and human-generated debris shall be properly contained and/or removed from the site.
7. All roads, fences, and structures damaged as a result of vegetation management operations shall be repaired. All gates shall be left open if found open or locked if found locked.
8. Contractor shall have a working cell phone or radio on the job site at all times capable of communicating with PG&E. If reception is not available at the job site, the closest area of reception shall be identified and all employees familiarized with that location.
9. All equipment shall be permitted by the Air Resources Board as required.
10. During fire season in designated State Responsibility Areas (SRAs), motorized equipment shall have federal or state approved spark arrestors; all vehicles shall be equipped with fire fighting tools as appropriate and in accordance with all applicable laws, rules, regulations, orders, and ordinances.
11. Contractor shall be responsible for checking daily Project Activity Level (PAL is a measure of fire weather conditions and, at certain levels, restricts activities otherwise permitted) during fire season when working on USFS property.
12. When routine VM activities are conducted in an area of potential valley elderberry longhorn beetle (VELB) habitat, a qualified individual shall survey for the presence of elderberry plants within a minimum of 20 feet from the worksite within the utility easement, ROW, franchise, or license, and shall note in VM Work Request documents to avoid or minimize potential impacts on elderberry plants. If elderberry plants have one or more stems 1 inch or more in diameter at ground level, additional measures identified in the VELB conservation plan shall be implemented. Otherwise, no additional minimization, avoidance, or protective measures are required.
13. All PG&E employees and contractors shall follow the VM Migratory Bird Process when applicable to VM activities to comply with Migratory Bird Treaty Act.
14. If cultural resources are found (i.e., old bottles, cans, buildings), they shall be left in place and undisturbed.

15. VM shall verify that the environmental screening process was followed prior to conducting VM activities associated with capital jobs and other non-VM work.

In addition to BMPS 1–15, BMPS 16–20 shall be applied to all distribution removal projects more than 100 feet in linear length and to electric transmission ROW clearing project activities including manual, mechanical, cultural, chemical, and biological techniques.

16. Prior to any ROW clearing project or any enhancement project, the California Natural Diversity Database (CNDDB) shall be checked for any records of threatened, endangered, or sensitive species.
17. Any locations identified through the CNDDB search shall be flagged and appropriate avoidance measures shall be put in place. Tailboards shall be held before work begins.
18. Sensitive habitats such as meadows, riparian areas, and serpentine outcrops shall be flagged, and appropriate avoidance measures shall be put in place. Tailboards shall be held before work begins.
19. All existing roads shall be kept open and erosion control measures reinstalled after the project is completed or during inclement weather.

In addition to BMPs 1–15, BMPs 20–25 shall be implemented for all VM activities that occur within a wetland, a pond, or a stream with a defined stream channel or banks.

20. Vegetation removal shall be completed without the use of self-propelled mechanical equipment (i.e. Hydro-ax, Brontosaurus, Slashbuster, etc.).
21. The disturbance or removal of vegetation within the work area shall not exceed the minimum necessary to complete operations, subject to other public and health and safety directives governing the safe operations and maintenance of electric and gas facilities. Precautions shall be taken to avoid damage to non-target vegetation.
22. Cleared or trimmed vegetation and woody debris shall be disposed of in a legal manner. All cleared vegetation and debris shall be removed from the wetland, pond, or stream with a defined stream channel or bank corridor and placed or secured where they cannot reenter the watercourse.
23. Vegetation that at mature height does not pose a threat to the conductors shall not be removed except as required for compliance with CPRC 4292.
24. Vehicle access to streams and wetlands shall be limited to existing roads and crossings.
25. When practical, maintenance activities within the project area shall be completed when the area is dry or during periods of minimum flow.

Table 4-8. Best Management Practices (BMPs) for Mechanical Clearing of Electric Transmission and Distribution Rights of Way (ROWs)

1. Contractor shall clear all vegetation 10 feet around and under all towers/poles and guy wires. Only manual clearing work can occur within the above-mentioned 10 feet. ***No mechanical equipment shall be used within 10 feet of the above-mentioned structures***. All vegetation cut under and within 10 feet of the towers shall be removed from the area and mulched to a depth not greater than 12 inches.
2. Vegetation that is mowed shall be mulched to a depth not greater than 18 inches.
3. Trees greater than 12" diameter at breast height (dbh) shall be hand-felled and then the top and limbs removed and the bole decked on the side of the right-of-way.
4. Contractor shall flag all guy wires 200 feet in advance of working an area using brightly colored flagging (a minimum of three flags per wire).
5. Contractor shall have a water source containing a minimum of 300 gallons of water and 250 feet of 1-inch hose on site at all times during operation. The water source must either be self-propelled or always attached to a vehicle capable of moving it to where it is needed. Where access/terrain allows contractor's water source must always be within 500 feet of the mowing/cutting operation. Excess water shall be disposed of in accordance with all laws and regulations.
6. Each mower shall have a minimum 10-lb. Class A,B,C fire extinguisher mounted in the cab.
7. Contractor must stay on site ½ hour after mowing operations end for the day to ensure fire safety. When extreme fire levels are reached, the following extra precautions must be implemented immediately:
   a. An additional support person shall be dedicated to follow the mower with an Indian Back Pump and McLeod. Mowing hours will be reduced to the hours of 5:00 a.m. through 12:30 p.m.
   b. The use of a humidity meter shall occur. A reading of less than (<) 20% humidity shall stop the mowing operation for the day. Readings shall be taken every 3 hours during operation.
8. Watercourse protection zones will be marked by the PG&E representative in charge with brightly colored flagging prior to the start of any mowing/timber operation. Water classes are defined by the California Forest Practice Rules: 14 CR 916.5.

Watercourse	Class I	Class II	Class III
Characteristics or Key Indicator Beneficial Use	1) Domestic supplies, including springs, on site and/or within 100 feet downstream of the operations area and/or 2) Fish always or seasonally present on site; includes habitat to sustain fish migration and spawning.	1) Fish always or seasonally present off site within 1,000 feet downstream and/or 2) Aquatic habitat for nonfish aquatic species 3) Excludes Class III waters that are tributary to Class I waters	No aquatic life present, watercourse showing evidence of being capable of sediment transport to Class I and II waters under normal high water flow conditions after completion of timber operations.

9. The following watercourse protection zone clearances must be maintained to the maximum extent possible:
   a. Class I & II watercourses with a slope < 30% — No heavy equip. within 50 feet
   b. Class I & II watercourses with a slope > 30% — No heavy equip. within 75 feet
   c. Class III watercourse — No heavy equip. within 25 feet

No mowing shall be allowed within above distances. Trees within the buffer shall be removed manually. Brush and other small vegetation shall be left for a shade canopy on the watercourse. The actual width of the watercourse protection zone may vary based on a PG&E representative's judgment in the field. All impaired watercourses and their protection zone clearances shall be identified before the project begins.

Table 4-9. Survey Strategy for Wildlife Species Covered by the PG&E San Joaquin Valley HCP

Common and Scientific Name	Legal Status[1]		Survey Approach[2]	Survey Timing
	Federal	State		
Vernal pool fairy shrimp *Branchinecta lynchi*	T	–	During preactivity surveys, a qualified biologist will determine whether vernal pools are present. If vernal pools are present, the biologist will recommend avoidance and minimization measures (AMMs) (From Table 4-1). Any additional surveys to determine the presence of vernal pool fairy shrimp will be conducted by a biologist having successfully completed USFWS fairy shrimp training. If no surveys are conducted to determine the shrimp's presence, vernal pools will be considered occupied by the species.	No restriction for habitat survey. December 1–March 15[3] for pool surveys for species' presence.
Midvalley fairy shrimp *Branchinecta mesovallensis*	P	–	During preactivity surveys, a qualified biologist will determine whether vernal pools are present. If vernal pools are present, the biologist will recommend AMMs (From Table 4-1). Any additional surveys to determine the presence of vernal pool fairy shrimp will be conducted by a biologist having successfully completed USFWS fairy shrimp training. If no surveys are conducted to determine the shrimp's presence, vernal pools will be considered occupied by the species.	No restriction for habitat survey; December 1–March 15[3] for pool surveys for species' presence
Vernal pool tadpole shrimp *Lepidurus packardi*	E	–	During preactivity surveys, a qualified biologist will determine whether vernal pools are present. If vernal pools are present, the biologist will recommend AMMs (From Table 4-1). Any additional surveys to determine the presence of vernal pool tadpol shrimp will be conducted by a biologist having successfully completed USFWS tadpole shrimp training. If no surveys are conducted to determine the shrimp's presence, vernal pools will be considered occupied by the species.	No restriction for habitat survey; December 1–March 15[3] for pool surveys for species' presence
California tiger salamander *Ambystoma californiense (=A. tigrinum c.)*	T	SSC	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will conduct a survey to determine whether potential aquatic habitat for California tiger salamander is present at the worksite or on accessible	No restriction for habitat survey.

Common and Scientific Name	Legal Status[1]		Survey Approach[2]	Survey Timing
	Federal	State		
			lands within 0.5 miles, and if potentially suitable habitat is present, will recommend AMMs from those listed in Table 4-1. Photodocumentation will be made of any habitat identified. Assessment of aquatic habitat will include recording water depth, vegetation present, other amphibians observed, connection to other water sources, and observations of any fish and crayfish.	
Limestone salamander *Hydromantes brunus*	SC	T	During preactivity surveys, a qualified biologist will conduct a survey for potential habitat (i.e., limestone rock outcrops and talus) at the worksite, and if potentially suitable habitat is present, will recommend AMMs from those listed in Table 4-1.	No restriction for habitat survey.
California red-legged frog *Rana aurora draytoni*	T	SSC	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search the worksite, and accessible areas within 300 feet of it, for aquatic habitat for California red-legged frog, and if potentially suitable habitat is present, will recommend AMMs from those listed in Table 4-1. Photodocumentation will be made of any habitat identified at the site. Assessment of aquatic habitat will include recording water depth, vegetation (emergent and submergent) present, other amphibians observed, connection to other water sources, and observations of any fish and crayfish.	No restriction for habitat survey.
Blunt-nosed leopard lizard *Gambelia (=Crotaphytus) silus*	E	E	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will walk the worksite looking for burrows. If appropriately sized burrows are located on the project site, additional protocol surveys would be necessary to determine presence/absence of the species. If protocol surveys are not conducted, the habitat will be considered occupied, and the biologist will recommend applicable AMMs from those listed in Table 4-1.	No restriction for habitat survey. Protocol surveys must be conducted between April 15–June 30 and August 1–September 15; require ambient temperatures between 25 ^{o}C and 35^{o}C and soil temperatures between 30–50 ^{o}C; and require six separate surveys of the site between 0900 and 1400 hours

Common and Scientific Name	Legal Status[1]		Survey Approach[2]	Survey Timing
	Federal	State		
			Protocol surveys involve systematic searches for active blunt-nosed leopard lizard burrows in all habitat at the worksite and within 30 feet of it. Biologists will conduct burrow searches by systematically walking 30- to 100-foot-wide transects throughout the area. Transect width will be adjusted based on vegetation height and topography. A burrow will be considered active if a blunt-nosed lizard or signs of it are observed at the burrow. Active burrows will be assigned a number and mapped on topographic maps. Active burrows will be flagged in the field with pin flags marked with the burrow number. Information on the size of the burrow, signs of activity, surrounding terrain and land cover type, presence of special habitat features (e.g., washes), and distance to other burrows will be recorded.	
Giant garter snake *Thamnophis gigas*	T	T	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search the worksite, and accessible areas within 250 feet of it, for garter snake habitat in perennial marsh and open water cover types. The biologist will evaluate and record attributes, including water depth, presence of emergent and submergent vegetation, and connection to other water bodies. If potentially suitable habitat is present, the biologist also will recommend AMMs from those listed in Table 4-1.	No restriction for habitat survey.
Swainson's hawk *Buteo swainsoni*	–	T	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will walk the worksite and an area within 0.25 miles of the worksite, and visually inspect all large trees with binoculars to document the presence or absence of active nests. If a potentially active Swainson's hawk nest is present, the biologist will recommend AMMs from Table 4-1.	March 15–September 15[4]; if the first survey is conducted in April, a second survey in May–July is recommended

Common and Scientific Name	Legal Status[1]		Survey Approach[2]	Survey Timing
	Federal	State		
White-tailed kite *Elanus caeruleus*	–	FP	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will walk the worksite and visually inspect all large trees with binoculars to document the presence or absence of active nests. If a potentially active white-tailed kite nest is present, the biologist will recommend AMMs from Table 4-1.	March 15–August 15[4]; if the first survey is conducted in April, a second survey in May–July is recommended
Western burrowing owl *Athene cunicularia hypugea*	SC	SSC	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will determine if any burrows are present that have evidence of use by owls (i.e. owls present, pellets, whitewash, or prey remains); The survey will include all accessible habitat within 250 feet of the worksite. If a potentially active western burrowing owl burrow is present, the biologist will recommend AMMs from Table 4-1.	No restriction for habitat survey.
Bank swallow *Riparia riparia*	–	T	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search the worksite, and accessible areas within 500 feet of it, for habitat and will visually inspect cliff faces to determine whether any swallows and/or swallow burrows are present. If any bank swallows or swallow burrows are present, the biologist will recommend AMMs from Table 4-1.	April 1–July 31
Tricolored blackbird *Agelaius tricolor*	SC	SSC	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search the worksite for nesting habitat. If potentially suitable habitat is present, the biologist will recommend AMMs from those listed in Table 4-1.	April 1–July 31[4]
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	E	E	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search all habitat at the worksite, and within 30 feet of it, for kangaroo rat burrows. Biologists will conduct burrow searches by systematically walking 30- to 100-foot-wide transects throughout the area where ground-disturbing activities will occur. Transect width will be adjusted based on	No restriction for habitat survey.

Common and Scientific Name	Legal Status[1]		Survey Approach[2]	Survey Timing
	Federal	State		
			vegetation height and topography. If a potentially active Tipton kangaroo rat burrow is found, and protocol surveys are not conducted, the burrow will be considered active and the biologist will recommend AMMs from Table 4-1. When a burrow or precinct is found, the biologist will measure the diameter of the burrow(s); evaluate the shape of the burrow entrance(s); and note tracks, scat, tail drags, or presence of haystacks at the site. Scat may be collected for later confirmation of species by known experts. All active and potential burrows or precincts will be assigned a number, mapped on topographic maps, and photographed. Burrows or precincts will be flagged in the field with pin flags marked with the burrow or precinct number and the species of kangaroo rat with which the structure is associated. Active and potential borrows or precincts will be distinguished from each other in the field by the pin flag color. Information on the size and number of burrows, signs of activity, surrounding terrain and habitat type, and distance to other burrows or precincts will be recorded.	
Giant kangaroo rat *Dipodomys ingens*	E	E	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search all habitat at the worksite, and within 30 feet of it, for kangaroo rat burrows. Biologists will conduct burrow searches by systematically walking 30- to 100-foot-wide transects throughout the area where ground-disturbing activities will occur. Transect width will be adjusted based on vegetation height and topography. If a potentially active giant kangaroo rat burrow is found, and protocol surveys are not conducted, the burrow will be assumed active and the biologist will recommend AMMs from Table 4-1. When a burrow or precinct is found, the biologist will measure the diameter of the burrow(s); evaluate the shape of the burrow entrance(s); and note tracks, scat, tail drags,	No restriction for habitat survey.

Common and Scientific Name	Legal Status[1]		Survey Approach[2]	Survey Timing
	Federal	State		
			or presence of haystacks at the site. Scat may be collected for later confirmation of species by known experts. All active and potential burrows or precincts will be assigned a number, mapped on topographic maps, and photographed. Burrows or precincts will be flagged in the field with pin flags marked with the burrow or precinct number and the species of kangaroo rat with which the structure is associated. Active and potential borrows or precincts will be distinguished from each other in the field by the pin flag color. Information on the size and number of burrows, signs of activity, surrounding terrain and habitat type, and distance to other burrows or precincts will be recorded.	
Buena Vista Lake shrew *Sorex ornatus relictus*	E	SSC	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search the worksite to determine whether suitable riparian habitat is present. If potentially suitable habitat is present, the biologist also will recommend AMMs from those listed in Table 4-1.	No restriction for habitat survey.
San Joaquin (Nelson's) antelope squirrel *Ammospermophilus nelsoni*	SC	T	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will conduct a single systematic search for San Joaquin antelope squirrel burrows in all suitable habitat at the worksite and within 30 feet of it. The biologist will conduct burrow searches by systematically walking 30- to 100-foot-wide transects throughout the area where ground-disturbing activities will occur. Transect width will be adjusted based on vegetation height and topography. If a potentially active San Joaquin antelope squirrel burrow is found, and protocol surveys are not conducted, the burrow will be considered active and the biologist will recommend AMMs from Table 4-1. When a burrow or precinct is found, the biologist will measure the diameter of the burrow(s); evaluate the shape of	No restriction for habitat survey.

Common and Scientific Name	Legal Status[1]		Survey Approach[2]	Survey Timing
	Federal	State		
			the burrow entrance(s); and note tracks, scat, tail drags, or presence of haystacks at the site. Scat may be collected for later confirmation of species by known experts. All active and potential burrows or precincts will be assigned a number, mapped on topographic maps, and photographed. Burrows or precincts will be flagged in the field with pin flags marked with the burrow or precinct number and the species of kangaroo rat with which the structure is associated. Active and potential borrows or precincts will be distinguished from each other in the field by the pin flag color. Information on the size and number of burrows, signs of activity, surrounding terrain and habitat type, and distance to other burrows or precincts will be recorded.	
Riparian (San Joaquin Valley) woodrat *Neotoma fuscipes riparia*	E	SSC	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search the worksite for riparian vegetation providing woodrat habitat. If potentially suitable habitat is present, the biologist also will recommend AMMs from those listed in Table 4-1	No restriction for habitat survey.
Riparian brush rabbit *Sylvilagus bachmani riparius*	E	E	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search the worksite for riparian vegetation providing brush rabbit habitat. If potentially suitable habitat is present, the biologist also will recommend AMMs from those listed in Table 4-1	No restriction for habitat survey.
San Joaquin kit fox *Vulpes macrotis mutica*	E	T	During preactivity surveys, within 30 days prior to O&M activities, a qualified biologist will search for habitat at the worksite and accessible areas within 250 feet of it. Habitat will be inspected for the presence of potential dens more than 5 inches in diameter. In the absence of additional surveys, dens will be considered active and the biologist will recommend AMMs from Table 4-1.	No restriction for habitat survey.

Common and Scientific Name	Legal Status[1]		Survey Approach[2]	Survey Timing
	Federal	State		
			Additional surveys to determine San Joaquin kit fox use of a potential den will monitor dens for evidence of San Joaquin kit fox use by placing a tracking medium at the den's entrances for at least three consecutive nights. PG&E will notify USFWS and DFG immediately if a natal or pupping den is found in the survey area. For active Dens, PG&E will notify USFWS and DFG verbally of the results of preactivity den searches and den excavations within 5 days after these activities are completed and before the start of O&M activities in the area. PG&E will notify USFWS and DFG in writing of the results within 30 days after these activities are completed.	

Notes:

[1] Status explanations:

Federal

E = listed as endangered under the federal Endangered Species Act.

T = listed as threatened under the federal Endangered Species Act.

C = species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list.

SC = species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.

D = delisted under the federal Endangered Species Act.

P = proposed for listing as threatened or endangered under the federal Endangered Species Act.

FS = U.S. Forest Service sensitive species.

– = no status.

State

E	=	listed as endangered under the California Endangered Species Act.
T	=	listed as threatened under the California Endangered Species Act.
FP	=	fully protected under the California Fish and Game Code.
SSC	=	species of special concern in California.
–	=	no status.

[2] = All surveys will record the percentage of the worksite providing habitat. Vegetation management excluded from these surveys because of limited habitat effects on covered species and BMPs.

[3] = Survey should be conducted after soaking rains.

[4] = The survey for nests needs to be conducted only if habitat is present at the site and O&M activities are planned during the nesting period. (Survey timing also is based on the nesting period.)

Table 4-10. Timing of Surveys for Covered Plant Species

Species	Survey Season[1]
Large-flowered fiddleneck *Amsinckia grandiflora*	April–May
Lesser saltscale *Atriplex minuscula*	May–October
Bakersfield smallscale *Atriplex tularensis*	June–October
Big tarplant *Blepharizonia plumosa* ssp. *plumosa*	July–October
Mariposa pussypaws *Calyptridium pulchellum*	April–August
Tree-anemone *Carpenteria californica*	July
Succulent owl's-clover *Castilleja campestris* ssp. *succulenta*	April–May
California jewelflower *Caulanthus californicus*	February–May
Hoover's spurge *Chamaesyce hooveri*	July–August
Slough thistle *Cirsium crassicaule*	May–August
Mariposa clarkia *Clarkia biloba ssp. australis*	May–July
Merced clarkia *Clarkia lingulata*	May–June
Springville clarkia *Clarkia springvillensis*	May–July
Vasek's clarkia *Clarkia tembloriensis ssp. calientensis*	April
Hispid bird's-beak *Cordylanthus mollis* ssp. *hispidus*	June–September
Palmate-bracted bird's-beak *Cordylanthus palmatus*	May–October
Kern mallow *Eremalche parryi* ssp. *kernensis*	March–May
Congdon's woolly sunflower *Eriophyllum congdonii*	May–June
Delta button-celery *Eryngium racemosum*	June–August
Striped adobe-lily *Fritillaria striata*	February–April
Bogg's Lake hedge-hyssop *Gratiola heterosepala*	April–August
Pale-yellow layia *Layia heterotricha*	March–June
Comanche Point layia *Layia leucopappa*	March–April
Legenere *Legenere limosa*	April–June

Species	Survey Season[1]
Panoche pepper-grass *Lepidium jaredii* ssp. *album*	March–May
Congdon's lewisia *Lewisia congdonii*	April–June
Mason's lilaeopsis *Lilaeopsis masonii*	April–November
Mariposa lupine *Lupinus citrinus* var. *deflexus*	April–May
Showy madia *Madia radiata*	March–May
Hall's bush mallow *Malacothamnus hallii*	May–September
San Joaquin woollythreads *Monolopia congdonii*	February–May
Pincushion navarretia *Navarretia myersii*	May
Colusa grass *Neostapfia colusana*	May–August
Bakersfield cactus *Opuntia basilaris* var. *treleasei*	Year-round
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	April–September
Hairy Orcutt grass *Orcuttia pilosa*	May–September
Hartweg's golden sunburst *Pseudobahia bahiifolia*	March–April
San Joaquin adobe sunburst *Pseudobahia peirsonii*	March–April
Keck's checkerbloom *Sidalcea keckii*	April–May
Oil netstraw *Stylocline citroleum*	March–April
Greene's tuctoria *Tuctoria greenei*	May–September
Kings gold *Twisselmannia californica*	March

Note:

[1] Survey seasons are based on the flowering period.

instances where a survey is not conducted, project effects will be evaluated and compensated for as described later in this chapter under Compensation.

Additional Pre-Activity Surveys

If preactivity surveys identify the need for AMMs 12–22 and these measures have not already been implemented, a qualified biologist will conduct additional pre-activity surveys, monitor the activity, and stake and flag exclusion zones, as necessary. These surveys will be conducted within 30 days prior to the activity, and will help ensure that effects on covered species are avoided, or if they are unavoidable, the effects will be minimized. An on-site biological monitor will be required in instances where there is a known presence of a covered species and where direct mortality may occur despite implementation of the AMMs.

Agency Monitoring and Inspection

USFWS and DFG staff are entitled to inspect PG&E's work areas and training and survey records.

Data Archiving

Survey results will be archived and entered into a database. Database fields will include the following:

- date;
- PG&E facility surveyed;
- survey location (i.e., GPS coordinates);
- total area surveyed (i.e., length and average width);
- species surveyed for;
- amount and type of suitable habitat for each species in areas to be disturbed;
- AMMs required as a result of the survey;
- AMMs implemented; and
- notes (e.g., site-specific recommendations).

A sample data collection form is provided in Figure 4-5.

Several measures will be implemented to ensure that the information in the database is complete and accurate. If field data collection forms have illegible or missing data, the data entry staff will return the forms, with the errors noted, to the surveyor for correction. Following each data entry session, the data entry technician will check that data were entered accurately for all species and all sites

surveyed. Also, to control data quality, PG&E is working to create a database with the following attributes:

- look-up tables with pull-down lists will be used for fields requiring unique values (e.g., species name);
- numeric values (e.g., habitat acreage) will be tested against preset maximum and minimum values to ensure that data are within valid ranges; and
- survey results cannot be finalized if mandatory data (e.g., date) are missing.

Compensation

Although PG&E will avoid and minimize effects to the extent practicable, some take is likely to result from O&M activities. To reduce potential impacts on sensitive habitats and species, PG&E will fund the acquisition, enhancement, and maintenance of habitat to conserve and promote the recovery of sensitive species within the HCP area. The approach to compensation, determination of compensation needs, compensation mechanisms, and attributes and management of compensation land are discussed below.

Approach

Compensation will be based on both documented and estimated habitat losses. Preactivity surveys will record the acreage of suitable habitat to be disturbed for all activities that could result in minor effects (i.e., more than 0.1 acre). Compensation will be based on these acreages. These acreages also will be used to estimate cumulative habitat losses resulting from activities typically affecting less than 0.1 acre and for which no preactivity surveys will be conducted. In addition, preactivity surveys will also verify the suitable habitat assumptions made in the HCP.

All permanent suitable habitat losses will be compensated for at a 3:1 ratio; temporary losses of suitable habitat will be mitigated at a 0.5:1 ratio. Loss of wetland habitats will be compensated for at a 3:1 ratio: 2 acres will be preserved and 1 acre will be created for each acre directly affected by using existing wetland mitigation banks. Compensation will occur by means of several mechanisms described below, including placement of conservation easements on existing PG&E lands, purchase of high-quality natural lands (particularly if they support target species), purchase of credits from existing mitigation banks, and purchase of conservation easements from willing sellers.

Compensation will be proposed by PG&E for approval by USFWS and DFG in 5-year increments. As activities occur over the 5-year period subsequent to advanced compensation, any surpluses and deficits that arise will be addressed by adjusting the compensation requirement during the subsequent 5-year compensation iteration. By providing compensation in 5-year increments, PG&E will stay ahead of project impacts. Toward the end of the 5-year period, the

Figure 4-5. Draft Pre-Activity Survey Data Collection Form

Wildlife Biologist: _____ **Date:** _____ **Time**: _____
Botanist: _____ **Date:** _____ **Time**: _____

Activity type(s) conducted (circle all that apply):

Gas

G1. Patrols
G2. Inspections
G3. Remedial Maintenance
G4. Compressor Station Maintenance
G5. Pipeline Electric Test System (ETS)
G6. Pipeline Valve Recoating
G7. Pipeline Valve Replacement
G8. Pipeline Cathodic Protection
G9. Pipeline Lowering
G10. Pipeline Coating Replacement
G11. Pipeline Replacement
G12. Telecommunication Site Maintenance
G13. Vegetation Management
G14. Pipeline Pressure Limiting Station
G15. Pipeline Valve Installation
G16. New/Replacement Pipeline Construction

Electric

E1. Patrols
E2. Inspections
E3. Electric Insulator Washing
E4. Electric Substation Maintenance
E5. Electric System Outage Repair
E6. Tower Replacement/Repair
E7. Transmission System Repair
E8. Pole/Equipment Repair/Replacement
E9. Electric Line Reconductoring
E10. Vegetation Management
E11. Test and Treat (Remedial Maintenance)
E12. Electric Pole Line Construction/Relocation
E13. Tower Line Minor Construction
E14. Substation Minor Construction/Expansion

County: _____ **Coordinates**: _____

PG&E Job Number: _____ **Pole Number/Mile Marker:** _____

Land cover type(s) of work site and immediately adjacent land (check all that apply):

Land Cover Type	Work Site	Adjacent	Land Cover Type	Work Site	Adjacent
Agricultural fields			Other developed & disturbed lands		
Blue oak woodland			Permanent freshwater wetland		
Blue oak/foothill pine			Seasonal wetland		
Coastal live oak			Upland scrub		
Conifer			Urban		
Grassland			Woody riparian		
Montane hardwood					
Open water					

Were vernal pools on-site or nearby? YES NO **Approximate distance (ft):** _____

Were other wetlands or waterways on-site or nearby? YES NO **Approximate distance (ft):** _____

Job Site Area: Length (ft) _____ x Width (ft) _____ = Area _____

[Job site is defined as a single box enclosing all areas disturbed or entered by any equipment or individuals.]

Area Estimated to be Disturbed by Activity			
Disturbance Code[1]	**Length (ft)**	**Width (ft)**	**Area**
			Total Area:

[1] – Disturbance codes: T-E = temporary disturbance due to excavation, T-O = other temporary disturbance (e.g., staging and parking areas), P = permanent disturbance.

Figure 4-5. Continued

Wildlife Species:

What percent of the job site is suitable habitat for the following wildlife species:

Species	% of work site (circle one)	Species	% of work site (circle one)
Vernal pool fairy shrimp	0 0-25 26-50 51-75 76-100	Western burrowing owl	0 0-25 26-50 51-75 76-100
Midvalley fairy shrimp	0 0-25 26-50 51-75 76-100	Bank swallow	0 0-25 26-50 51-75 76-100
VELB	0 0-25 26-50 51-75 76-100	Tricolored blackbird	0 0-25 26-50 51-75 76-100
Limestone salamander	0 0-25 26-50 51-75 76-100	Tipton kangaroo rat	0 0-25 26-50 51-75 76-100
California tiger salamander	0 0-25 26-50 51-75 76-100	Giant kangaroo rat	0 0-25 26-50 51-75 76-100
California red-legged frog	0 0-25 26-50 51-75 76-100	Buena Vista Lake shrew	0 0-25 26-50 51-75 76-100
Blunt-nosed leopard lizard	0 0-25 26-50 51-75 76-100	Riparian (SJV) woodrat	0 0-25 26-50 51-75 76-100
Giant garter snake	0 0-25 26-50 51-75 76-100	Riparian brush rabbit	0 0-25 26-50 51-75 76-100
		SJ antelope squirrel	0 0-25 26-50 51-75 76-100
Swainson's hawk	0 0-25 26-50 51-75 76-100	SJ kit fox	0 0-25 26-50 51-75 76-100
White-tailed kite	0 0-25 26-50 51-75 76-100	Bald Eagle	0 0-25 26-50 51-75 76-100
		Golden Eagle	0 0-25 26-50 51-75 76-100

1) If a value other than 0 is selected for VELB then AMM 12 should be implemented,
2) If a value other than 0 is selected for California black rail, then AMM 18 should be implemented,
3) If a value other than 0 is selected for California red-legged frog or giant garter snake, then AMMs 16 and 17 should be implemented, and
4) If a value other than 0 is selected for California tiger salamander, Limestone salamander or Blunt-nosed leopard then AMMs 17 and/or 25 should be implemented.

Were any of the above species identified on or near the site? YES NO If yes, which: _____

_____

Were potentially active Swainson's hawk, White-tailed kite nests observed? YES NO If yes, describe species and nest location, including GPS coordinates (with associated datum) for the nest or its vicinity:

_____

_____

_____

[If the answer to the above question is "YES" then AMMs 20 and 23 should be implemented.]

Was a nesting colony of Tricolored Blackbird or Bank Swallow present? YES NO If yes, describe species and colony's location, including GPS coordinates (with associated datum) for the habitat or its vicinity: _____

_____

_____

_____

[If the answer to the above question is "YES", then AMM 24 should be implemented.]

Were potentially active blunt-nosed leopard lizard, giant or Tipton kangaroo rat burrows, or San Joaquin antelope squirrel burrows observed? YES NO If yes, provide notes regarding burrow dimensions, signs of animal use, and its GPS coordinates (including the datum associated with the coordinates). In addition, attach a topographic or other map of the site with the locations of all active and potential burrows, burrow numbers, and photographs of the burrows (electronic files for digital photos preferred):

_____

_____

_____

_____

_____

[If the answer to the above question is "YES", then AMMs 21 and/or 25 should be implemented.]

Figure 4-5. Continued

Were potentially occupied San Joaquin kit fox burrows observed? YES NO If yes, provide notes regarding burrow dimensions, signs of animal use, and its GPS coordinates (including the datum associated with the coordinates). In addition, attach a topographic or other map of the site with the locations of all active and potential burrows, and photographs of the burrows (electronic files for digital photos preferred):

_____
_____
_____
_____
_____

[If the answer to the above question is "YES", then AMM 22 should be implemented.]

Plants Species:

Were plant surveys conducted during an appropriate seasonal identification window? YES NO

Was a CNDDB search conducted for the activity? YES NO

If yes, were any records located within 200m of the activity? YES NO

Were any species identified on-site?

Species	Present	Area of Population	Approx. # Individuals	Notes
	YES NO			

[If in the above table, the answer is "yes" for any species, then AMMs 9, 10, 11, 13, 14, 30 and 31 should be implemented]

Figure 4-5. Continued

Which of the following avoidance and minimization measures (if any) should be implemented on this site? [DK = Don't know]

Note: When working in areas of natural vegetation, these avoidance and minimization measures (AMMs) will be implemented where practicable. Measures are practicable where physically possible and not conflicting with other regulatory obligations or safety considerations. Avoidance is always preferable to minimization, and avoidance is required for fully protected species. AMMs 1–11will be implemented for all O&M activities. AMMs 12–21 will be implemented as needed to minimize or avoid effects on species as identified by surveys for activities disturbing >0.1 acre. AMMs 22–30 will be implemented as needed to minimize or avoid effects on species as identified by surveys for small-, medium-, and large-disturbance activities.

Code	Avoidance and Minimization Measure	Applicable?
AMM 1	Employees and contractors performing O&M activities will receive ongoing environmental education. Training will include review of environmental laws and guidelines that must be followed by all personnel to reduce or avoid effects on covered species during O&M activities.	YES NO DK
AMM 2	Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas to the extent practicable.	YES NO DK
AMM 3	The development of new access and ROW roads by PG&E will be minimized, and clearing vegetation and blading for temporary vehicle access will be avoided to the extent practicable.	YES NO DK
AMM 4	Vehicles will not exceed a speed limit of 15 mph in the ROWs or on unpaved roads within sensitive land-cover types.	YES NO DK
AMM 5	Trash dumping, firearms, open fires (such as barbecues) not required by the O&M activity, hunting, and pets (except for safety in remote locations) will be prohibited in O&M work activity sites.	YES NO DK
AMM 6	No vehicles will be refueled within 100 feet of a wetland, stream, or other waterway unless a bermed and lined refueling area is constructed.	YES NO DK
AMM 7	During any reconstruction of existing overhead electric facilities in areas with a high risk of wildlife electrocution (e.g., nut/fruit orchards, riparian corridors, areas along canal or creek banks, PG&E's raptor concentration zone [RCZ]), PG&E will use insulated jumper wires and bird/animal guards for equipment insulator bushings or will construct lines to conform to the latest revision of PG&E's Bird and Wildlife Protection Standards.	YES NO DK
AMM 8	During fire season in designated State Responsibility Areas (SRAs), all motorized equipment will have federal or state approved spark arrestors; a backpack pump filled with water and a shovel will be carried on all vehicles; and fire-resistant mats and/or windscreens will be used when welding. In addition, during "red flag" conditions as determined by California Department of Forestry (CDF), welding will be curtailed, each fuel truck will carry a large fire extinguisher with a minimum rating of 40 B:C, and all equipment parking and storage areas will be cleared of all flammable materials.	YES NO DK
AMM 9	Erosion control measures will be implemented where necessary to reduce erosion and sedimentation in wetlands, waters of the United States, and waters of the state, and habitat occupied by covered animal and plant species when O&M activities are the source of potential erosion problems.	YES NO DK
AMM 10	If an activity disturbs more than 0.25 acre in a previously undisturbed natural vegetation, and the landowner approves or it is within PG&E rights and standard practices, the area should be returned to pre-existing conditions and broadcast-seeded using a commercial seed mix. Seed mixtures/straw used for erosion control on projects of all sizes within sensitive land-cover types will be certified weed-free.	YES NO DK

Figure 4-5. Continued

Code	Avoidance and Minimization Measure	Applicable?
AMM 11	When routine O&M activities are conducted in an area of potential VELB habitat, a qualified individual will survey for the presence of elderberry plants within a minimum of 20 feet from the worksite. If elderberry plants have one or more stems measuring 1 inch or more in diameter at ground level are present, the qualified individual will flag those areas to avoid or minimize potential impacts on elderberry plants. If impacts (pruning/trimming, removal, ground disturbance or damage) are unavoidable or occur, then additional measures identified in the VELB conservation plan and compliance brochure will be implemented. The VELB compliance brochure must be carried in all vehicles performing O&M activities within the potential range of VELB.	YES NO DK
AMM 12	If a covered plant species is present, a qualified biologist will stake and flag exclusion zones of the maximum practicable distance up to 100 feet around individuals of the covered species prior to O&M activities*. (Note: AMM 11 addresses elderberry plants and valley elderberry longhorn beetle.)	YES NO DK
AMM 13	If a covered annual plant species is present, O&M activities will occur after plant senescence and prior to the first significant rain to the extent practicable.	YES NO DK
AMM 14	If a covered plant species is present, the upper 4 inches of topsoil will be stockpiled separately during excavations. When this topsoil is replaced, compaction will be minimized to the extent consistent with utility standards.	YES NO DK
AMM 15	If vernal pools are present, a qualified biologist will stake and flag an exclusion zone prior to O&M activities. The exclusion zone will encompass the maximum practicable distance from the worksite up to 100 feet where pools are upslope from the worksite and 250 feet where the pools are downslope from the worksite.* Work will be avoided after the first significant rain until June 1, or until pools remain dry for 72 hours.	YES NO DK
AMM 16	If suitable habitat for giant garter snake or California red-legged frog is present and protocol-level surveys have not been conducted, a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 250 feet around the habitat prior to O&M activities.* Work will be avoided within this zone from October 1 to May 1 for giant garter snake and from the first significant rain to May 1 for California red-legged frog.	YES NO DK
AMM 17	If suitable habitat for covered amphibians and reptiles is present and protocol-level surveys have not been conducted, a qualified biologist will conduct preconstruction surveys prior to O&M activities involving excavation. If necessary, barrier fencing will be constructed around the worksite to prevent reentry by the covered amphibians and reptiles. A qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 50 feet around the potentially occupied habitat.* No monofilament plastic will be used for erosion control in the vicinity of listed amphibians and reptiles. Barrier fencing will be removed upon completion of work.	YES NO DK
AMM 18	If western burrowing owls are present at the site, a qualified biologist will work with O&M staff to determine whether an exclusion zone of 160 feet during the non-nesting season and 250 feet during the nesting season can be established. If it cannot, an experienced burrowing owl biologist will develop a site-specific plan (i.e., a plan that considers the type and extent of the proposed activity, the duration and timing of the activity, the sensitivity and habituation of the owls, and the dissimilarity of the proposed activity with background activities) to minimize the potential to affect the reproductive success of the owls.	YES NO DK
AMM 19	If a Swainson's hawk nest or white-tailed kite nest is known to be within 0.25 mile of a planned worksite, a qualified biologist will evaluate the effects of the planned O&M activity. If the biologist determines that the activity would significantly disrupt nesting, a buffer and limited operation period (LOP) during the nesting season (March 15–June 30) will be implemented. Evaluations will be performed in consultation with the local DFG representative.	YES NO DK

Figure 4-5. Continued

Code	Avoidance and Minimization Measure	Applicable?
AMM 20	If potential active burrows for San Joaquin antelope squirrel or giant or Tipton kangaroo rat are present, a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 30 feet around the burrows prior to O&M activities at the job site.*	YES NO DK
AMM 21	If potentially occupied San Joaquin kit fox dens are present, their disturbance and destruction will be avoided where possible. However, if potentially occupied dens are located within the proposed work area and cannot be avoided during construction, qualified biologists will determine if the dens are occupied. If unoccupied, the qualified biologist will remove these dens by hand excavating them in accordance with USFWS procedures (U.S. Fish and Wildlife Service 1999). Exclusion zones will be implemented following USFWS procedures (U.S. Fish and Wildlife Service 1999) or the latest USFWS procedures. The radius of these zones will follow current standards or will be as follows: Potential Den—50 feet; Known Den—100 feet; Natal or Pupping Den—to be determined on a case-by-case basis in coordination with USFWS and DFG. Pipes will be capped and exit ramps will also be installed in these areas to avoid direct mortality.	YES NO DK
AMM 22	All vegetation management activities will implement the nest protection program to avoid and minimize effects on Swainson's hawk, white-tailed kite, golden eagle, bald eagle, and other nesting birds. Additionally, trained pre-inspectors will use data from HCP Administrator and CNDDB from the past 5 years to determine whether active Swainson's hawk, golden eagle, or bald eagle nests are located near proposed work. If pre-inspectors identify an active nest near a proposed work area, they will prescribe measures to avoid nest abandonment, including working the line another time of year, maintaining a 500-foot setback, or if the line is in need of emergency pruning, contacting HCP Administrator.	YES NO DK
AMM 23	If activities take place in at a previously known or current breeding colony of tricolored blackbirds or bank swallows a qualified biologist will evaluate the site prior to work during the breeding season (April 1-July 31). If and active colony of either species is present, the biologist will stake and flag an exclusion zone of the maximum practicable distance up to 350 feet around the colony prior to O&M activities at the site. Work will be avoided in this zone during April 1–July 31.*	YES NO DK
AMM 24	If activities take place in blunt-nosed leopard lizard habitat and outside the road ROW, PG&E staff will identify if burrows are present and if work can avoid burrows. If work cannot avoid the burrows, a qualified biologist will evaluate the site for occupancy and stake and flag an exclusion zone of the maximum practicable distance up to 50 feet around the burrows prior to O&M activities at the job site.*	YES NO DK
AMM 25	If activities take place in designated occupied habitat[1] of Buena Vista Lake shrew, a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 100 feet, and PG&E staff will minimize the use of mechanical equipment and the area of ground disturbance.	YES NO DK
AMM 26	If activities take place in designated occupied habitat[1] of the riparian brush rabbit, a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 100 feet, and PG&E staff will minimize the use of mechanical equipment and the area of ground disturbance. Work will be avoided during the reproductive period (January 1 to May 31).	YES NO DK
AMM 27	If activities take place in designated occupied habitat[1] of the riparian woodrat, a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 100 feet around the habitat, and PG&E staff will minimize the use of mechanical equipment and the area of ground disturbance.	YES NO DK

Figure 4-5. Continued

Code	Avoidance and Minimization Measure	Applicable?
AMM 28	If activities take place in designated occupied habitat[1] of the limestone salamander, a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 100 feet around the habitat, and PG&E staff will minimize the use of mechanical equipment and minimize the area of ground disturbance.	YES NO DK
AMM 29	No herbicide will be applied within 100 feet of exclusion zones, except when applied to cut stumps or frilled stems or injected into stems.	YES NO DK
AMM 30	Trees being felled in the vicinity of an exclusion zone will be directionally felled away from the zone, where possible. If this is not feasible, the tree will be removed in sections.	

- If an exclusion zone cannot extend the specified distance from the habitat, the biologist will stake and flag a restricted activity zone of the maximum practicable distance from the exclusion zone around the habitat. This exclusion zone distance is a guideline that may be modified by a qualified biologist, based on site specific conditions (including habituation by of the species to background disturbance levels). Measures are practicable where physically possible and not conflicting with other regulatory obligations or safety considerations; O&M activities will be prohibited or greatly restricted within restricted activity zones. However, vehicle operation on existing roads and foot travel will be permitted. A qualified biologist will monitor O&M activities near flagged exclusion and restricted activity zones. Within 60 days after O&M activities have been completed at a given worksite, all staking and flagging will be removed.
- [1] Designated occupied habitat is defined as all land within 2 miles of a CNDDB occurrence and suitable land within 5 miles of a CNDDB occurrence.

Additional Notes: _____

_____

_____

Recommendations for future activities of similar nature: _____

_____

amount of advance compensation will decline. However, PG&E will prepare to purchase the second 5-year increment in year 4, or as needed, to ensure the compensation stays ahead of project effects. Compensation for the rarest of plants will occur as close as possible to the time of disturbance but will not occur more than 2 years after the disturbance.

Rationale for Proposed Compensation Ratio

~~PG&E is proposing a compensation ratio of 0.5:1 for temporary effects because the effects of small disturbances have been conservatively estimated given the majority of habitat disturbances are of small size (<0.1 acre) and of short duration (several hours to several days); this makes the PG&E's HCP unique relative to many other projects with temporary habitat disturbance. PG&E activities also result in disturbance that recovers rapidly because the vast majority of these disturbances will occur in areas that were previously disturbed or are subject to quick recovery (i.e., grassland). PG&E is also providing permanent habitat protection to offset temporary project effects, including making purchases in advance of project effects. In sum, the biological effects of the project are minimal compared to total available habitat, direct mortality effects of the project are minimal and supported by the mitigation proposed, and the uncertainty of effects estimated in the HCP will be verified with annual and periodic monitoring.~~

This HCP is unique in that it primarily addresses small-scale temporary effects that are dispersed over a large geographic area. PG&E is proposing a compensation ratio of 0.5:1 for temporary effects. AMMs will be consistently applied to temporary disturbance activities. As discussed in Chapter 3, the vast majority (greater than 95%) of activities result in very small disturbances (<0.1 acres) and are considered to have a very low potential for species effects. Potential effects of small disturbances have been conservatively estimated in that small disturbances are assumed to support covered species habitat in the same proportion as activities that have pre-activity surveys, when in fact they probably do not support covered species habitat to the same extent. Because of the small size of the majority of the activities, the habitat will continue be usable by most species immediately after the activity is completed (i.e., the habitat will still support most breeding, foraging, sheltering, dispersal, and colonization opportunities). Some species with large home ranges (e.g., raptors and kit fox) would not be affected by the disturbance of very small amounts of habitat within their home ranges; for the kit fox for example, O&M activities would result in the temporary disturbance of 73 acres of habitat dispersed throughout the Plan Area out of 2.8 million acres of suitable habitat. In addition, PG&E activities causing temporary effects are of short duration (several hours to several days). PG&E activities result in disturbance that recovers rapidly (1 to 3 years) because the vast majority of these temporary disturbances will occur in areas that were previously disturbed or are habitats that recover relatively quickly (i.e., annual grassland). PG&E is also providing permanent habitat protection to offset temporary effects, including making compensation purchases in advance of project effects. Perpetual protection and management of habitats on conservation lands will ensure that there is a net increase in the habitat value of those lands.

Over time, this increase in habitat value will greatly exceed the effects of temporary habitat losses, even at the proposed 0.5:1 ratio for temporary effects. The purchase of compensation lands in advance of project effects also serves to ensure that benefits accrue to the species before the effects occur. In summary, the effects of the project on species habitat are minimal compared to total available habitat in the Plan Area, direct species mortality effects of the activities are very minimal and are further reduced by the implementation of AMMs, unavoidable project effects are expected to be fully compensated by the mitigation proposed, and the effects estimated in the HCP will be verified with annual reporting on the number of activities and size of activities and periodic audits of project effects during the first three years of the program (see Chapter 6, "Monitoring, Reporting, and Adaptive Management Program.").

Determination of Compensation Needs

Required compensation will be based on documented and estimated habitat losses. Where preactivity surveys are not practicable for the widely dispersed sites at which numerous O&M activities affect relatively small areas (in some cases less than 0.01 acre), habitat losses will be estimated. These estimates are discussed in Chapter 3 and are based on:

- the activity type;
- the area typically disturbed by that activity (Table 3-1);
- the distribution of covered species across counties (as given in tables in Appendix B);
- the estimated percentage of each land-cover type providing habitat for each covered species (Table 3-8); and
- the county and mapped land-cover type(s) of the facility.

For small-disturbance activities (i.e., activity types typically affecting <0.1 acre), the total land area disturbed will be estimated as the area typically affected by that type of activity (Table 3-1) multiplied by the number of times that activity type occurred (data collection will occur for all activities is described in Chapter 6, "Monitoring, Reporting, and Adaptive Management Program"). For example, if activity E8, Pole Equipment Repair or Replacement, were performed 1,000 times, the total disturbed area would be estimated at 32 acres because this activity typically disturbs 0.032 acres (1,000 times 0.032 = 32). To estimate the portion of this disturbed area that was suitable as habitat for a particular species, the total land area disturbed will be multiplied by the proportion of disturbed habitat considered suitable for that species by biologists conducting surveys prior to other activities. For example, if 50% of land was considered suitable habitat for San Joaquin kit fox during preactivity surveys, activity E8 would disturb an estimated 16 acres of San Joaquin kit fox habitat (50% times 32 = 16). A similar estimate will be made for any activities causing medium disturbance (i.e., activity types typically affecting >0.1 acre) that were not preceded by a survey (e.g., emergency activities).

Actual habitat losses and compensation for valley elderberry longhorn beetle will be determined as described below under Consideration of Regional Species Effects and Compensation and in Chapter 5, "Effects Determinations and Requested Take Authorization."

O&M activities resulting in temporary effects on agricultural fields and developed or disturbed lands ~~are excluded from~~do not require compensation. These land-cover types undergo regular disturbance comparable in intensity to, and more extensive than, the effects of O&M activities and the potential for direct take is small. Therefore, the conditions resulting from O&M activities will be consistent with existing conditions on these lands.

The compensatory mitigation lands will provide a greater area of habitat than that lost as a result of PG&E's O&M activities including direct effects that could be associated with other disturbances. First, PG&E is providing permanent compensation for temporary effects. Second, the area of mitigation lands will be substantially more than the maximum area of habitat in a disturbed state because grassland effects often recover within several years. Third, although the effects of a small activity on an individual species may be disproportionately less severe than the effects of a larger activity (e.g., an activity resulting in effects >0.1 acre), the compensation for all effects will be provided on a per-acre basis. For example, activities causing habitat loss of less than 0.1 acre affect an insignificant proportion of the home range of species such as Swainson's hawk or San Joaquin kit fox, and thus probably have no effect on these species. Nevertheless, these small acreages will be mitigated.

Compensation estimates are based on species habitat loss. Compensation acreages were generated by:

1. Acreages of permanent disturbance were multiplied by 3 and acreages of temporary disturbance by 0.5 and then the products were summed to provide compensation acreage for each county-species-land-cover-type combination.

2. The numbers for each combination of species and land-cover type were summed for the counties within each of the three compensation regions. This resulted in three tables, one for each compensation region.

3. For each land cover type, the maximum compensation acreage for a species was used as the required compensation for that land-cover type. This assumes that all compensation acreage for the most widespread species within the land-cover type also provides habitat for all of the other species requiring compensation for disturbance to that land-cover type in that region of the San Joaquin Valley.

4. The acreages for the different land-cover types were summed into a regional total of approximately 43 acres per year (Table 4-11). This total represents the minimum acreage of land that actually would have to be provided in order to provide the specified compensation for each land cover type. It is unlikely that parcels of land can be acquired with exactly these acreages for

each land-cover type, and thus some additional land would need to be acquired.

5. Regional totals and species effects were evaluated to determine if species requirements were achieved. Species with co-existing habitats and ranges were grouped and one-year and five-year compensation requirements were estimated (Table 4-12).

Table 4-11 shows the sum of temporary and permanent mitigation for each species based on the activity information, regional distribution of facilities, land-cover type disturbances, species ranges, and percent of habitat suitable for occupancy by the species that are affected. Table 4-12 provides an estimate of the acreage requirements to achieve compensation for the various suites of species and illustrates how the mitigation requirements could be combined to maximize multiple species benefits.

Vernal pool and plant effects were calculated separately. Based on the analyses in Chapter 3, most vernal pools and covered plant species are unlikely to be directly affected by a single O&M activity. AMMs will limit overall effects, but approximately 17 acres of vernal pools and approximately 4–25 acres of occupied plant habitat will be affected over 30 years. Vernal pool effects include temporary and permanent effects, and are most likely in counties with the greatest density of vernal pools. The plant species with occurrences of the largest area and the greatest number of documented occurrences in the study area are most likely to be affected, while the species with the smallest and fewest occurrences are the least likely to be affected. Anticipated plant compensation requirements are illustrated in Table 4-13.

Compensation is proposed in 5-year increments. As activities occur over the 5-year period subsequent to advanced compensation, any surpluses will be addressed by adjusting the compensation requirement during the subsequent 5-year compensation period. Toward the end of each 5-year period, the amount of advance compensation will decline. If it appears that the amount of compensation required will exceed the amount remaining in that 5-year increment, PG&E will either purchase the next 5-year increment early, or purchase sufficient compensation so that project compensation stays ahead of impacts. By providing compensation in 5-year increments and purchasing additional compensation lands early if it appears that they will run out of excess compensation, PG&E will stay ahead of project impacts.

There is some uncertainty with respect to actual species effects for very limited distribution wildlife and very rare plants. The HCP is written to avoid, minimize, and mitigate effects to all covered species, but pre-activity surveys for the rarest wildlife species (i. e., riparian brush rabbit, Buena Vista lake shrew, riparian woodrat and limestone salamander) will ultimately determine if there is the potential for an effect and if a particular activity needs to be mitigated; in these instances, mitigation must occur in advance of the impact. Potential effects for the very rare plant species will be similarly determined. In instances where the rarest of plants could be affected, substantial efforts will be made to avoid and

Table 4-11. Estimates of Regional Compensation by Land-Cover Type (acres)[1]

Natural Community	Regional Land-cover Type	Total Compensation[2]		Species-Specific Disturbance Estimates[3]																			
		5 year total	1 year total	Valley elderberry longhorn beetle	California tiger salamander	Limestone salamander	California red-legged frog	Blunt-nosed leopard lizard	Giant garter snake	Swainson's hawk	White-tailed kite	Golden eagle	Bald eagle	Western burrowing owl	Bank swallow	Tricolored blackbird	Buena Vista Lake shrew	Riparian brush rabbit	Riparian (san Joaquin) woodrat	Tipton kangaroo rat	Giant kangaroo rat	San Joaquin (nelson's) antelope squirrel	San Joaquin kit fox
North San Joaquin Valley																							
Woodland	Blue Oak Woodland	1.77	0.35	0.18	0.07	0.11	0.06	--	--	0.03	0.13	**0.35**	0.07	--	--	0.06	--	--	--	--	--	--	0.03
	Blue Oak/Foothill Pine	0.55	0.11	**0.11**	--	0.08	0.03	--	--	--	--	--	0.04	--	--	--	--	--	--	--	--	--	--
	Coastal Oak Woodland	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Valley Oak Woodland	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Conifer	0.29	0.06	--	--	**0.06**	--	--	--	--	--	--	0.03	--	--	--	--	--	--	--	--	--	--
	Montane Hardwood	0.71	0.14	--	--	**0.14**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Grassland	Grassland	51.90	10.38	--	4.75	--	0.74	--	0.74	3.71	1.48	1.58	0.79	0.74	--	0.30	--	--	--	--	--	--	**10.38**
Wetland	Permanent Freshwater Wetland	0.03	0.01	--	0.01	--	0.01	--	0.01	--	--	--	0.01	--	--	--	--	--	--	--	--	--	--
	Seasonal Wetland	0.06	0.01	--	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--	0.01
	Open Water	0.28	0.06	--	0.03	--	0.03	--	0.03	--	--	--	**0.06**	--	--	--	--	--	--	--	--	--	--
Scrub	Upland Scrub	0.14	0.03	--	--	0.03	--	--	--	--	--	0.03	0.01	--	--	--	--	--	--	--	--	--	--
Woody Riparian	Woody Riparian	1.08	0.22	0.22	--	--	--	--	--	0.22	0.07	--	0.01	--	--	--	--	0.02	0.02	--	--	--	--
	Subtotal	56.81	11.36	0.50	4.86	0.42	0.87	0.00	0.77	3.96	1.68	1.97	1.02	0.75	0.00	0.37	0.00	0.02	0.02	0.00	0.00	0.00	10.42

Table 4-11. Continued

Natural Community	Regional Land-cover Type	Total Compensation[2]		Species-Specific Disturbance Estimates[3]																		
		5 year total	1 year total	Valley elderberry longhorn beetle	California tiger salamander	Limestone salamander	California red-legged frog	Blunt-nosed leopard lizard	Giant garter snake	Swainson's hawk	White-tailed kite	Golden eagle	Bald eagle	Western burrowing owl	Bank swallow	Tricolored blackbird	Buena Vista Lake shrew	Riparian brush rabbit	Riparian (san Joaquin) woodrat	Tipton kangaroo rat	Giant kangaroo rat	San Joaquin (nelson's) antelope squirrel	San Joaquin kit fox
Central San Joaquin Valley																						
Woodland	Blue Oak Woodland	5.38	1.08	0.54	0.22	--	0.44	--	--	0.22	1.08	1.08	0.22	--	--	0.54	--	--	--	--	--	--	0.22
	Blue Oak/Foothill Pine	1.45	0.29	**0.29**	--	--	0.17	--	--	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--
	Coastal Oak Woodland	0.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Valley Oak Woodland	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Conifer	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Montane Hardwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Grassland	Grassland	63.51	12.70	--	5.44	--	0.71	5.44	0.91	4.54	1.81	1.81	0.91	0.91	--	0.36	--	--	--	--	0.73	9.07	**12.70**
Wetland	Permanent Freshwater Wetland	0.04	0.01	--	0.01	--	0.01	--	0.01	--	--	--	0.01	--	--	--	--	--	--	--	--	--	--
	Seasonal Wetland	0.15	0.03	--	0.01	--	--	--	--	**0.03**	0.01	--	0.01	0.01	--	0.01	--	--	--	--	--	--	0.02
	Open Water	0.21	0.04	--	0.02	--	0.02	--	0.02	--	--	--	**0.04**	--	--	--	--	--	--	--	--	--	--
Scrub	Upland Scrub	0.14	0.03	--	--	--	--	**0.03**	--	--	--	0.01	0.01	0.01	--	--	--	--	--	--	0.01	0.03	0.03
Woody Riparian	Woody Riparian	1.63	0.33	0.33	--	--	--	--	--	0.33	0.10	--	0.01	--	--	--	--	--	--	--	--	--	--
	Subtotal	72.55	14.51	1.15	5.70	0.00	1.35	5.47	0.94	5.11	3.00	2.90	1.32	0.93	0.00	0.91	0.00	0.00	0.00	0.00	0.74	9.10	12.97

Table 4-11. Continued

Natural Community	Regional Land-cover Type	Total Compensation[2]		Species-Specific Disturbance Estimates[3]																		
		5 year total	1 year total	Valley elderberry longhorn beetle	California tiger salamander	Limestone salamander	California red-legged frog	Blunt-nosed leopard lizard	Giant garter snake	Swainson's hawk	White-tailed kite	Golden eagle	Bald eagle	Western burrowing owl	Bank swallow	Tricolored blackbird	Buena Vista Lake shrew	Riparian brush rabbit	Riparian (san Joaquin) woodrat	Tipton kangaroo rat	Giant kangaroo rat	San Joaquin (nelson's) antelope squirrel	San Joaquin kit fox
South San Joaquin Valley																						
Woodland	Blue Oak Woodland	1.48	0.30	0.15	0.06	--	0.04	--	--	0.06	0.30	0.30	0.06	--	--	0.15	--	--	--	--	--	--	0.06
	Blue Oak/Foothill Pine	0.10	0.02	0.02	--	--	--	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--	--	--
	Coastal Oak Woodland	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Valley Oak Woodland	3.77	0.75	0.38	0.15	--	--	--	--	0.15	0.75	0.75	0.15	--	--	--	--	--	--	--	--	--	--
	Conifer	0.03	0.01	--	--	--	--	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--	--	--
	Montane Hardwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Grassland	Grassland	76.59	15.32	--	6.56	--	0.80	6.56	--	5.47	2.19	2.19	1.09	1.09	--	0.42	--	--	--	2.19	2.08	10.94	**15.32**
Wetland	Permanent Freshwater Wetland	0.04	0.01	--	0.01	--	0.01	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--	--	--
	Seasonal Wetland	0.06	0.01	--	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--	0.01
	Open Water	0.07	0.01	--	0.01	--	0.01	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--	--	--
Scrub	Upland Scrub	0.45	0.09	--	--	--	--	0.09	--	--	--	0.05	0.02	0.05	--	--	--	--	--	0.09	0.09	0.09	0.09
Woody Riparian	Woody Riparian	0.20	0.04	0.04	--	--	--	--	--	0.04	0.01	--	--	--	--	--	--	--	--	--	--	--	--
	Subtotal	82.80	16.56	0.59	6.79	0.00	0.85	6.65	0.00	5.73	3.26	3.28	1.36	1.14	0.00	0.57	0.00	0.00	0.00	2.28	2.17	11.03	15.48
	SubtotalRegions	212.16	42.43	2.24	17.35	0.42	3.07	12.12	1.71	14.8	7.94	8.15	3.7	2.82	0	1.85	0	0.02	0.02	2.28	2.91	20.13	38.87

Table 4-11. Continued

Natural Community	Regional Land-cover Type	Total Compensation[2]		Species-Specific Disturbance Estimates[3]																			
		5 year total	1 year total	Valley elderberry longhorn beetle	California tiger salamander	Limestone salamander	California red-legged frog	Blunt-nosed leopard lizard	Giant garter snake	Swainson's hawk	White-tailed kite	Golden eagle	Bald eagle	Western burrowing owl	Bank swallow	Tricolored blackbird	Buena Vista Lake shrew	Riparian brush rabbit	Riparian (san Joaquin) woodrat	Tipton kangaroo rat	Giant kangaroo rat	San Joaquin (nelson's) antelope squirrel	San Joaquin kit fox
	Total	212.16	42.43																				

Notes:

1 Compensation for impacts to vernal pools and vernal pool species is calculated separately as indicated on page 4-22. Impacts to plants are also compensated separately (Table 4-14)

2 Total compensation assumes that the acreage within one land-cover type will support multiple species. Numbers in bold reflect the species-specific impact estimate used to derive the annual compensation amount. In all cases, the largest species impact acreage was used as the annual compensation acreage. If multiple totals were the same for species, that total was carried forward.

3 Species-specific compensation is based on annual estimates. Decimal places do not indicate level of accuracy. Totals should not be summed across species because land-cover types will provide compensation for multiple species (see preceding footnote). Totals and Grand Totals may not sum due to rounding.

Table 4-12. Estimated Acreages Required to Achieve Compensation for Various Suites of Coexisting Species for PG&E's San Joaquin Valley Habitat Conservation Plan (SJV HCP)

Species Group	North SJV	Central SJV	South SJV
1 Year			
Vernal pool fairy shrimp, Midvalley fairy shrimp, Vernal pool tadpole shrimp, California tiger salamander	0.21	0.46	0.11
California tiger salamander, California red-legged frog, Giant garter snake, Tricolored blackbird	0.66	1.35	0.74
California tiger salamander, San Joaquin kit fox, Swainson's hawk	4.00	3.89	5.94
Blunt-nosed leopard lizard, Tipton kangaroo rat, San Joaquin antelope squirrel, San Joaquin kit fox	0.00	0	2.28
Blunt-nosed leopard lizard, Giant kangaroo rat, San Joaquin antelope squirrel, San Joaquin kit fox	0	0.74	2.17
Blunt-nosed leopard lizard, San Joaquin antelope squirrel, San Joaquin kit fox	0	4.73	2.21
San Joaquin antelope squirrel, San Joaquin kit fox	0	3.63	4.38
San Joaquin kit fox, Swainson's hawk	6.42	0.00	0.00
Riparian brush rabbit, Riparian woodrat	0.02	0	0
Limestone salamander	0.42	0	0
Total	11.73	14.80	17.83
5 Years			
Vernal pool fairy shrimp, Midvalley fairy shrimp, Vernal pool tadpole shrimp, California tiger salamander	1.03	2.31	0.55
California tiger salamander, California red-legged frog, Giant garter snake, Tricolored blackbird	3.30	6.75	3.71
California tiger salamander, San Joaquin kit fox, Swainson's hawk	19.98	19.45	29.71
Blunt-nosed leopard lizard, Tipton kangaroo rat, San Joaquin antelope squirrel, San Joaquin kit fox	0.00	0.00	11.39
Blunt-nosed leopard lizard, Giant kangaroo rat, San Joaquin antelope squirrel, San Joaquin kit fox	0.00	3.70	10.86
Blunt-nosed leopard lizard, San Joaquin antelope squirrel, San Joaquin kit fox	0.00	23.66	11.03
San Joaquin antelope squirrel, San Joaquin kit fox	0.00	18.15	21.88
San Joaquin kit fox, Swainson's hawk	32.12	0.00	0.00
Riparian brush rabbit, Riparian woodrat	0.11	0.00	0.00
Limestone salamander	2.11	0.00	0.00
Total	58.64	74.02	89.13
Additional acreage required to ensure all species are covered.	*1.83*	*1.47*	*6.33*

Note: Grassland acquisitions will provide foraging habitat benefits for Bald Eagle, Golden Eagle, White-tailed kite, Swainson's hawk and Western burrowing owl. Trocolored blackbird is lumped with California tiger salamander, California red-legged frog, and giant gartersnake because the effects analysis focuses on grassland effects to these species. ~~Table does not include compensation for Swainson's Hawk, b~~Bank swallow~~, tricolored blackbird,~~ and~~or~~ Buena vista lake shrew will benefit from riparian mitigation but~~because~~ direct mortality is expected to occur very infrequently, if at all, for these species. Acquisition lands for Riparian brush rabbit and Riparian woodrat may benefit riparian dependent species. Raptors also benefit from the avian protection program. Valley elderberry longhorn beetle (VELB) compensation will occur through the VELB program and will include a minimum of 2 acres and may also benefit other covered species.

minimize effects, and if this is not possible, the effects will be mitigated as soon as possible within 2 years of the effect.

Potential land-cover type conversions due to invasive weeds are unlikely because of PG&E's existing environmental programs and practices which include proactive measures to avoid the spread of invasive weeds.

Compensation Mechanisms

PG&E proposes to compensate for species effects through a variety of mechanisms. These mechanisms may be combined in various configurations, including purchase of compensation lands, purchase of mitigation credits from existing mitigation banks, placement of conservation easements on PG&E lands, and purchase of conservation easements. An emphasis will be placed on purchase of compensation lands, purchase of credits from mitigation banks, and placement of conservation easements on PG&E lands.

Compensation lands will demonstrate habitat characteristics similar to those disturbed by O&M activities. Depending on the species and habitat requiring compensation, compensation may involve occupied or suitable habitat (e.g., direct effects on a specific plant population will require compensation to include occupied habitat, whereas the temporary disturbance of San Joaquin kit fox habitat will require compensation to include suitable San Joaquin kit fox habitat). Specific site selection criteria are described in Chapter 6, "Monitoring, Reporting, and Adaptive Management Program." The use of proposed compensation land is subject to USFWS and DFG approval and will be protected and maintained in perpetuity. Purchase of Conservation Lands

PG&E will, in consultation with both USFWS and DFG, survey and rank potential conservation lands following the criteria listed below. PG&E will purchase high-quality land (i.e., predominantly native or unimproved land) suitable to support the covered species and place conservation easements on these lands. PG&E will work with qualified organizations such as The Nature Conservancy, Wildlands, and the Center for Natural Lands Management to manage the properties. Preserve sites will be selected to maximize habitat values; the following characteristics are considered desirable attributes:

- proximity to other compensation lands or mitigation banks;
- proximity to other important habitats (e.g., wetlands, vernal pools, riparian areas) that may not be a target of compensation efforts;
- minimum of past site disturbance or high capability of restoration from disturbance;
- verification of demonstrated species use (if possible); and
- overall habitat suitability and quality.

Purchase from Existing Mitigation Banks

PG&E will purchase available mitigation credits from certified mitigation banks. PG&E conducted an inventory of existing conservation and mitigation banking opportunities in the San Joaquin Valley in fall 2002. At that time there were 15 mitigation banks with credits available, as well as several prospective mitigation banks in development. At that time, there appeared to be sufficient mitigation bank credits in the northern and southern San Joaquin Valley to meet PG&E's needs but insufficient bank capacity in the central San Joaquin Valley.

Conservation Easements on Existing PG&E Lands

Several PG&E land holdings in the San Joaquin Valley provide potential habitat for covered species. Ten parcels were evaluated for endangered species habitat and suitability as compensation land. Five of the parcels were identified as suitable to support several of the covered species. Use of conservation easements on these parcels will be subject to the review and approval by USFWS and DFG.

Purchase of Conservation Easements

It may not be feasible to purchase conservation credits for some sensitive plant species from an existing mitigation bank. Furthermore, because of timing issues, determination of the presence of sensitive plants may not be possible when pursuing the purchase of a mitigation parcel. In these instances, PG&E will secure conservation easements from willing landowners where rare plants are identified in facility ROWs. Management plans will be tailored to each owner to meet the needs of the landowners and the biological goals of the covered species. The purchase of conservation easements adds to the overall flexibility of the compensation program. Conservation easements will be subject to the review and approval of USFWS and DFG.

Conservation Organization Donation

In the event that rare plant compensation areas cannot be established through any of the foregoing mechanisms because of the rarity of a plant species, PG&E will donate money to a conservation organization (e.g., The Nature Conservancy, a local land trust, or the USACE Wetland Plant Conservation Program) for habitat acquisition, preservation, and restoration in a manner that is consistent with the HCP's conservation strategy of mitigating for permanent effects at a ratio of 3:1 and temporary effects at a ratio of 0.5:1. The amount of money will be based on the relative size of the disturbance to the plant population, current land values in the vicinity of the sensitive species, and the long-term management costs needed to maintain a parcel of equivalent size. Donations to conservation organizations are expected to be a very small percentage of the total money spent on

Table 4-13. Anticipated Compensation for Plant Species During Implementation of PG&E's San Joaquin Valley O&M HCP[1,2]

Species	Compensation[3]		Species Range in SJV Counties		
	5 yr	10 yr	Northern	Central	Southern
Bakersfield cactus *Opuntia basilaris var. treleasei*	0.68	1.36			X
Succulent owl's-clover *Castilleja campestris ssp. succulenta*	0.45	0.91	X	X	
Mason's lilaeopsis *Lilaeopsis masonii*	0.23	0.45	X		
Lesser saltscale *Atriplex minuscula*	< 0.1	< 0.2		X	X
Big tarplant *Blepharizonia plumosa ssp. plumosa*	< 0.1	< 0.2	X		
Hoover's spurge *Chamaesyce hooveri*	< 0.1	< 0.2	X	X	X
Slough thistle *Cirsium crassicaule*	< 0.1	< 0.2	X		X
Mariposa clarkia *Clarkia biloba ssp. australis*	< 0.1	< 0.2	X		
Springville clarkia *Clarkia springvillensis*	< 0.1	< 0.2			X
Hispid bird's-beak *Cordylanthus mollis ssp. hispidus*	< 0.1	< 0.2		X	
Palmate-bracted bird's-beak *Cordylanthus palmatus*	< 0.1	< 0.2		X	
Kern mallow *Eremalche parryi* ssp. *kernensis*	< 0.1	< 0.2			X
Congdon's woolly sunflower *Eriophyllum congdonii*	< 0.1	< 0.2	X		
Delta button-celery *Eryngium racemosum*	< 0.1	< 0.2	X	X	
Striped adobe-lily *Fritillaria striata*	< 0.1	< 0.2			X
Legenere *Legenere limosa*	< 0.1	< 0.2	X		

Species	Compensation[3]		Species Range in SJV Counties		
	5 yr	10 yr	Northern	Central	Southern
San Joaquin woollythreads *Monolopia congdonii*	< 0.1	< 0.2		X	X
Colusa grass *Neostapfia colusana*	< 0.1	< 0.2	X	X	
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	< 0.1	< 0.2	X	X	X
Hartweg's golden sunburst *Pseudobahia bahiifolia*	< 0.1	< 0.2	X	X	
San Joaquin adobe sunburst *Pseudobahia peirsonii*	< 0.1	< 0.2		X	X
Large-flowered fiddleneck *Amsinckia grandiflora*	0	0	X		
Bakersfield smallscale *Atriplex tularensis*	0	0			X
Mariposa pussypaws *Calyptridium pulchellum*	0	0	X	X	
Tree-anemone *Carpenteria californica*	0	0		X	
California jewelflower *Caulanthus californicus*	0	0		X	X
Merced clarkia *Clarkia lingulata*	0	0	X		
Vasek's clarkia *Clarkia temblorensis ssp. calientensis*	0	0			X
Bogg's Lake hedge-hyssop *Gratiola heterosepala*	0	0	X	X	
Pale-yellow layia *Layia heterotricha*	0	0		X	X
Comanche Point layia *Layia leucopappa*	0	0			X
Panoche pepper-grass *Lepidium jaredii ssp.album*	0	0			X
Congdon's lewisia *Lewisia congdonii*	0	0	X		

Species	Compensation[3]		Species Range in SJV Counties		
	5 yr	10 yr	Northern	Central	Southern
Mariposa lupine *Lupinus citrinus var. deflexus*	0	0	X		
Showy madia *Madia radiata*	0	0	X	X	X
Hall's bush mallow *Malacothamnus hallii*	0	0	X	X	
Pincushion navarretia *Navarretia myersii*	0	0		X	
Hairy Orcutt grass *Orcuttia pilosa*	0	0	X	X	
Keck's checkerbloom *Sidalcea keckii*	0	0		X	X
Oil netstraw *Stylocline citroleum*	0	0			X
Greene's tuctoria *Tuctoria greenei*	0	0	X	X	X
Kings gold *Twisselmannia californica*	0	0		X	

Notes:

[1] = Estimates are based on greatest acreages in estimated range of effects, and on a 0.5:1 compensation ratio.

[2] = Compensation consists of occupied habitat.

[3] = Compensation acreages < 1 acre reflect low probability of requiring compensation; actual compensation is likely to be greater (perhaps 0.5-2 acres) but will be needed for only some of these species.

conservation efforts. These donations will be subject to the review and approval of USFWS and DFG. Donations must be completed within two years of impacts.

Enhancement as Compensation

Enhancement of covered plant habitat is another compensation tool. In the event a covered plant species is identified within a ROW during preactivity surveys, a qualified biologist will identify actions, such as invasive plant control, that could enhance habitat conditions. Compensatory enhancement and its contribution toward compensation obligations will be contingent on USFWS and DFG approval. This compensation approach would be quantified through PG&E's documentation of pre- and post-enhancement rare plant population attributes (e.g., density and extent). Specific survey and monitoring design, and the compensation value associated with enhancement, will need the advance approval of USFWS and DFG. If this option is selected, the enhancement will be implemented within two years of project impacts.

Consideration of Regional Species Effects and Compensation Objectives

PG&E has evaluated the likely breakdown of regional effects attributable to O&M activities and will acquire compensation lands in the appropriate regional area. Tables 4-11, 4-12 and 4-13 provide a summary of these effects, the estimate of regional compensation, the amount of land that will be acquired for the first 5 years of the project, and the target species this compensation addresses. After the first 5 years of the project, the regional distribution of compensation lands and the species it addresses will be adjusted (either up or down) based on the habitat effects documented from each of the previous year's accounting results.

Compensation for species effects will be obtained largely through acquiring grassland habitat that is suitable for a suite of species. Acquired San Joaquin Valley grasslands should provide foraging habitat for covered large and small mammals, raptors, and reptiles and, depending on the proximity to water, dispersal habitat for amphibians. Other suitable habitats will also be acquired to achieve species requirements. Estimates of acquisition acreages are shown in Table 4-12. Because this program includes permanent mitigation for temporary effects, possible direct species effects from other disturbance will be sufficiently compensated for by the program.

Estimates of temporary and permanent vernal pool habitat effects were summed from Table 3-9 to arrive at an estimated annual effect of 0.577 acres of effect per year. PG&E estimates that an area one and one-half times size of the combined permanent and temporary effects results in indirect effects; therefore, PG&E multiplied the direct effects by 1.5 to arrive at an estimate of the total annual habitat disturbance of approximately 0.865 acres. Assuming that 30% of these areas contain occupied habitat, PG&E estimates compensating for 0.26 acres.

Compensating at 3:1, this is 0.78 acres annually, or 3.9 acres over the first 5 years. As 26%, 59%, and 14% of wetlands are distributed in the north, central, and south San Joaquin Valley, respectively, mitigation will likely be acquired in 1.01, 2.3, and 0.55 acre increments in each region.

Plant mitigation will be achieved in accordance with Table 4-13 and as determined by annual preactivity survey results.

Compensation for temporary losses of valley elderberry longhorn beetle habitat from routine operations and maintenance activities – both in the Plan Area and system-wide – is described in and satisfied by the *Valley Elderberry Longhorn Beetle Conservation Program* (Appendix D). This compensation includes:

- implementation of a valley elderberry longhorn beetle conservation program (including approximately 125 acres of acquisition and management per year for a total of 1,000 acres of high quality habitat);
- development and implementation of a valley elderberry longhorn beetle training and education program;
- implementation of avoidance and protective measures;
- development of a reporting and monitoring plan; and
- BMPs for transmission system corridor management.

Based on the disturbance estimates conducted in Chapter 3, an additional 1 acre of VELB habitat could be permanently affected and 22.23 acres temporarily affected over 30 years, due to the minor new construction activities covered by this Plan that are not included in the BO. Compensation for these additional effects will occur as a supplemental part of the VELB Conservation Program. Specifically, PG&E will account for additional impacts to VELB in the Plan Area by applying the survey and reporting protocols established by the Biological Opinion to minor new construction activities covered by this Plan, and mitigating for the actual impacts by acquiring and managing sufficient high quality VELB habitat above and beyond the 1,000 acres required by the BO.

Through the addition of the Migratory Bird Protection Program PG&E is providing beneficial conservation for birds through retrofitting and installing bird-safe poles. This statewide compensation includes:

- retrofitting a minimum of 2,000 planned locations annually;
- retrofitting involved or adjacent poles annually in response to incidents; and
- building new and replaced bird-safe poles annually.

Attributes and Management of Compensation Lands

Purchase of high-quality natural lands, especially those already supporting multiple covered species, is most desirable in the overall compensation package. Lands not requiring intensive management to maintain existing habitat quality and those that will provide opportunities for habitat enhancement also will be assigned high priority in acquisition of compensation lands.

Compensation Land Attributes

Compensation habitat will be selected to satisfy habitat requirements of affected covered species. However, several general attributes that affect the condition and management of most habitats include:

- size: larger contiguous areas of habitat are preferable to an equal acreage of smaller discontinuous areas;
- surrounding land uses: compensation habitat should be surrounded by compatible land uses;
- coordination with other regional conservation efforts: compensation land should be integrated with other related conservation efforts; and
- location relative to impact areas: compensation habitat that is in kind and close to the affected site is preferable to more distant habitat or different habitat types.

No compensation strategy can fully meet all these conditions. The key to successful mitigation lies in balancing each of these considerations to protect the environment while allowing O&M activities to proceed. Numerous other attributes (e.g., specialized foraging or reproductive requirements) determine the presence of habitat for particular species or affect the quality and management of that habitat. In the following sections, such attributes of different types of compensation lands are discussed, and corresponding recommendations are outlined.

Riparian and Wetlands

Compensation lands may include woody riparian habitat, permanent freshwater wetlands, vernal pools, and other seasonal wetlands. Preservation of riparian and wetland vegetation that adjoins grassland or other land-cover types providing habitat for covered species is desirable because the transition augments the quality and quantity of habitat provided by both the upland and wetland areas. For example, in addition to the specialized species each habitat may support, wetland and riparian areas also provide water sources for upland animals while, conversely, uplands provide floodwater refuges for animals dependent on wetland and riparian areas. Connections between rivers, riparian vegetation, and seasonal and permanent wetlands are desirable for similar reasons.

Factors that may adversely affect both riparian and wetland land-cover types include runoff from adjacent land, nonnative invasive species, excessive livestock grazing, and nonnative predators. Management goals for riparian and wetland areas include:

- exclusion or restriction of livestock from riparian and wetland vegetation;
- establishment and maintenance of adequate buffers from developed lands or roads (with specific distances based on site-specific conditions);
- implementation of erosion control and stabilization measures, where appropriate, to reduce deposition of sediment from adjacent uplands;
- monitoring for the presence and control of invasive nonnative plant species; and
- control of potential native and nonnative predators to the extent feasible.

Vegetation structure (both vertical and horizontal) within woody riparian areas also has a strong influence on habitat quality for several species. Wider forests provide greater moderation of microclimate; greater diversity of plant and wildlife species; greater diversity of vegetation layers; and reduced predation, parasitism, and invasion by aggressive weedy species (Saunders et al. 1991; Foreman 1999). Thus, wider patches (>30 feet) have greater overall habitat value for covered species than do narrow patches. For example, both Buena Vista Lake shrew and California red-legged frog benefit from a high cover of understory vegetation. A goal in selecting compensation areas for these species accordingly would be wider sites with more structural diversity including over- and understory components; management would entail control of livestock.

Considerations for riparian- and wetland-dependent covered species include:

- proximity to foraging habitat for Swainson's hawk (row crops, pasture, and grassland) and tricolored blackbird (grassland);
- presence of permanent or semi-permanent water for California red-legged frog;
- proximity to restricted areas of occupied habitat for riparian brush rabbit and riparian wood rat;
- presence of rodent burrows or comparable small crevices for giant garter snake and California red-legged frog;
- presence of tule- or cattail-dominated patches for tricolored blackbird a (within the latter species' limited area of occurrence); and
- absence or control of bullfrogs and nonnative fish for California tiger salamander and California red-legged frog.

A more detailed discussion of covered species requirements occurs in Appendix C.

Grasslands

Grasslands serving as compensation lands can be most beneficial if they are located adjacent to preserved areas of other land-cover types or in a matrix of other grassland habitat, depending on the targeted species. Proximity to aquatic habitats increases the quality and quantity of grassland habitat for a number of species that breed in riparian and aquatic habitats but forage or rest in grasslands (California tiger salamander, California red-legged frog, Swainson's hawk). For individual grassland species, other important considerations include:

- management to maintain presence of ground squirrel burrows for San Joaquin kit fox and western burrowing owl,
- management to maintain presence of Tipton and giant kangaroo rats and San Joaquin (Nelson's) antelope squirrel;
- proximity to suitable aquatic breeding sites for California tiger salamander and California red-legged frog that do not support competing fish and bullfrogs;
- sparsely vegetated areas for blunt-nosed leopard lizard;
- protection from disking and agricultural uses;
- restriction of use of rodenticides and other toxic compounds; and
- prescribed and managed livestock grazing where needed as a tool to maintain suitable vegetation conditions.

Oak Woodland

Desirable lands include the valley oak, live oak, and blue oak woodland land-cover types. San Joaquin Valley woodlands have few oaks because woodcutting and livestock grazing conflict with their recruitment and growth. A management plan designed with the help of a qualified professional to protect any oak woodland compensation area should address these conflicts.

Characteristics of oak woodland habitats important to covered species include:

- proximity to water sources for California tiger salamander and California red-legged frog;
- presence of rodent burrows, rock crevices; or fallen logs for California tiger salamander;
- proximity to foraging habitat in grasslands or agricultural lands for Swainson's hawk and white-tailed kite; and
- retention of snags (standing dead trees) and downed wood to benefit multiple wildlife species.

Upland Scrub

Compensation lands may be upland scrub habitats, including alkali desert scrub, Valley/Coast Range Saltbush scrub, Valley sink scrub, and three types of chaparral: mixed, chamise-redshank, and montane. Management goals for these areas will vary by species and localized habitat types. In general, these management goals may include:

- exclusion or restriction of livestock;
- establishment and maintenance of adequate buffers from developed lands or roads (with specific distances based on site-specific conditions);
- monitoring for the presence and control of invasive nonnative plant species; and
- control of feral cats and nonnative predators to the extent feasible.

Management plans for compensation lands consisting of upland scrub land-cover types should address the risk of wildfire and its containment. Such a natural occurrence has a strong influence on habitat and consequences for public safety.

Compensation Land Management

The major goal for all compensation land management and habitat enhancement activities is the maintenance and protection of habitat quality for covered species. To ensure this end, management plans will be designed for each conservation parcel in consultation with both USFWS and DFG within 120 days of the acquisition of the compensation lands. These management plans should include the following:

- goals;
- description of proposed management/enhancement activities;
- maps of existing habitat;
- table of acreage of each habitat type included within the preserve;
- maps of fence and sign locations;
- O&M schedule, where possible;
- description of anticipated management activities to be performed on the preserve (including vegetation management) and a schedule for conducting other necessary management activities;
- maps of habitat anticipated to result from enhancement;
- success criteria for lands to be enhanced or restored and remediation plans to be implemented if success criteria are not met;
- description of applicable monitoring activities;
- name of holder of conservation easement, if any;

- cost for the acquisition, management, and endowment;
- source of funding for management activities;
- name of managing entity;
- description of other activities allowed on the preserve (e.g., recreation, education, flood control) and how their effects on covered species will be minimized;
- determination of whether public access would be permitted;
- description of potential revenue-generating activities to be permitted, if applicable;
- description of how unwanted or illegal activities within the preserve will be eliminated or reduced; and
- control of potential predators (e.g., feral cats, red fox) if necessary.

Chapter 5

Effects Determinations and Requested Take Authorization

Introduction

This chapter describes the potential direct, indirect, and critical habitat effects on covered species that may result from PG&E's implementation of O&M activities; it also details the identified compensation program. An overall summary of these effects and compensatory actions is provided specifying requested authorization for take or other treatment of species.

Two major direct effects are addressed: habitat loss and mortality or injury resulting directly from O&M activities. Direct effects include those that result directly in mortality or eliminate habitat on a temporary or permanent basis such that take could occur. Indirect effects include those that could affect species in areas adjacent to project sites disturbed by O&M activities. Examples of indirect effects include disruption of hydrology; introduction of invasive weeds; habitat modification that could create favorable conditions for establishment of nonnative species; noise; and dust deposition.

Direct and indirect effects will be substantially eliminated for some covered species through adoption of AMMs (see Chapter 4, "Conservation Strategy"). The AMMs will reduce the potential for direct and indirect effects on most covered species (Tables 5-1 and 5-2); however, a potential for some amount of take of covered species will remain.

The determination of the amounts of both direct and indirect effects on covered species is based on the amount of habitat to be disturbed for each species; the sizes of disturbed areas (relative to the species' population density and home range); and the overall extent of the species' habitat and population. The amounts of habitat to be disturbed are based on the amount of various land-cover types to be disturbed, the habitat requirements of covered species, and the estimated proportion of land-cover types that are expected to be suitable for occupancy by covered species (see Chapter 3, "Analysis of Habitat Disturbance for Covered Species"). The effects determination also considered other species-specific factors, such as species' abilities to move to avoid effects, and their sensitivity to human activities.

PG&E's request for authorization for take, or other considerations, for each species reflects legal authorities and limitations under the various relevant laws and regulations, as described in Chapter 1. Therefore, PG&E is not requesting authorization from USFWS for take of species that are listed under the Bald and Golden Eagle Protection Act or the MBTA but is requesting other protections from prosecution under these statutes that are available. Similarly, PG&E is not requesting authorization from DFG for species that are not listed or candidates under CESA or that are designated as Fully Protected Species. Specific requested authorizations are summarized in Table 5-3, Table 5-4, and Table 5-5.

Covered Wildlife Species

Vernal Pool Fairy Shrimp, Midvalley Fairy Shrimp, and Vernal Pool Tadpole Shrimp

Direct Effects

As documented in Chapter 3, O&M activities are estimated to temporarily disturb 0.473 acres and permanently remove 0.104 acre of vernal pool habitat suitable for covered shrimp species annually (14.19 and 3.12 acres respectively over the 30-year life of the project [Table 3-9]), but only 30% of these wetlands have been estimated to be suitable for occupancy by the three covered shrimp species. PG&E, however, will assume that all the acreages listed above are potentially occupied by listed shrimp and will seek to avoid direct effects whereever possible and not conduct protocol-level surveys.

The potential exists for O&M activities to cause direct temporary habitat loss and direct take of habitat and populations of covered shrimp species. Covered activities (i.e., ground-disturbing activities) have the potential to result in direct mortality, life cycle disturbance, and reduced habitat quality for vernal pool shrimp species. Shrimp cysts could be buried by soil moved into vernal pools or swales during ground-disturbing activities.

Vehicles and equipment could crush shrimp cysts and adults when entering or passing through vernal pools or swales during travel to worksites, inspections, and other incidental activities. Based on the methodology presented in Chapter 3 "Analysis of Habitat Disturbance for Covered Species," PG&E has estimated that vehicle travel through vernal pools could result in other disturbance on 3.16 acres of vernal pool habitat per year (Table 3-9). Only a portion of the cysts in disturbed areas would be expected to be damaged by vehicle travel. However, because of the implementation of AMMs and permanent compensation for temporary effects, no additional compensation is proposed for these effects. Given the typical abundance of shrimp cysts in occupied pools and the relatively small proportion of the area and population affected by incidental travel, the effects of vehicle travel in vernal pools are not considered to be substantial on local, regional and species populations.

Table 5-1. Summary of Applicability of Avoidance and Minimization Measures to Covered Wildlife Species

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Vernal pool fairy shrimp *Branchinecta lynchi*	X	X	X	X	X	X		X	X	X				X	X														X	
Midvalley fairy shrimp *Branchinecta mesovallensis*	X	X	X	X	X	X		X	X	X				X	X														X	
Vernal pool tadpole shrimp *Lepidurus packardi*	X	X	X	X	X	X		X	X	X				X	X														X	
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	X	X	X	X	X	X		X			X																		X	X
California tiger salamander *Ambystoma californiense (A. tigrinum c.)*	X	X	X	X	X	X		X	X	X																			X	
Limestone salamander *Hydromantes brunus*	X	X	X	X	X	X		X	X	X																		X	X	X
California red-legged frog *Rana aurora draytoni*	X	X	X	X	X	X		X	X							X	X												X	X
Blunt-nosed leopard lizard *Gambelia (Crotaphytus) silus*	X	X	X	X	X	X		X	X															X					X	
Giant garter snake *Thamnophis gigas*	X	X	X	X	X	X		X	X	X						X	X												X	
Swainson's hawk *Buteo swainsoni*	X	X	X	X	X	X	X	X											X			X								X
White-tailed kite *Elanus caeruleus*	X	X	X	X	X	X	X	X											X			X								X
Golden eagle *Aquila chrysaetos*	X	X	X	X	X	X	X	X														X								X
Bald Eagle *Haliaeetus leucocephalus*	X	X	X	X	X	X	X	X														X								X
Western burrowing owl *Athene cunicularia hypugea*	X	X	X	X	X	X		X										X											X	
Bank swallow *Riparia riparia*	X	X	X	X	X	X		X	X													X	X							
Tricolored blackbird *Agelaius tricolor*	X	X	X	X	X	X		X														X	X							
Buena Vista Lake shrew *Sorex ornatus relictus*	X	X	X	X	X	X		X	X	X															X				X	
Riparian brush rabbit *Sylvilagus bachmani riparius*	X	X	X	X	X	X		X		X																X			X	X
Riparian (San Joaquin Valley) woodrat *Neotoma fuscipes riparia*	X	X	X	X	X	X		X		X																	X		X	X
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	X	X	X	X	X	X		X		X										X									X	

Table 5-1. Continued

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Giant kangaroo rat *Dipodomys ingens*	X	X	X	X	X	X		X		X										X									X	
San Joaquin (Nelson's) antelope squirrel *Ammospermophilus nelsoni*	X	X	X	X	X	X		X		X										X									X	
San Joaquin kit fox *Vulpes macrotis mutica*	X	X	X	X	X	X		X		X											X									

Table 5-2. Summary of Applicability of Avoidance and Minimization Measures to Plant Species

	Avoidance and Minimization Measure Number[1]														
Species	1	2	3	4	5	6	8	9	10	12	13	14	15	29	30
Large-flowered fiddleneck	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Lesser saltscale	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Bakersfield smallscale	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Big tarplant	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Mariposa pussypaws	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Tree-anemone	X	X	X	X	X	X	X	X	X	X		X		X	X
Succulent owl's-clover	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
California jewelflower	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Hoover's spurge	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Slough thistle	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Mariposa clarkia	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Merced clarkia	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Springville clarkia	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Vasek's clarkia	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Hispid bird's-beak	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Palmate-bracted bird's-beak	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Kern mallow	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Congdon's woolly sunflower	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Delta button-celery	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Striped adobe-lily	X	X	X	X	X	X	X	X	X	X		X		X	X
Bogg's Lake hedge-hyssop	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Pale-yellow layia	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Comanche Point layia	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Legenere	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 5-2. Continued

Species	Avoidance and Minimization Measure Number[1]														
	1	2	3	4	5	6	8	9	10	12	13	14	15	29	30
Panoche pepper-grass	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Congdon's lewisia	X	X	X	X	X	X	X	X	X	X		X		X	X
Mason's lilaeopsis	X	X	X	X	X	X	X	X	X	X		X		X	X
Mariposa lupine	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Showy madia	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Hall's bush mallow	X	X	X	X	X	X	X	X	X	X		X		X	X
San Joaquin woollythreads	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Pincushion navarretia	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Colusa grass	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Bakersfield cactus	X	X	X	X	X	X	X	X	X	X		X		X	X
San Joaquin Valley Orcutt grass	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hairy Orcutt grass	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hartweg's golden sunburst	X	X	X	X	X	X	X	X	X	X	X	X		X	X
San Joaquin adobe sunburst	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Keck's checkerbloom	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Oil neststraw	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Greene's tuctoria	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Kings gold	X	X	X	X	X	X	X	X	X	X	X	X		X	X

[1] AMMs 7,12, and 15-29 are wildlife species measures and therefore not listed.

Table 5-3. Requested Federal Take Authorizations for Wildlife and Expected Frequencies of Take under the San Joaquin Valley HCP

Common and Scientific Name	Federal Legal Status [a]	Federal Requested Authorizations[b]	Type of Take			Frequency of Take-Direct (N/L/M/H)[c]
			Harass	Injure/ Harm	Direct Mortality	
Vernal pool fairy shrimp *Branchinecta lynchi*	T	Take		X	X	M
Midvalley fairy shrimp *Branchinecta mesovallensis*	P	Take		X	X	M
Vernal pool tadpole shrimp *Lepidurus packardi*	E	Take		X	X	M
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T	Take		X	X	M
California tiger salamander *Ambystoma californiense (A. tigrinum c.)*	T	Take	X	X	X	M
Limestone salamander *Hydromantes brunus*	SC	~~SNP~~	X			L
California red-legged frog *Rana aurora draytoni*	T	Take	X	X	X	M
Blunt-nosed leopard lizard *Gambelia (Crotaphytus) silus*	E	Take	X			N
Giant garter snake *Thamnophis gigas*	T	Take	X	X	X	L
Swainson's hawk *Buteo swainsoni*	–	21.27	X			L
White-tailed kite *Elanus caeruleus*	–	21.27	X			L
Golden eagle *Aquila chrysaetos*	–	21.27	X			L
Bald Eagle *Haliaeetus leucocephalus*	FPD, FT	~~21.27~~	X			L
Western burrowing owl *Athene cunicularia hypugea*	SC	21.27	X			M
Bank swallow *Riparia riparia*	–	21.27	X			L
Tricolored blackbird *Agelaius tricolor*	SC	21.27	X			L
Buena Vista Lake shrew *Sorex ornatus relictus*	E	Take	X	X	X	L

Common and Scientific Name	Federal Legal Status [a]	Federal Requested Authorizations[b]	Type of Take			Frequency of Take-Direct (N/L/M/H)[c]
			Harass	Injure/ Harm	Direct Mortality	
Riparian brush rabbit *Sylvilagus bachmani riparius*	E	Take	X			L
Riparian (San Joaquin Valley) woodrat *Neotoma fuscipes riparia*	E	Take	X	X	X	L
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	E	Take	X	X	X	L-M
Giant kangaroo rat *Dipodomys ingens*	E	Take	X	X	X	L-M
San Joaquin (Nelson's) antelope squirrel *Ammospermophilus nelsoni*	SC	Take	X	X	X	M
San Joaquin kit fox *Vulpes macrotis mutica*	E	Take	X	X	X	L-M

[a] Status Explanations:

Federal

E	=	listed as endangered under the federal Endangered Species Act (ESA).
T	=	listed as threatened under the federal ESA.
PE	=	proposed for federal listing as endangered under the federal ESA.
PT	=	proposed for federal listing as threatened under the federal ESA.
C	=	species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded.
P	=	petitioned for listing as threatened or endangered under the federal Endangered Species Act.
SC	=	species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.
FPD	=	federally proposed for delisting
–	=	no listing.
21.27	=	federal code for non-prosecution under MBTA when species is listed.

[b] PG&E requests take authorization for unlisted covered species should they become listed in the future or should other federal or state regulations be revised.

[c] Frequency assumptions based on habitat disturbance estimates and projections for direct take:

N	=	none; no take expected to occur.
L	=	low; take may not occur or could occur less than one incident/5 years.
M	=	moderate; take expected once per year to once every 5 years.
H	=	high; take expected in limited numbers every year.

Table 5-4. Requested State Take Authorizations for Wildlife and Expected Frequencies of Take under the San Joaquin Valley HCP

Common and Scientific Name	State Legal Status [a]	State Requested Authorizations[b]	Type of Take		Frequency of Take-Direct (N/L/M/H)[c]
			Injure/ Harm	Direct Mortality	
Vernal pool fairy shrimp *Branchinecta lynchi*	–	–			M
Midvalley fairy shrimp *Branchinecta mesovallensis*	–	–			M
Vernal pool tadpole shrimp *Lepidurus packardi*	–	–			M
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	–	–			M
California tiger salamander *Ambystoma californiense (A. tigrinum c.)*	SSC	–			M
Limestone salamander *Hydromantes brunus*	T, FP	–			~~L~~N
California red-legged frog *Rana aurora draytoni*	SSC	–			M
Blunt-nosed leopard lizard *Gambelia (Crotaphytus) silus*	E, FP	–			N
Giant garter snake *Thamnophis gigas*	T	Take	X	X	L
Swainson's hawk *Buteo swainsoni*	T	Take	X	X	L
White-tailed kite *Elanus caeruleus*	FP	–			~~L~~N
Golden eagle *Aquila chrysaetos*	FP	–			~~L~~N
Bald Eagle *Haliaeetus leucocephalus*	E, FP	–			~~L~~N
Western burrowing owl *Athene cunicularia hypugea*	SSC	–			M
Bank swallow *Riparia riparia*	T	Take			L
Tricolored blackbird *Agelaius tricolor*	SSC	–			L
Buena Vista Lake shrew *Sorex ornatus relictus*	SSC	–			L

Common and Scientific Name	State Legal Status [a]	State Requested Authorizations[b]	Type of Take		Frequency of Take-Direct (N/L/M/H)[c]
			Injure/ Harm	Direct Mortality	
Riparian brush rabbit *Sylvilagus bachmani riparius*	E	–			~~L~~N
Riparian (San Joaquin Valley) woodrat *Neotoma fuscipes riparia*	SSC	–			L
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	E	Take	X	X	L-M
Giant kangaroo rat *Dipodomys ingens*	E	Take	X	X	L-M
San Joaquin (Nelson's) antelope squirrel *Ammospermophilus nelsoni*	T	Take	X	X	M
San Joaquin kit fox *Vulpes macrotis mutica*	T	Take	X	X	L-M

[a] Status Explanations:

State

E = listed as endangered under the California ESA.
T = listed as threatened under the California ESA.
FP = fully protected under the California Fish and Game Code.
SSC = species of special concern in California.
SNP = DFG Statement of Non-prosecution
– = no listing.

[b] PG&E requests take authorization for unlisted covered species should they become listed in the future or should other federal or state regulations be revised.

[c] Frequency assumptions based on habitat disturbance estimates and projections for direct take:

N = none; no take expected to occur.
L = low; take may not occur or could occur less than one incident/5 years.
M = moderate; take expected once per year to once every 5 years.
H = high; take expected in limited numbers every year.

Table 5-5. Requested Take Authorizations and Expected Frequencies of Take for Covered Plants

Common Name	Legal Status [a]		Requested Authorization			Frequency of Take–Direct (High/Medium/Low)[b]
	Federal	State	CNPS	Federal	State	
Large-flowered fiddleneck	E	E	1B	No direct take	No direct take	Low [c]
Lesser saltscale	–	–	1B	Take	~~Take~~	Medium
Bakersfield smallscale	SC	E	1B	No direct take	No direct take	Low [c]
Big tarplant	–	–	1B	Take	~~Take~~	Medium
Mariposa pussypaws	T	–	1B	No direct take	~~No direct take~~	Low [c]
Tree-anemone	SC	T	1B	No direct take	No direct take	Low [c]
Succulent owl's-clover	T	E	1B	Take	Take	High
California jewelflower	E	E	1B	Take	Take	Low
Hoover's spurge	T	–	1B	Take	~~Take~~	Medium
Slough thistle	SC	–	1B	Take	~~Take~~	Medium
Mariposa clarkia	–	–	1B	Take	~~Take~~	Medium
Merced clarkia	SC	E	1B	No direct take	No direct take	Low [c]
Springville clarkia	T	E	1B	Take	Take	Medium
Vasek's clarkia	SC	–	1B	No direct take	~~No direct take~~	Low [c]
Hispid bird's-beak	SC	–	1B	Take	~~Take~~	Medium
Palmate-bracted bird's-beak	E	E	1B	Take	Take	Medium
Kern mallow	E	–	1B	Take	~~Take~~	Medium
Congdon's woolly sunflower	–	R	1B	Take	Take	Medium

Common Name	Legal Status [a]		Requested Authorization			Frequency of Take–Direct (High/Medium/Low)[b]
	Federal	State	CNPS	Federal	State	
Delta button-celery	SC	E	1B	Take	Take	Medium
Striped adobe-lily	SC	T	1B	Take	Take	Medium
Bogg's Lake hedge-hyssop	–	E	1B	Take	Take	Low
Pale-yellow layia	SC	–	1B	No direct take	~~No direct take~~	Low [c]
Comanche Point layia	SC	–	1B	Take	~~Take~~	Low [c]
Legenere	SC	–	1B	Take	~~Take~~	Medium
Panoche pepper-grass	SC	–	1B	No direct take	~~No direct take~~	Low [c]
Congdon's lewisia	–	R	1B	No direct take	No direct take	Low [c]
Mason's lilaeopsis	SC	R	1B	Take	Take	High
Mariposa lupine	SC	T	1B	No direct take	No direct take	Low [c]
Showy madia	–	–	1B	No direct take	~~No direct take~~	Low [c]
Hall's bush mallow	–	–	1B	No direct take	~~No direct take~~	Low [c]
San Joaquin woollythreads	E	–	1B	Take	~~Take~~	Medium
Pincushion navarretia	–	–	1B	No direct take	~~No direct take~~	Low [c]
Colusa grass	T	E	1B	Take	Take	Medium
Bakersfield cactus	E	E	1B	Take	Take	High
San Joaquin Valley Orcutt grass	T	E	1B	Take	Take	Medium
Hairy Orcutt grass	E	E	1B	Take	Take	Low
Hartweg's golden sunburst	E	E	1B	Take	Take	Medium

Common Name	Legal Status [a]		Requested Authorization			Frequency of Take–Direct (High/Medium/Low)[b]
	Federal	State	CNPS	Federal	State	
San Joaquin adobe sunburst	T	E	1B	Take	Take	Medium
Keck's checkerbloom	E	–	1B	No direct take	~~No direct take~~	Low [c]
Oil neststraw	–	–	1B	Take	~~Take~~	Low
Greene's tuctoria	E	R	1B	Take	Take	Low
Kings gold	-	-	1B	No direct take	~~No direct take~~	Low

[a] Status Explanations:

Federal

E = listed as endangered under the federal Endangered Species Act (ESA).

T = listed as threatened under the federal ESA.

SC = species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.

– = no listing.

State

E = listed as endangered under the California ESA.

R = listed as rare under the California Native Plant Protection Act. This category is no longer used for newly listed plants, but some plants previously listed as rare retain the designation.

– = no listing.

CNPS = California Native Plant Society

1B = List 1B species: rare, threatened, or endangered in California and elsewhere.

4 = List 4 species: plants of limited distribution

[b] *Low* designation indicates that with the implementation of avoidance and minimization measures no take is anticipated; *Medium* designation indicates 0–1 acres of take is anticipated; *High* designation indicates that >1 acre of take is anticipated, and the expected acreages are discussed in Chapter 3.

[C] "No Take" species

As specified in the AMMs (See Chapter 4, "Conservation Strategy"), exclusion zones will be established prior to O&M activities, and work will be avoided during periods when vernal pool habitat is wet. The establishment of buffers around vernal pools during the wet and dry periods would reduce habitat loss and direct mortality to shrimp. It is not possible to reliably estimate the level of take of individuals resulting from O&M activities, which is why PG&E is estimating take in terms of the amount of suitable habitat disturbed. The amount of habitat impacted is being used as a surrogate for the number of individuals taken by the proposed project.

Indirect Effects

Potential indirect temporary habitat loss or degradation could result from dust generated during construction and subsequently deposited within vernal pools adjacent to work areas. Water and habitat quality could be reduced by a variety of indirect effects associated with O&M activities. O&M activities have the potential to spread invasive weeds that could reduce habitat quality within vernal pools.

AMMs include establishing exclusion zones around vernal pools and implementing measures to control dust, erosion, and invasive weeds. These measures would substantially reduce potential affects of O&M activities on water and habitat quality and consequently on covered shrimp species.

PG&E expects that the indirect effects would be equal to or less than the direct effects because of the temporary nature and low intensity of the disturbances, the small dispersal area affected by disturbances, and PG&E's implementation of AMMs.

Effects on Critical Habitat

Critical habitat designated for the vernal pool fairy shrimp and vernal pool tadpole shrimp includes >70,000 acres and >40,000 acres in the plan area, respectively (see Table 3-12). Less than 0.01% of critical habitat for both species are estimated to be affected by covered activities including 0.01 acre permanently per year and 2.2 acres temporarily per year for vernal pool fairy shrimp, and 0.004 acres permanently per year and 0.59 acres temporarily per year for vernal pool tadpole shrimp. Critical habitat for these species extends to substantial areas of land elsewhere in the Central Valley and southern California. Effects of O&M activities on critical habitat are consistent with the descriptions of the direct and indirect effects identified previously. Overall, only a minute fraction of the designated critical habitat in the plan area, and an even smaller fraction of the total designated critical habitat for these species, would be directly or indirectly affected by the project. As a result, the project would not result in adverse modification of critical habitat, as defined under the ESA and are not expected to adversely impact either the survival or the recovery of the species.

Compensation Efforts

Impacts on potential habitat for covered shrimp species will be compensated at a 3:1 ratio. Compensatory mitigation will entail preservation of existing pools offsite that are occupied by covered shrimp species at a 2:1 ratio and creation of vernal pools at a 1:1 ratio. PG&E will compensate based on actual effects to suitable habitat, but compensation will always stay ahead of impacts.

Overall Effects

The probability of direct and indirect effects on covered shrimp species is considered low with implementation of AMMs. Any effects would be localized by the limited extent of activities anticipated to occur within the vicinity of vernal pool habitat and would be compensated. With the implementation of compensation, O&M activities are not anticipated to have a substantial effect on populations of covered shrimp species in the plan area.

Requested Authorization

PG&E requests authorization from USFWS for all take of covered shrimp species that may result from O&M activities with adopted AMMs and compensation measures implemented.

Valley Elderberry Longhorn Beetle

Direct Effects

Vegetation clearance and other covered activities may have direct effects on valley elderberry longhorn beetle, including disturbance of occupied elderberry shrubs. The valley elderberry longhorn beetle occupies only a relatively small proportion of the elderberry shrubs that occur within its range, but detection of valley elderberry longhorn beetle in any individual shrub is problematic. Therefore, consistent with existing protocols under the existing BO, the PG&E VELB Conservation Program and this HCP treat all elderberry shrubs as if valley elderberry longhorn beetle were present, and mitigate any unavoidable effects to any elderberry shrub.

Most impacts on elderberry plants in the Plan Area will occur as the result of vegetation management activities in maintaining clearance between vegetation and electrical conductors on overhead transmission and distribution lines. Beetles could be killed during trimming or pruning of elderberry stems during routine vegetation management activity. Clearance requirements vary with line voltage and other factors. In many areas, vegetation-conductor clearance is sufficient to preclude the need for pruning elderberry plants. Clearance often does not require

removal of entire shrubs. PG&E studies have shown that more than 90% of potentially occupied elderberry galleries can be retained during trimming and that trimming does not necessarily have a direct impact on feeding larvae. The numbers of known plants along all PG&E facilities (including areas outside the plan area that may be affected by operation and maintenance activities or projects) are summarized in Appendix D. Based on PG&E surveys conducted in 2001 and 2002, approximately 107 "shrub units" (which includes all stems within a 6-by-6-by-6-foot area) will need to be pruned annually in the plan area during routine vegetation management activity. Previous surveys indicate that nearly one-third of these plants will have been pruned previously.

This summary of potential impacts on the valley elderberry longhorn beetle is based on a more detailed analysis of potential impacts on the beetle from PG&E's vegetation management activities and other routine operations and maintenance activities for gas and electric (e.g., G1-G13 and E1-E11) in the BO and VELB Conservation Program (Appendix D). Because the BO provides incidental take authorization for these routine operations and maintenance activities systemwide, it is not necessary for the HCP to re-analyze the impacts on or seek coverage for VELB for those activities within the Plan Area. As provided by AMM 11, PG&E will apply the same avoidance and minimization measures required by the VELB Conservation Program to all routine operations and maintenance activities in the Plan Area. Similarly, the lands acquired and managed in perpetuity under the VELB Conservation Program will mitigate for impacts from PG&E's routine operations and maintenance throughout the system, including in the San Joaquin Valley.

The BO did not analyze effects of substation expansion and minor new construction activities (e.g., G14-G16 and E12-E15). Assuming that these activities result in impacts similar to the relative percentage of disturbance estimated in Table 3-2 and habitat disturbed in Table 3-11, approximately 0.01 acres of VELB habitat could be permanently affected annually (1 acre over 30 years) and 0.7 acres temporarily affected annually (22.23 acres over 30 years).

Indirect Effects

Pruning of elderberry shrubs may result in indirect effects on larvae or beetles (through changes in plant vigor), although these effects are difficult to measure. This effect is under study at University of California at Davis, and results may need to be incorporated adaptively into the HCP.

Effects on Critical Habitat

Critical habitat has been designated for valley elderberry longhorn beetle but none of it occurs within the plan area. Therefore, there the project would not result in adverse modification of critical habitat as defined under the ESA.

Compensation Efforts

PG&E's Valley Elderberry Longhorn Beetle Conservation Program (Appendix D) provides funding for acquisition and long-term management of compensation areas and for research to determine optimum placement of several elderberry conservation areas. PG&E has successfully established valley elderberry longhorn beetle mitigation habitat for a number of individual projects (see Appendix D).

Under the BO, PG&E is providing mitigation for all impacts to the beetle from all routine operations and maintenance including vegetation management throughout PG&E's service territory; therefore, no further mitigation is required for the potential impacts from such activities in the plan area. However, because the BO did not address the potential impacts to the beetle from minor new construction including substation expansion, PG&E proposes to avoid, minimize and compensate for effects of these additional activities in the plan area that may affect elderberry plants, using the same avoidance, minimization, compensation and monitoring methods described in the BO (Appendix D), and by increasing the number acres of high quality VELB habitat acquired under the BO based on the actual impacts to the beetle from minor new construction activities in the plan area.

PG&E is compensating for all elderberry shrubs regardless of occupancy; therefore, the compensation will provide a substantial amount of habitat relative to the amount of occupied habitat that is expected to be affected by O&M activities. Furthermore, VELB compensation areas could result in benefits to other covered species in the HCP.

Overall Effects

Vegetation clearance for O&M activities other than vegetation management will affect a modest number of elderberry shrubs relative to the total population in the San Joaquin Valley, and effects will be scattered over a large area. Adopted compensation areas will mitigate loss of all elderberry shrubs, which will produce habitat of significant value for valley elderberry longhorn beetle and will more than offset PG&E impacts on elderberry shrubs and valley elderberry longhorn beetle. Critical habitat will not be adversely modified. Overall, the HCP will assist USFWS in meeting recovery goals for the species.

Requested Authorization

PG&E has received authorization for take that may result from vegetation management and other routine operations and maintenance activities through the Valley Elderberry Longhorn Beetle Conservation Program BO (Appendix D). PG&E requests authorization from USFWS through the incidental take permit for additional take that may occur under minor new construction activities that have

not been previously authorized including substation expansion, new electric poles and towers, new pipeline extensions, and new pressure limiting stations, with adopted AMMs and compensation measures implemented.

California Tiger Salamander

Direct Effects

O&M activities are estimated to result annually in the temporary disturbance of 33 acres of potentially occupied upland and aquatic salamander habitat and to permanently remove less than 0.36 acre of potentially occupied aquatic habitat (vernal pools) annually (990 and 11 acres respectively over the 30-year plan) (Table 3-11) O&M activities have the potential to result in direct mortality, disturbance of individual California tiger salamanders through vibrations, and reduced habitat quality.

To minimize effects on aquatic habitat, AMMs (see Chapter 4, "Conservation Strategy," Table 4-1) include conducting preconstruction surveys for covered amphibians prior to O&M activities and, where practicable, establishing exclusion zones around sensitive habitats (i.e., suitable aquatic breeding habitat). O&M activities will be avoided near vernal pools during periods when vernal pool habitat is wet, which coincides with the breeding and larval development stages of the species' life cycle. The establishment of exclusion zones around suitable aquatic breeding habitat would reduce habitat removal, habitat disturbance, and mortality to salamanders**.**

Salamanders may travel to aestivation sites up to 1 mile from aquatic breeding habitat; consequently, individuals are likely to disperse widely over a large area. While this characteristic makes a large area subject to potential for take, it also reduces the potential for mortality and limits the proportion of a local population that may be affected by the relatively small amounts of disturbance required for O&M activities (see Table 3-1). The AMMs (see Chapter 4, "Conservation Strategy," Table 4-1) include minimizing the construction of new access roads, maintaining low speed limits, and parking vehicles in previously disturbed areas where practicable.

In cases where the buffer distances around aquatic habitat cannot be maintained or where new access roads are required to complete O&M activities, the potential exists for direct habitat disturbance or removal and direct take of individual California tiger salamanders. Salamanders could be subject to direct mortality from ground-disturbing activities that could crush adults and larvae if equipment enters the aquatic habitat. Salamanders aestivating in upland areas within 1 mile of aquatic habitat could be crushed in their burrows by O&M equipment. This potential effect would occur infrequently and would be localized, based on the size of disturbance areas. The net effect would be a minor to local populations, and would not noticeably alter regional or species populations.

Indirect Effects

Potential indirect temporary habitat loss or degradation resulting from O&M activities that reduce water quality during the wet season could lead to lower survivability of larval salamanders. AMMs that specify installation of erosion control measures and implementation of invasive weed control measures will reduce effects of O&M activities on water and habitat quality to a minimal level.

Salamander travel and access are not expected to be disrupted by the majority of O&M activities because most activities will be conducted during dry periods, when salamanders would not be moving. During emergency activities, salamander travel may be slightly disrupted for short periods. Such effects are localized and infrequent and would have negligible effects on local populations.

Effects on Proposed Critical Habitat

Proposed critical habitat for the California tiger salamander encompasses more than 140,000 acres of the plan area (Table 3-12). Proposed critical habitat for the salamander also extends to substantial areas of land elsewhere in the Central Valley, its surrounding foothills, and central and southern coastal California. Effects of O&M activities on critical habitat are consistent with the descriptions of the direct and indirect effects identified previously. Overall, only a minute fraction (<0.01% or 0.02 acres per year due to permanent effects and 2.5 acres per year due to temporary disturbance) of the designated proposed critical habitat in the plan area, and an even smaller fraction of the total designated critical habitat for these species, would be directly or indirectly affected by the project. As a result, the project would not result in adverse modification of proposed critical habitat, as defined under the ESA.

Compensation Efforts

Compensation requirements would include preserving and/or enhancing areas that support both terrestrial and aquatic habitat at appropriate ratios to ensure that all life history needs of the species are met. Compensation areas will also contain suitable refugia habitat (rodent burrows, soil cracks, or crevices). Compensation will provide perpetual habitat for California tiger salamander as mitigation of temporary effects of O&M activities.

Overall Effects

The temporary disturbance and permanent habitat removal resulting from covered activities will not result in substantial effects on local or regional populations of California tiger salamander because of the small size of O&M activities, the limited number of acres affected, the AMMs that will be implemented, and the requirements set forth by the HCP for compensation of

habitat loss for the species. Proposed critical habitat will not be adversely modified.

Requested Authorization

PG&E requests authorization from USFWS for all take of California tiger salamander that may result from O&M activities with adopted AMMs and compensation measures implemented.

Limestone Salamander

Direct Effects

Limestone salamanders are restricted to limestone outcrops on north-facing slopes in Mariposa County. The limited known and potential distribution of the limestone salamander has been identified as "designated occupied habitat," based on the critical habitat and known distribution of the species (see Figure I-1, Appendix I). Because of this very localized distribution, the potential for direct effects to occur during O&M activities is remote. Approximately 1 acre of potentially occupied habitat is anticipated to be temporarily affected each year and less then 1 acre permanently affected per year (30 and 0.03 acre respectively over 30 years) by O&M activities (Table 3-11).

If O&M activities occurred in limestone salamander habitat, direct effects on limestone salamanders could result from ground disturbance or compaction by equipment, which could reduce the quality of refugia habitat available to this species. Vegetation clearing may change the microclimate around rock outcrops, possibly reducing the quality of the habitat for salamanders. AMMs include minimizing construction of new access roads and parking vehicles in previously disturbed areas when practicable. AMMs also prescribe that the location of all O&M activities in Mariposa County be checked to determine whether they fall within the limestone salamander's designated occupied habitat, and a qualified biologist will evaluate any activities within this area prior to construction. If habitat is found to be suitable, exclusion zones will be established around sensitive habitat (such as rock outcrops) where practicable to minimize effects on habitat and avoid direct take of individuals.

The direct effects described above are unlikely to result from O&M activities because suitable habitat is unlikely to be disturbed, and exclusion zones will be established around suitable habitat to the maximum extent feasible.

Indirect Effects

Vibrations generated by O&M activities adjacent to potentially occupied habitat have the potential to indirectly affect limestone salamanders, but potential for such effects are considered remote. AMMs that include establishment of exclusion zones around sensitive habitat (such as rock outcrops) will reduce the potential for indirect effects.

Compensation Efforts

Compensation areas will contain both suitable aquatic and terrestrial habitat, configured spatially so that it is appropriate for occupation by limestone salamander. Compensation areas will be located within dispersal distance to other suitable habitat or other areas currently occupied by limestone salamander. Permanent effects will be mitigated at 3:1 and temporary effects will be mitigated at 0.5:1.

Overall Effect

PG&E O&M activities are not expected to result in any direct take of limestone salamanders because the probability that occupied habitat will be disturbed is low and AMMs to survey and avoid suitable habitat will be implemented. Therefore, the HCP is unlikely to result in take or any other effect on populations of limestone salamander, and any effects that may occur in areas adjacent to potential habitat will not result in substantial effects on the species. If it is determined that a specific activity poses potential for take, PG&E will work adaptively with DFG and USFWS to develop measures to avoid take and compensate for any effects on habitat.

Requested Authorization

Direct mortality is unlikely for limestone salamander. Actions that directly cause mortality cannot be authorized by USFWS or DFG because the species is fully protected under California State law. If an O&M project is expected to result in disturbance of limestone salamander habitat, PG&E will work adaptively with USFWS and DFG to identify appropriate compensation. Coverage is requested such that any incidental take in the form of harassment or take of habitat under California State law, should it occur, would be authorized by USFWS. Also, should the species no longer be listed as fully protected, take would be authorized by DFG under the terms of the permit.

California Red-Legged Frog

Direct Effects of Habitat Loss and Direct Mortality

As shown in Table 3-11, O&M activities are estimated to temporarily disturb 6 acres of suitable California red-legged frog aquatic habitat (including adjacent uplands) annually over the 30-year life of the project (180 acres over 30-years). Less than 0.05 acres of permanent removal of potentially occupied habitat would result annually (1.5 acres over 30-years) from O&M activities. Implementation of AMMs (see Chapter 4, "Conservation Strategy"), including preconstruction surveys for covered amphibians prior to O&M activities and, where practicable, establishment of exclusion zones around sensitive habitat (i.e., suitable aquatic breeding habitat and adjacent upland), would reduce the potential for direct effects on this covered species.

In infrequent cases where the established buffer distances cannot be maintained during O&M activities, the potential exists for direct temporary habitat loss, direct take of habitat, and direct take of individual red-legged frogs. Red-legged frogs could be subject to direct mortality from ground-disturbing activities and reduced habitat quality. It is difficult to estimate the numbers of individuals at various life stages that may be taken. Given the small size of most activities, such effects are expected to affect only a small proportion of local populations in the area of O&M activities.

Indirect Effects

Potential indirect temporary habitat loss or degradation resulting from O&M activities that reduce water quality during the wet season could lead to lower survivability of larval red-legged frogs. Implementation of AMMs, including erosion control and invasive weed control measures, will reduce or eliminate effects of O&M activities on water and habitat quality.

Effects on Proposed Critical Habitat

Proposed critical habitat for the California red-legged frog encompasses more than 330,000 acres within the plan area (Table 3-12). All potential permanent disturbance could affect approximately 4.9 acres (less than 0.01% of the total area) annually. Proposed critical habitat for the red-legged frog also extends to substantial areas of land elsewhere in the Central Valley, its surrounding foothills, and central coastal California. Effects of O&M activities on critical habitat are consistent with the descriptions of the direct and indirect effects identified previously. Overall, only a minute fraction of the designated proposed critical habitat in the plan area, and an even smaller fraction of the total designated critical habitat for this species, would be directly or indirectly affected

by the project. As a result, the project would not result in adverse modification of proposed critical habitat, as defined under the ESA.

Compensation Efforts

Compensation areas will contain both suitable aquatic and terrestrial habitat, configured spatially so that it is appropriate for occupation of California red-legged frog. Preserves or restored habitat will have measures in place to minimize or eliminate populations of exotic aquatic predators such as bullfrog. Compensation areas will be located, when feasible, within dispersal distance to other suitable habitat, or other areas currently occupied by California red-legged frogs.

Overall Effect

Temporary habitat disturbance and permanent habitat loss resulting from covered activities (180 and 1.5 acres over the 30-year plan) will not adversely affect local or regional populations of California red-legged frog because of the limited number of acres affected, the implementation of AMMs, and the requirements set forth in the HCP for compensation of habitat loss.

Requested Authorization

PG&E requests authorization from USFWS and DFG for any incidental take of California red-legged frogs that may result from O&M activities with adopted AMMs and compensation measures implemented. PG&E also requests a determination that the proposed HCP activities will not result in adverse modification of proposed critical habitat for the California red-legged frog.

Blunt-Nosed Leopard Lizard

Direct Effects

O&M activities are estimated to temporarily disturb 23 acres of potentially occupied blunt-nosed leopard lizard habitat annually (690 acres over the 30-year life of the project) (Table 3-11). The O&M activities, however, would result mainly in small amounts of disturbance at scattered locations throughout the species' range; less than 0.3 acres annually (9 acres over 30-years) could be subject to permanent loss of potentially occupied habitat would result from O&M activities. An undetermined portion of this disturbance would occur at facilities within the managed ROWs of paved highways; such areas are not considered suitable for blunt-nosed leopard lizards because of frequent habitat disturbance

and the likelihood that direct mortality from vehicles on adjacent roads would largely preclude occupation of the ROWs.

As specified in the AMMs (see Chapter 4, "Conservation Strategy"), PG&E staff and, if necessary, a qualified biologist will conduct appropriate surveys for all activities that disturb any area that is likely to be occupied by leopard lizards. If activities take place in habitat likely to be occupied by blunt-nosed leopard lizards (i.e., areas within the species range and outside the managed ROWs of paved roads), PG&E staff will determine whether burrows are present and whether burrows can be avoided. If the work cannot avoid the burrows, a qualified biologist will evaluate the site for occupancy and stake and flag an exclusion zone of the maximum practicable distance up to 50 feet around the burrows prior to O&M activities at the job site. AMMs (see Chapter 4, "Conservation Strategy") have been identified to protect lizards on the ground surface or in burrows from injury or mortality from vehicles and equipment. These measures include minimizing the construction of new access roads, adopting speed limits in sensitive areas, and parking vehicles in areas outside suitable habitat (e.g., in existing disturbed areas). In cases where the established buffer distances cannot be maintained during O&M activities, the potential exists for direct temporary habitat loss.

Indirect Effects

Potential indirect temporary habitat loss or degradation could result from habitat disturbances that increase the likelihood of colonization by invasive weeds. Adoption of AMMs to discourage introduction of weeds would reduce the potential of invasive weeds colonizing suitable blunt-nosed leopard lizard habitat. Any residual indirect effects after implementation of AMMs would not result in any indirect mortality or other harm to blunt-nosed leopard lizards.

Blunt-nosed leopard lizards may be passively displaced from worksites and adjacent occupied habitat by human activity and noise. Such temporary displacement could be considered take by harassment under the federal ESA, but is not considered take under CESA.

Compensation Efforts

Compensation areas will either support blunt-nosed leopard lizard populations, or if desired, as part of recovery actions for the species (U. S. Fish and Wildlife Service 1998), lands suitable for habitat restoration and colonization from adjacent occupied lands will be targeted. Compensation lands will contain ground squirrel burrows or kangaroo rat tunnels that can be used by blunt-nosed leopard lizards for shelter, predator avoidance, and behavioral thermoregulation. To the extent feasible, compensation will occur in priority sites for blunt-nosed leopard lizard and other species identified in the San Joaquin Valley Recovery Plan (U. S. Fish and Wildlife Service 1998). Compensation will provide

permanent preservation and management of land to offset temporary effects that are expected to last only a few years, thereby providing a net benefit over time.

Overall Effect

Temporary habitat loss resulting from covered activities is not expected to result in take of individual leopard lizards or to adversely affect local or regional populations of blunt-nosed leopard lizards because of the limited number of acres affected, the dispersed and localized extent of disturbance, and the implementation of avoidance and minimization measures and compensation of habitat loss for blunt-nosed leopard lizard.

Incidental harassment of leopard lizard could occur at and adjacent to worksites due to noise and human activities. This effect would be temporary and would not constitute take under CESA.

Requested Authorization

PG&E cannot request authorization from DFG for take of blunt-nosed leopard lizard as defined under CESA because the species is fully protected under the Fish and Game code. USFWS will not issue a permit under the federal ESA for take that is inconsistent with state law (i.e., kill, capture, harm, pursue). Incidental harassment, which could occur as a result of O&M projects, is included under the definition of take under the federal ESA but not under CESA. Therefore, take by harassment can be authorized by USFWS without conflicting with CESA. Therefore, PG&E requests USFWS authorization for take by harassment of the blunt-nosed leopard lizard that may occur incidental to and unintentionally during O&M activities. Also, should the species no longer be listed as fully protected, take would be authorized by DFG under the terms of the permit.

Giant Garter Snake

Direct Effects of Habitat Loss and Direct Mortality

Approximately 3 acres of potentially occupied giant garter snake habitat will be temporarily disturbed by O&M activities annually (90 acres over the 30-year life of the project). As previously noted, disturbance will occur as a number of small disturbances in scattered locations over this extended period. Less than 0.1 acres of permanent removal of habitat will result annually (3 acres over 30 years) from O&M activities. As described in the AMMs, exclusion zones will be established prior to O&M activities, and work will be avoided during the winter inactive period (October 1–May 1) when practical. The establishment of buffers around

suitable habitat and scheduling work outside of the winter inactive period will reduce habitat disturbance and direct and indirect mortality to giant garter snakes.

In cases where the established buffer distances cannot be maintained or O&M activities must occur during the inactive period, the potential exists for direct temporary habitat disturbance and take of individual giant garter snakes. Giant garter snakes could be subject to direct mortality from ground-disturbing activities (i.e., snakes could be crushed by vehicles and equipment operating in occupied habitat).

Indirect Effects

Potential indirect temporary habitat loss or degradation of adjacent habitat areas could result from O&M activities that reduce water quality during the wet season. Such indirect disturbance could lead to lower survivability of giant garter snakes. Implementation of AMMs, including erosion control and invasive weed control measures, will reduce indirect effects of O&M activities on water and habitat quality for the giant garter snake.

Compensation Efforts

Compensation areas for giant garter snake will permanently protect cover and foraging habitat, basking areas, and protected hibernation sites for the species. Selected compensation areas will contain small mammal burrows and other small crevices in upland habitat for giant garter snake.

Overall Effect

Habitat loss resulting from covered activities will not adversely affect local or regional giant garter snake populations because of the limited number of acres affected, the AMMs that will be implemented, and the requirements set forth in the HCP for compensation of habitat loss.

Requested Authorization

PG&E requests authorization from USFWS and DFG for all take of giant garter snake that may result from O&M activities with adopted AMMs and compensation measures implemented.

Swainson's Hawk and White-Tailed Kite

Direct Effects

O&M Activities

Temporary direct disturbance to potentially occupied Swainson's hawk and white-tailed kite habitat (nesting and foraging) is estimated at 28 acres and 15 acres respectively annually over the 30-year life of the project (Table 3-11). Less than 1 acre and 0.4 acres of permanent removal of habitat would occur annually for each species respectively, as a result from implementation of O&M activities. The total amount of foraging habitat that is temporarily disturbed is small relative to the amount used by the species. Furthermore, this disturbance is distributed in small disjunct areas, which represent a negligible amount of the substantial area of foraging habitat used by individual Swainson's hawks and white-tailed kites. Finally, Swainson's hawks seek out recently disturbed areas for foraging. Accordingly, temporary habitat disturbance will not affect individuals of either species. Similarly, minor new construction will occur on such small, dispersed areas, that this loss of habitat will be insignificant in terms of the species range and foraging requirements.

As described in Chapter 4, "Conservation Strategy," and specified in AMM 22, PG&E has adopted a program to prevent any direct mortality to nesting raptors and their eggs and young during implementation of vegetation management activities; the nest protection program was developed as a part of the Migratory Bird Protection Program (Appendix E) and complies with the Migratory Bird Treaty Act. Briefly, for the Swainson's hawk, the program involves tracking previous known nest sites, identifying these sites as sensitive areas during vegetation management activities, and establishing spatial buffers and seasonal restrictions to avoid impacts on nesting birds. Work crews will be educated regarding nest protection requirements and will follow the nestprotection protocol to avoid nests of these species, other raptors, and other migratory birds during vegetation management. These measures are expected to avoid any direct take of the Swainson's hawk and white-tailed kite or occupied nests from vegetation management. Should removal of a nest be necessary to maintain the safety of PG&E facilities, it will be coordinated with the breeding requirements of the bird and will take place only during the non-nesting season. Nest removals are unlikely, but may also be needed under emergency conditions or imminent fire threat.

Indirect Effects

Both Swainson's hawks and white-tailed kites regularly occur in areas where farm equipment and vehicles are used. As a result they are not sensitive to disturbance by use of O&M equipment. Some disturbance could occur from equipment use immediately adjacent to nest sites. Implementation of AMMs, including the nest protection program for raptors and migratory birds, will

identify buffers around nest sites and train workers to recognize sensitive nesting situations, reducing the potential for effects.

Compensation Efforts

~~No c~~Compensation ~~is~~ proposed for Swainson's hawk and~~or~~ white-tailed kite includes grassland foraging habitat that is obtained as part of the compensation for other grassland species including the San Joaquin kit fox. Furthermore, in the event a nest tree is removed, PG&E will plant 3 trees for each tree removed on an existing compensation parcel that is in close proximity to suitable foraging habitat. While ~~because the~~ small and dispersed habitat disturbances resulting from O&M activities covered under the HCP are not expected to have measurable effects on habitat quality or on individuals or populations of Swainson's hawks or white-tailed kites in the plan area, mitigation ensures that suitable habitat is protected into the future. ~~Compensating for such minor temporary habitat disturbances would have no measurable beneficial effect.~~

Overall Effects

Because of the relatively small amount of temporary disturbance to Swainson's hawk and white-tailed kite habitat, lack of permanent habitat removal, and implementation of AMMs, the potential for direct and indirect effects is considered very low and localized. Implementing O&M measures under the terms of the HCP is not expected to have a substantial effect on populations of Swainson's hawk or white-tailed kite within the plan area.

Requested Authorization

Swainson's Hawk. Although PG&E had designed its O&M activities to avoid all take of nesting raptors, a small potential exists for take of Swainson's hawk that may result from O&M activities with adopted AMMs and compensation measures implemented. Under the MBTA, direct take of migratory birds and their nests is only allowable with a Special Purpose Permit, which PG&E has obtained outside of this HCP. Appendix 5 of the HCP handbook also provides a mechanism for permitting take of ESA-listed species. Should the Swainson's hawk become listed under the ESA, PG&E requests that the incidental take permit serve as a Special Purpose Permit as part of the HCP under 50 CFR 21.27 for take of Swainson's hawk that may result from PG&E's O&M activities.

Under the MBTA take is defined as direct take of nests, eggs, or birds while under the ESA, take is defined more broadly to include certain forms of harm and harassment. PG&E requests federal take authorization for harm and harassment. As the species is state listed, PG&E also requests take authorization from DFG.

White-Tailed Kite. Because white-tailed kite has been designated as Fully Protected in the California Fish and Game Code, DFG will not authorize take. White-tailed kite is also protected from actions that directly cause mortality under the MBTA. However, should the species no longer be listed as fully protected, and should the species be listed in the future, take would be authorized by DFG under the terms of the permit. Because the definition for take under the ESA differs from the more narrow definition under Fish and Game code and under the MBTA, PG&E requests federal take authorization for harm and harassment, as defined under the ESA.

Should the Swainson's hawk become listed under the ESA, PG&E requests that the incidental take permit serve as a Special Purpose Permit as part of the HCP under 50 CFR 21.27 for take of Swainson's hawk that may incidentally result from PG&E's O&M activities.

Bald and Golden Eagles

Direct Effects

O&M Activities

Temporary direct disturbance could occur to potentially occupied bald eagle and golden eagle habitat (nesting and foraging), but the amount of habitat disturbed (16 and 7 acres annually [Table 3-11]) is small relative to the large home ranges of individuals of these species. No permanent removal of habitat would result from implementation of O&M activities. Loss of foraging and perching habitat in grassland, riparian, and oak woodland habitats would be limited and widely dispersed and would represent a very small fraction of the total areas suitable for and used by bald and golden eagles. Consequently, O&M activities are not expected to affect foraging or perching habitat for bald or golden eagles.

Potential loss of unoccupied nest sites in trees during vegetation management is unlikely to occur but is addressed through requirements of PG&E's adopted nest protection program (Chapter 4, AMM 22, and Appendix E). Implementing this procedure will avoid disturbance of nest trees during the nesting season and avoid removal of eagle nests during the non-nesting period. As described in the AMMs and the Migratory Bird Protection Program (Appendix E), trained vegetation management pre-inspectors will evaluate potential nest sites to determine whether exclusion zones should be established around active nest sites prior to O&M activities during the nesting period (March 15–August 15). Establishment of exclusion zones during the nesting period, if needed, is expected to eliminate direct mortality to nesting eagles.

Although few pairs of bald eagles are known to nest in the plan area, populations could increase over the life of the plan in response to population recovery from the DDT era and availability of new habitat at reservoirs. To avoid potential for disturbance of nesting bald eagles, PG&E will query CNDDB or PG&E's bald

eagle expert to identify known eagle nests and ensure that a qualified raptor biologist evaluates O&M activities proposed within 0.5 mi of a bald eagle nest. Potential for disturbance to a bald eagle nest will be avoided, consistent with AMM 22 and the nest protection program for vegetation management, by establishing activity buffers or seasonal restrictions around active nests.

Indirect Effects

Construction activity and noise could displace bald and golden eagles from perch sites used during foraging or roosting, but this effect is not considered a substantial effect. Noise and disturbance could affect nesting success of golden eagles in the unlikely event that activities occur close to nests, but AMMs to survey and protect located nest sites should be adequate to minimize this effect.

Compensation Efforts

Grassland compensation provided for other species under this plan will provide foraging opportunities for bald and golden eagles. However, additional compensation is not currently proposed for bald and golden eagles because the O&M activities are not expected have effects on the habitat of these species. If disturbance of any bald or golden eagle nest by O&M activities cannot be avoided, PG&E will consult with USFWS and DFG within 1 year and prior to effects to develop an adaptive management solution that can be incorporated into the HCP.

Overall Effects

Habitat disturbance and direct disturbance of foraging and wintering bald and golden eagles are considered to have very low effects on individuals and on the species populations. The effect of vegetation management on nesting golden and bald eagles is considered minimal with implementation of adopted AMMs.

Requested Authorization

Bald and golden eagles are federally protected under the Bald and Golden Eagle Protection Act and the MBTA. Take, as defined by these statutes includes direct mortality and take of nests or eggs. Disturbance of habitat, harassment or harm (as defined by the ESA) does not constitute take under these statutes. To facilitate permitting between these statutes and Section 10 of the ESA, PG&E requests that this document serve as an acknowledgment of non-prosecution under the Bald and Golden Eagle Protection Act per Appendix 5 of the HCP handbook. Should the golden eagle become listed under the ESA in the future, PG&E requests that the USFWS provide acknowledgement of non-prosecution for this species under the Bald and Golden Eagle Protection act. As long as the bald eagle is listed

under the ESA and if the golden eagle should become listed under the ESA in the future, PG&E requests that the incidental take permit serve as a Special Purpose Permit under the MBTA for take as defined by that statute. DFG cannot authorize take because the eagles are both fully protected. Should the species no longer be listed as fully protected, and the golden eagle become state listed, take would be authorized by DFG under the terms of the permit.

Western Burrowing Owl

Direct Effects

Based on the land-cover analysis, PG&E estimates that 5 acres of potentially occupied western burrowing owl habitat will be temporarily disturbed annually by O&M activities over the 30-year life of the project (Table 3-11). Less than 0.1 acre per year (3 acres over 30 years) of burrowing owl habitat is expected to be permanently removed by O&M activities. Effects on breeding owls will be avoided or minimized by conducting preconstruction surveys and establishing buffers as described in AMM 18. In the event the buffers are not possible and the species is present, PG&E will develop a site specific plan to avoid take of this species. The AMM will reduce potential habitat disturbance and if necessary a site specific plan will result in avoidance of direct mortality to burrowing owls. For nonbreeding owls, passive relocation techniques will be used as needed to ensure that owls move out of construction areas prior to ground disturbance.

Burrowing owls are known to occur at several substation sites in the plan area. These individuals are presumably attracted by the bare ground conditions created by vegetation management as well as by the presence of fencing and cover that offer protection from predators. Burrowing owls in these situations often tend to be habituated to human activities.

Temporary disturbance of foraging habitat is not considered detrimental to burrowing owls because of the small area of disturbance expected at any given site and because disturbance may increase prey diversity and foraging opportunities for burrowing owls.

PG&E is working ~~with DFG and USFWS~~ to develop a burrowing owl conservation program for PG&E facilities. This program will identify protection, management, and enhancement activities for burrowing owl populations that are adapted to work activities at substations and other facility sites. The program ~~is expected to~~may lead to a separate MOU between PG&E and the agencies for burrowing owl management and ~~will~~ may be incorporated adaptively into the HCP.

Indirect Effects

Burrowing owls regularly occur in areas subject to noise and other disturbance from farm equipment, highways, and other activities. Nonetheless, some potential exists for burrowing owls to be indirectly affected by construction activities in more remote areas. Implementation of measures to conduct surveys, establish site-specific buffers, and restrict activities of maintenance crews will avoid or substantially minimize potential indirect effects.

Compensation Efforts

Compensation will be provided for disturbance to occupied burrowing owl habitat. Compensation may entail acquiring existing occupied burrowing owl habitat or enhancing lands near occupied burrowing owl habitat (i.e., at substations). Acquired occupied land will contain three basic attributes: open, well-drained terrain; short, sparse vegetation; and underground burrows (created by ground squirrels or other fossorial mammals) or facsimiles. Such lands will be managed to maintain compatibility with burrowing owl use, including restrictions on use of rodenticides. This compensation will provide permanently protected compensation land as mitigation for temporary disturbance of grassland habitat. Enhancement will consist of constructing artificial nesting habitat or performing other management actions to enhance the population at existing occupied sites (i.e., substations). Enhancement may be performed in advance on PG&E lands. Specific enhancement measures will be developed adaptively with the agencies.

Overall Effects

The covered activities are not expected to result in take or have any other substantial effect on populations of burrowing owls in the plan area because of the small amount of estimated temporary disturbance to potentially occupied habitat, the lack of any permanent removal of suitable habitat, implementation of AMMs to reduce disturbance to nesting owls, and requirements set forth in the HCP for compensation of habitat loss.

Requested Authorization

Under the MBTA take is defined as direct take of nests, eggs, or birds, while under the ESA, take is defined more broadly to include certain forms of harm and harassment. PG&E requests take authorization for harm and harassment. , Should the burrowing owl become federally listed PG&E requests that the incidental take permit serve as a Special Purpose Permit from USFWS under 50 CFR 21.27 for any take, as defined by the MBTA, of the western burrowing owl that may result accidentally and unintentionally from PG&E's O&M activities, with implementation of adopted AMMs.

Currently, the burrowing owl is not listed under CESA, so no mechanism exists to authorize take of the species. The owl, however, has been recently petitioned for state listing. Should this listing occur before the HCP process is completed, or become listed during the term of the permit, PG&E requests that DFG provide authorization under Section 2081 for any accidental take that may occur with implementation of AMM 18 or subsequent avoidance efforts.

Bank Swallow

Direct Effects

O&M activities were calculated to have the potential to temporarily disturb less than 1 acre annually or permanently remove less than 0.01 acre annually (30 and 0.3 acres over the 30-year life of the permit) (Table 3-11)**.** This level of habitat disturbance is unlikely, however, because habitat for bank swallows is highly limited in the San Joaquin Valley and O&M activities typically do not disturb streamside banks. There is a very low potential for direct take of individual bank swallows as a result of burrow collapse from vibrations caused by ground-disturbing activities close to occupied habitat. As described in the AMMs (see Chapter 4, "Conservation Strategy*"*), known populations will be avoided, exclusion zones will be established prior to O&M activities, and work will be avoided during the nesting period (April 1–July 31). The establishment of buffers and avoidance of O&M activities during the nesting season would eliminate direct mortality to bank swallows**.**

A very small potential exists for direct take of individual bank swallows if emergency actions are needed in occupied bank swallow habitats. In this unlikely event, PG&E will work adaptively with DFG and USFWS to develop a site-specific plan to avoid and minimize effects.

Indirect Effects

Indirect impacts, including noise disturbance at colony sites, are considered unlikely. Implementation of AMMs specifying surveying suitable habitat and establishing buffers wherever possible will prevent indirect effects.

Compensation Efforts

Compensation is proposed for bank swallows prior to the implementation of the O&M activity causing the disturbance. The exact location and amount of mitigation will be determined at that time because the O&M activities are expected to have very minimal to no effects on bank swallow habitat or populations. However, compensation for projects impacts would be provided at 3:1 ratio for permanent effects and at 0.5:1 for temporary effects. Advanced

compensation is difficult to achieve for bank swallow because of the species' requirement for steep eroding riverbanks. If disturbance of any bank swallow nesting habitat by O&M activities cannot be avoided, PG&E will consult with USFWS and DFG to develop a solution that can be incorporated into the HCP.

Overall Effect

Because of the expected lack of any direct temporary or permanent effects on potentially occupied habitat, the low probability of O&M activities occurring in areas near occupied habitat, and the implementation of AMMs, the potential for direct and indirect effects is considered very low and localized. O&M activities are not anticipated to have a substantial effect on populations of bank swallow within the plan area.

Requested Authorization

Under the MBTA take is defined as direct take of nests, eggs, or birds, while under the ESA, take is defined more broadly to include certain forms of harm and harassment. PG&E requests federal take authorization for harm and harassment. Should the bank swallow become federally listed, PG&E requests that the incidental take permit serve as a Special Purpose Permit from USFWS under 50 CFR 21.27 for any take, as defined by the MBTA, of bank swallow that may result accidentally and unintentionally from PG&E's O&M activities, with implementation of adopted AMMs.

PG&E requests authorization from DFG CESA for incidental take of bank swallow.

Tricolored Blackbird

Direct Effects

O&M activities are estimated to temporarily disturb 4 acres annually of nesting or foraging habitat (120 acres over the 30-year life of the project). Most of this disturbance would occur in foraging habitat; less than 0.1 acre of permanent removal of nesting habitat would result annually (3 acres over 30 years) from O&M activities. Tricolored blackbirds travel to forage over large areas; consequently, minor disturbance of grassland foraging habitat will not rise to the level of mortality.

Because of the sensitivity of tricolored nesting colonies to human disturbance, even at areas of small disturbance (<0.1 acre), PG&E has adopted the protection measure (AMM 23) to query the CNDDB and other data sources to identify previous nesting colony sites that may occur adjacent to worksites (see Chapter

4, Table 4-1). Any worksites adjacent to previously known colony sites, or colonies discovered during work operations, will be evaluated to assess effects of work activities. Direct take of tricolored blackbirds (i.e., abandonment of eggs and young in nests) from noise disturbance and ground-disturbing activities near an active nesting colony would be avoided by establishment of buffers and avoidance of O&M activities during the nesting season (March 1–July 31).

Disturbance of known nesting habitat (e.g., blackberry patches) during the non-nesting season could reduce the quality of habitat for nesting in subsequent years. The impacts of this disturbance depend on a variety of factors, including the extent of nesting habitat at the site, the size of the nesting colony, the degree of disturbance, and the rate of vegetation recovery. The effects of disturbing nesting habitat during the non-nesting period will be evaluated on a site-specific basis, and individual plans will be developed to minimize disturbance, restore and enhance habitat onsite (to the degree possible under PG&E's access and easement agreements with landowners), and compensate for disturbance effects. These plans will be coordinated with the permitting agencies.

Noise and human activity associated with O&M activities conducted in areas adjacent to nesting colonies could cause nest abandonment. Establishment of buffers around active nesting areas will avoid these impacts, except in the unlikely event of an emergency action needed near a nesting colony.

Indirect Effects

No indirect effects of O&M activities have been identified for the tricolored blackbird.

Compensation Efforts

Compensation areas that may be protected as mitigation for temporary disturbance of tricolored blackbird nesting habitat will consist of an active colony site or a suitable nesting site that contains accessible open water, a protected nesting substrate including either flooded or thorny/spiny vegetation, and a suitable foraging space providing adequate insect prey within a few miles of the nesting colony.

Overall Effect

Because of the small quantity of direct temporary effects on potentially occupied habitat, the lack of permanent habitat removal, the low probability of O&M activities occurring in areas near occupied nesting habitat, and implementation of AMMs to identify and protect known nesting colony sites, the potential for direct and indirect effects on nesting tricolored blackbirds is considered very low and localized. Overall effects on the species are not considered substantial.

Requested Authorization

Under the MBTA take is defined as direct take of nests, eggs, or birds while under the ESA, take is defined more broadly to include certain forms of harm and harassment. PG&E requests federal take authorization for harm and harassment. Should the bank swallow become federally listed, PG&E requests that the incidental take permit serve as a Special Purpose Permit from USFWS under 50 CFR 21.27 for any take, as defined by the MBTA, of bank swallow that may result accidentally and unintentionally from PG&E's O&M activities, with implementation of adopted AMMs.

Because the tricolored blackbird is not state-listed, DFG cannot authorize take for the species.

Buena Vista Lake Shrew

Direct Effects

O&M activities were calculated to have potential to temporarily or permanently disturb less than 0.3 acre of potentially occupied Buena Vista Lake shrew habitat over the 30-year life of the permit (Table 3-11). Temporary disturbance of habitat could occur as a result of O&M activities such as pole replacements. However, direct take of individual shrews is unlikely because of the very localized distribution (in Kern County) and specific habitat requirements (wetlands and riparian forest) of the species.

Although potential for effects from O&M activities is low, any such effects could be important, because the known population is small and availability of suitable habitat is limited. Therefore, PG&E has adopted AMM 25, which will protect the Buena Vista Lake shrew from effects of all O&M activities (see Chapter 4, Table 4-1). This protection involves incorporating the known occupied habitat of the shrew (see Figure I-2, Appendix I) into the PG&E's workload management database, querying the database before conducting covered activities, identifying areas of potential habitat, verifying habitat conditions in the field, applying seasonal restrictions to minimize direct effects, and applying buffers to maximize protection of suitable habitat. This program will avoid or minimize effects of the O&M program on the Buena Vista Lake shrew.

Indirect Effects

Indirect effects of construction noise and humans on Buena Vista Lake shrews are considered highly unlikely because of the low likelihood of an overlap between activities and the range of the species, and implementation of AMMs.

Effects on Critical Habitat

Critical habitat for the Buena Vista Lake shrew encompasses approximately 4,657 acres located entirely within the plan area (Table 3-12). Effects of O&M activities on critical habitat are consistent with the descriptions of the direct and indirect effects identified previously. Overall, only a minute fraction of the designated proposed critical habitat in the plan area (0.01% or 0.001 acres per year due to permanent disturbance and 0.23 acres per year due to temporary disturbance) would be directly or indirectly affected by the project. As a result, the project would not result in adverse modification of proposed critical habitat, as defined under the ESA. These effects are not expected to adversely impact either the survival or the recovery of the species.

Compensation Efforts

Less than 1 acre of compensation is expected to be required for this species over the 30-year permit term. Compensation for this species is proposed prior to the implementation of the O&M activity causing the disturbance. The exact location and amount of mitigation will be determined at that time but would consist of mitigating permanent effects at a 3:1 ratio and temporary effects at 0.5:1 because of the very low probability that any O&M activities would be conducted in the small area this species is known to occupy. If any disturbance of occupied habitat is unavoidable, PG&E will consult adaptively with USFWS to develop appropriate compensation.

Overall Effect

Buena Vista Lake shrew has a limited distribution within the plan area. There is only a slight chance that covered activities may result in direct mortality if activities occur within suitable and occupied habitat. However, the lack of any habitat estimated to be temporarily or permanently affected and the rarity of the species make it unlikely that O&M activities would substantially affect the species. Implementation of AMMs to identify potential habitat and minimize disturbance will further reduce potential for effects. If any habitat is affected, compensation would be implemented.

Requested Authorization

Although O&M activities covered in the HCP are unlikely to result in take of Buena Vista Lake shrew, PG&E requests authorization from USFWS for any take of the species that may result from O&M activities with adopted AMMs and compensation measures implemented. The species is not state-listed, and thus no authorization is available from DFG.

Riparian (San Joaquin Valley) Woodrat and Riparian Brush Rabbit

Direct Effects of Habitat Loss and Direct Mortality

O&M activities could temporarily or permanently affect up to 1.5 acres of riparian habitat potentially occupied by these species over the life of the plan based on an annual disturbance of 0.05 acre (Table 3-11). However, direct take of individual riparian brush rabbits or riparian woodrats is unlikely because the species have very localized distribution in San Joaquin and Stanislaus County and specific habitat requirements (riparian forest).

Because of concerns about the limited populations and distributions of these species in the plan area, PG&E adopted AMMs 26 and 27 to further minimize effects. The AMMs apply to all activities that may occur in designated occupied habitat (see Figure I-3 and I-4, Appendix I), including those that disturb <0.1 acre of habitat. Implementation of this measure will further reduce the potential for habitat impacts or direct mortality to the species.

For activities that may be conducted within or adjacent to riparian habitats in the limited range of these species, surveys will be conducted and project-specific AMMs will be developed in coordination with the permitting agencies.

AMMs are expected to be effective at avoiding direct take of these species. A small possibility exists, however that direct take of one or a few individuals could occur.

Indirect Effects

No indirect effects from construction noise adjacent to O&M construction sites is expected to occur. If such effects are found to be possible in a given project area, specific AMMs will be developed and implemented to address those effects.

Compensation Efforts

Less than 1.5 acres of compensation are expected to be required for each of these species over the 30-year permit term. Compensation for these species is proposed prior to the implementation of the O&M activity causing the disturbance. The exact location and amount of mitigation will be determined at that time but would consist of mitigating permanent effects at a 3:1 ratio and temporary effects at 0.5:1 because of the very low probability that any O&M activities would occur in the small area these species are known to occupy. If disturbance of occupied habitat is unavoidable, PG&E will contact the permitting agencies and adaptively develop site-specific measures to minimize effects and provide compensation for the species.

Overall Effect

Riparian brush rabbit and riparian woodrat have a highly localized distribution within the plan area. With implementation of adopted AMMs, there is almost no chance that covered activities would result in direct mortality. If O&M activities need to occur within suitable and occupied habitat, PG&E will coordinate with the permitting agencies to develop site-specific plans to avoid and minimize effects. With these measures, the covered activities would not result in substantial effects on these species.

Requested Authorization

O&M activities covered in the HCP are unlikely to result in direct mortality of riparian brush rabbit and riparian woodrat because of their limited ranges. However, in the event existing facilities coincide with their habitat, PG&E requests authorization from USFWS for harassment for riparian brush rabbit and all forms of take for the riparian woodrat. PG&E's adopted AMMs and compensation measures are expected to avoid, minimize and mitigate for any potential effects.

DFG cannot issue take authorization for riparian brush rabbit because its population is so small, DFG also cannot issue take authorization for riparian woodrat because it is not state-listed.

Tipton and Giant Kangaroo Rats

Direct Effects

O&M activities are expected to temporarily disturb only a small amount of potentially occupied habitat annually for the giant kangaroo rat (5 acres) and Tipton kangaroo rat habitat (4 acres) (Table 3-11); disturbance would occur in small, scattered areas. Permanent loss of habitat for these respective species is expected to be less than 3 acres over 30 years. To reduce the potential for take of kangaroo rats, the AMMs specify preconstruction surveys of potentially suitable habitat and establishing exclusion zones up to 30 feet around active burrows prior to O&M activities. These measures would reduce effects on habitat and potential for mortality. Because the project would temporarily disturb only small amounts of habitat in scattered locations out of a relatively large species range, the direct effects of O&M activities are expected to minimal.

Indirect Effects

Indirect take of individual kangaroo rats could occur as a result of noise or ground vibrations during O&M activities near occupied habitat. This disturbance

would not cause mortality, but could affect breeding behavior during the nesting period. Such effects are considered unlikely and would be highly localized if they occurred.

Compensation Efforts

Compensation areas for Tipton and giant kangaroo rat will be located within the species' known range in areas generally considered to be occupied habitat. Selection of compensation areas for other grassland species will also include habitat for Tipton and giant kangaroo rats, if possible. Compensation areas for Tipton and giant kangaroo rats will contain friable soils with fine texture and terrain not subject to frequent flooding. Compensation would permanently protect habitat as mitigation of temporary loss of habitat use.

Overall Effect

Direct and indirect effects on Tipton and giant kangaroo rats are minor because of the expected small amount of temporary habitat disturbance, the relatively large area still occupied by these species, lack of permanent effects on potentially occupied habitat, and implementation of AMMs. In addition, any effects would be compensated for through permanent protection. The HCP would not result in any substantial effects on these species.

Requested Authorization

PG&E requests authorization from USFWS and DFG for all take of Tipton and giant kangaroo rats that may result from O&M activities with adopted AMMs and compensation measures implemented.

San Joaquin (Nelson's) Antelope Squirrel

Direct Effects

O&M activities are estimated to temporarily disturb 38 acres of potentially occupied San Joaquin antelope squirrel habitat annually (1,140 acres over the 30-year life of the project) (Table 3-11). Less than 0.5 acres of permanent loss of potentially occupied habitat would result from O&M activities annually (15 acres over 30-years). O&M activities have the potential to cause direct temporary habitat loss and direct take of San Joaquin antelope squirrels. There is some chance that antelope squirrels could be crushed by vehicles and equipment driving over occupied burrows or foraging squirrels.

Adopted AMM 20 specifies that all potential San Joaquin antelope squirrel habitat will be surveyed for active burrows and, if burrows are present, that a qualified biologist will stake and flag an exclusion zone of the maximum practicable distance up to 30 feet around active burrows prior to O&M activities at the site. The AMMs also include reducing the amount of new access roads constructed, imposing speed limits, and parking vehicles in areas outside suitable habitat (i.e., in already-disturbed areas). These measures will limit direct mortality but will not eliminate potential for a small amount of take over the life of the project.

Indirect Effects

Habitat for San Joaquin antelope squirrel could be degraded by invasion of weedy plants following ground-disturbing activities. Adoption of AMMs to discourage introduction of weeds would reduce the potential of invasive weeds colonizing suitable antelope squirrel habitat.

Compensation Efforts

Compensation areas for San Joaquin antelope ground squirrel will be located within the species' known range in areas generally considered to be occupied habitat. Permanent protection and management will be provided to mitigate temporary effects.

Overall Effect

Temporary habitat loss resulting from covered activities will not adversely affect local or regional San Joaquin antelope squirrel populations because of the limited number of acres temporarily affected, the relatively large range of the species, implementation of AMMs, and implementation of compensation.

Requested Authorization

PG&E requests authorization from USFWS and DFG for all take of San Joaquin antelope ground squirrel that may result from O&M activities with adopted AMMs and compensation measures implemented.

San Joaquin Kit Fox

Direct Effects of Habitat Loss and Direct Mortality

Less than 1 acre per year (30 acres over 30-years) of permanent loss of potentially occupied habitat would result from implementation activities covered in the HCP. O&M activities are estimated to temporarily disturb 73 acres of potentially occupied San Joaquin kit fox habitat annually over the 30-year life of the project (Table 3-11). This habitat loss in potential kit fox habitat would occur in small, linear areas (<0.1–18 acres per site) scattered throughout the plan area. Given the small proportion of total potential habitat affected and the small proportion of any individual's home range that may be affected, it is not expected that habitat disturbance will lead to take of any San Joaquin kit foxes. Nonetheless, PG&E has agreed to compensate for both permanent and temporary habitat losses.

O&M activities have the potential to cause direct take of individual San Joaquin kit foxes. Kit foxes could be struck by vehicles or equipment when out of their burrows or crushed in their dens by vehicles and equipment. They could also be attracted to prey that is displaced from construction sites, and thus be exposed to an elevated potential for injury or mortality.

The AMMs have incorporated standard kit fox construction mitigation measures to reduce temporary disturbance to habitat and take of kit fox. These measures include minimizing the construction of new access roads, limiting vehicle speeds, and parking vehicles in areas outside suitable habitat (i.e., in already-disturbed areas). Suitable habitat areas larger than 0.1 acre will be surveyed prior to disturbance. Any potentially occupied dens will be monitored and hand excavated if they cannot be avoided. Exclusion zones will be established around den sites in accordance with USFWS protocol. Standard restrictions on human activities at construction sites (e.g., prohibition of firearms and dogs, proper disposal of food scraps) are standard PG&E operating requirements. Despite implementation of these measures, however, a small potential exists that a kit fox will be taken during O&M activities.

Indirect Effects

Kit foxes in dens adjacent to work areas could be affected by noise and vibration from construction activity; such disturbance could disrupt reproduction. Such effects, however, will be avoided and minimized by implementation of survey and avoidance measures identified in the HCP AMMs.

Compensation Efforts

Compensation areas for San Joaquin kit fox will be located within the species' known range in areas generally considered to be occupied habitat. Compensation areas will be selected to contribute to maintenance of large habitat blocks and connectivity of remaining San Joaquin kit fox habitat in the Central Valley, consistent with the *San Joaquin Valley Recovery Plan* (U.S. Fish and Wildlife Service 1998). Compensation will provide permanent habitat protection and management to mitigate temporary and limited effects of O&M activities.

Overall Effect

Habitat loss resulting from covered activities will not adversely affect local or regional populations of San Joaquin kit fox because of the limited number of acres affected annually, the wide dispersion of effects, the AMMs that will be implemented, and the requirements set forth by the HCP for compensation of habitat loss.

Requested Authorization

PG&E requests authorization from USFWS and DFG for all take of San Joaquin kit fox that may result from O&M activities with adopted AMMs and compensation measures implemented.

Covered Plant Species

Direct Effects

Covered plant species may be directly affected by O&M activities through several mechanisms: crushing, burial, burning, and poisoning. These mechanisms and the AMMs that reduce their effects are described below.

Plants may be damaged or killed by the movement or parking of vehicles, movement of individuals, or placement of equipment and supplies. These effects would be reduced by AMMs that specify parking vehicles in already-disturbed areas when practicable and establishing exclusion zones around occupied habitat (see Chapter 4, "Conservation Strategy").

Plants and seeds may be damaged or killed by excavation in occupied habitat. This effect would be reduced by the AMM that specifies conducting O&M activities after covered plants have senesced and before the first major rains whenever practicable (see Chapter 4, "Conservation Strategy"). It also would be reduced by the AMM that specifies stockpiling topsoil separately and replacing it with a minimum of compaction.

Plants may be killed or damaged by fires accidentally ignited by O&M activities. This effect would be reduced by the AMMs that specify precautions to reduce the likelihood of accidental fires (see Chapter 4, "Conservation Strategy").

Covered plant species differ substantially in their relative exposure to effects of O&M activities. For 10 covered plant species, the potential for direct effects is negligible (zero to less than 0.25 acre over 30 years) (see Appendix F). These species are: *Caulanthus californicus, Clarkia temblorensis* ssp. *calientensis, Gratiola heterosepala, Lepidium jaredii* ssp.*album , Lewisia congdonii, Malacothamnus hallii, Navarretia myersii, Orcuttia pilosa, Stylocline citroleum,* and *Tuctoria greenei*. Each of these species has a very limited distribution within its potential geographic range, relatively few PG&E facilities within its potential geographic range, and no documented occurrences within 200 meters of a PG&E facility. Nonetheless, a small potential exists for effects on occupied habitat.

For 29 covered species, the potential for direct effects is very small (0-2 acres over 30 years) (see Appendix F). These species are: *Amsinckia grandiflora, Atriplex minuscula, A. tularensis, Blepharizonia plumosa* ssp. *plumosa, Calyptridium pulchellum, Carpenteria californica, Chamaesyce hooveri, Cirsium crassicaule, Clarkia biloba* ssp. *australis, Clarkia lingulata, Clarkia springvillensis, Cordylanthus mollis* ssp. *hispidus, Cordylanthus palmatus, Eremalche kernensis, Eriophyllum congdonii, Eryngium racemosum, Fritillaria striata, Layia heterotricha, L. leucopappa, Legenere limosa, Lupinus citrinus* var. *deflexus, Madia radiata, Monolopia congdonii, Neostafia colusana, Orcuttia inaequalis, Pseudobahia bahiifolia, P. peirsonii, Sidalcea keckii and Twisselmannia californica*. For each of these species, one or more documented occurrences exist within 200 meters of PG&E facilities; however, these species have limited distributions within their potential geographic range, and the extent of PG&E facilities is also limited within this range. Nonetheless, a small potential does exist for effects on occupied habitat. However, PG&E estimates that 0–1 acre of occupied habitat at 0–2 sites for each species may be temporarily affected over the 30-year life of the project. Because of the potential for small activities to affect populations and habitats of these relatively rare species, PG&E will evaluate project site locations that are within 1 km of known species occurrences in the CNDDB. Where potential for impacts may exist, the sites will be evaluated in the field, and where species are present, appropriate seasonal restrictions and buffers will be implemented to avoid or minimize impacts on these species populations. No permanent loss of occupied habitat is anticipated.

Disturbance of occupied habitat of three species is likely to occur during the 30-year term of the HCP: *Castilleja campestris* ssp. *succulenta*, *Lilaeopsis masonii*, and *Opuntia basilaris* var. *treleasei*. These species each have 9–15 occurrences within 200 meters of a PG&E facility. In addition, a somewhat larger portion of these species' geographic ranges will be disturbed by O&M activities (Table 3-13, Appendix F). For *Lilaeopsis masonii*, which occurs in numerous small areas in intertidal wetlands, several patches of occupied habitat could be disturbed during the 30-year term of the HCP, and their combined area is anticipated to be less than 1–2 acres. For *Castilleja campestris* ssp. *succulenta*, which occurs in vernal pools and at some sites can be found in scattered pools over a large area,

portions of several occupied sites could be disturbed, and their combined area is anticipated to be less than 1–4 acres over the course of the permit term. For *Opuntia basilaris* var. *treleasei*, which is an upland species that is dispersed over wide areas at some sites, portions of several occupied sites could be disturbed, and their combined area is anticipated to be less than 2–8 acres. The approach to addressing these effects is discussed in Chapter 4 ("Conservation Strategy").

Indirect Effects

Potential indirect temporary habitat loss or degradation may result from O&M activities that cause erosion or facilitate the spread of invasive plant species. Adoption of erosion control measures would reduce the potential for erosion to affect covered plant species habitat. Implementation of AMMs that discourage introduction of invasive plants would reduce the potential of invasive plants colonizing covered plant species habitat (see Chapter 4, Conservation Strategy).

Compensation Efforts

In the event that compensation is required for covered plant species, compensation lands will be identified and protected in areas already populated by the covered plant species that has been affected. If no habitat occupied by this species is available for purchase, PG&E will consult with the permitting agencies to adaptively develop an acceptable approach to achieve compensation.

Overall Effects

An estimated 4-25 acres of habitat occupied by the 42 covered plant species may be temporarily disturbed by O&M activities over the 30-year life of the project (see Appendix F). With the implementation of avoidance and minimization measures, O&M activities are not anticipated to have any effect on the populations of 16 of the species within the plan area. For three of the covered species, *Castilleja campestris* ssp *succulenta*, *Lilaeopsis masonii* and *Opuntia basilaris* var. *treleasei*, a moderate potential exists for effects on occupied habitat. For these three species combined, it is estimated that 4–14 acres of occupied habitat will be temporarily affected. Occupied habitat for several of the remaining 23 covered plant species may also be temporarily affected. However, current information is insufficient to determine which of these species will be affected and the precise acreage that will be disturbed for each species. No permanent removal of occupied habitat is expected to occur.

Temporary habitat loss is not likely to adversely affect any local or regional populations of covered plant species because of the limited extent of the areas affected, particularly relative to the area occupied by the larger occurrences of the more widespread of the covered plant species, which are those populations

most likely to be affected. Therefore, O&M activities are not anticipated to have a substantial effect on populations of covered plant species within the plan area.

Requested Authorization

Although take of plant species is not prohibited under the ESA and therefore cannot be authorized under an incidental take permit, the plant species described in this HCP would be included on the permits in recognition of the conservation benefits provided to the species under the HCP. Direct take is not anticipated for 16 "no take" species. These species are: Large-flowered fiddleneck (*Amsinckia grandiflora*), Bakersfield smallscale (*Atriplex tularensis*), Mariposa pussypaws (*Calyptridium pulchellum*), Tree-anemone (*Carpenteria californica*), Merced clarkia (*Clarkia lingulata*), Vasek's clarkia (*Clarkia tembloriensis ssp. calientensis*), Pale-yellow layia (*Layia heterotricha*), Comanche Point layia (*Layia leucopappa*), Panoche pepper-grass (*Lepidium jaredii ssp. album*), Congdon's lewisia (*Lewisia congdonii*), Mariposa lupine (*Lupinus citrinus var. deflexus*), Showy madia (*Madia radiata*), Hall's bush mallow (*Malacothamnus hallii*), Pincushion navarretia (*Navarretia myersii, a.k.a. N.m.*ssp. *m.*), Keck's checkerbloom (*Sidalcea keckii*), and kings gold (*Twisselmannia californica*). All non-emergency ground-disturbing activities will avoid all habitat known to be occupied by these species. Assurances provided under the "No Surprises" rule at 50 C.F.R. 17.3, 17.22(b)(5) and 17.32(b)(5) would extend to all other covered plant species.

Take of plants can be authorized by DFG for state-listed plants as part of a 2081 Permit. Therefore, based on the conservation strategy proposed in this plan, take authorization is requested from DFG for state-listed plants.

Maintenance on Compensation Lands

In the course of purchasing compensation lands, placing conservation easements on PG&E lands, or purchasing conservation easements, PG&E or its designee, will have an ongoing obligation to maintain these parcels with the express intent of maintaining, protecting and enhancing the land for the covered species. When conducting standard maintenance and monitoring of these lands (i.e., fencing, surveying, conducting biological surveys, conducting habitat enhancements, and driving on these lands) there is the possibility that take could occur. These activities and the potential for take are also covered by this HCP, including management activities carried out by an independent land manager with whom PG&E has contracted to perform those activities on PG&E's behalf. Take authorization for compensation parcels will expire when the permit expires.

Chapter 6

Monitoring, Reporting, and Adaptive Management Program

Introduction

The federal ESA Section 10 regulations require PG&E to monitor, report, and assess the impacts of the take of covered species that will result from covered activities over time. This chapter describes the monitoring, reporting, and adaptive management components of the HCP.

The goal of the monitoring, reporting, and adaptive management program is to provide a reliable basis for documenting compliance and improving the effectiveness of the program over time. The program will:

- document implementation of AMMs;
- estimate program effects that will require compensation;
- document compliance with compensation requirements;
- evaluate the effectiveness of compensation measures; and
- identify the methods for improving the program over time.

The adaptive management program also addresses other Section 10 requirements, such as consistency with recovery plans, emergency measures, changed and unforeseen circumstances, and HCP amendments.

Monitoring

Monitoring Biological Goals and Objectives

The biological goals and objectives will be monitored annually as part of the overall compliance for the plan (AMMs, effects requiring compensation, compliance with compensation, and compensation effectiveness). These results and their relevance to the biological goals and objectives will be summarized in the annual report described under Reporting Requirements.

Monitoring Avoidance and Minimization Measures

Use of AMMs will be monitored to ensure document compliance. Compliance monitoring of AMMs will follow the data-archiving process described in Chapter 4 ("Conservation Strategy").

As described in Chapter 4, medium- and large-disturbance activities that occur in natural vegetation will have preactivity surveys. Small-disturbance activities with the potential to affect biologically sensitive species will also require surveys (see Chapter 4. Conservation Strategy for details). Based on the results of these surveys, biologists may recommend implementing AMMs. For small-disturbance activities in sensitive areas, AMMs may also be required. The supervisor/crew foreman or, if necessary, a biological monitor then manages the implementation of the AMMs and, upon project completion, enters any notes into the database regarding the AMMs.

The HCP administrator will query the database to determine the percentage of actions for which required AMMs were implemented.

Specifically, the survey database will be designed to track all activities and will be queried to determine:

(1) the overall number and percentage of activities for which AMMs were required and implemented,

(2) the number and percentage of all jobs for which required AMMs were implemented for each activity type,

(3) the specific reason measures are or are not being implemented as indicated in the *Notes* section of the database, and

(4) the number of projects where covered species were identified on or near a worksite and AMMs implemented at those worksites.

The HCP administrator will periodically review this information to identify any problems with implementation of the AMMs and to develop modifications to the HCP implementation process, modifications to existing measures, or new measures to reduce habitat disturbance and take of covered species.

PG&E will prepare an annual HCP Monitoring Report for USFWS and DFG (see *Monitoring Data Reports and Archives*). This report will summarize the information described above and identify any actions that will be taken to improve the effectiveness of AMMs. This will help ensure that the Biological Goals and their objectives are achieved.

In addition, the accuracy of the data will be monitored as detailed in a Quality Management Plan developed by the HCP administrator. This plan will include both quality assurance and quality control to ensure the adequacy and accuracy of

the gathering and reporting of all data collected by PG&E personnel and qualified consultants. This plan will be prepared by the end of the first year of HCP implementation and will be approved by USFWS and DFG.

Monitoring Effects Requiring Compensation

Effects monitoring will provide the basis for identifying the extent of habitat losses for covered species and will be used to estimate habitat losses for emergency and other activities for which effects monitoring is not possible. The HCP administrator will compile a list of all jobs performed by activity type, county, and whether the job took place in natural vegetation. The HCP administrator will monitor and report the temporary and permanent effects requiring compensation from the results of preactivity survey estimates of habitat losses.

Specifically, the HCP administrator will use data collected during the previous year to report the area of temporary and permanent habitat loss attributable to minor effects based on the size of the work area (determined during preactivity surveys) and the percentage of that area providing suitable habitat for each species. This habitat loss will be calculated for all sites at which preactivity surveys were conducted and the acres affected will be summed. Because preactivity surveys will be conducted prior to all non-emergency O&M activities with minor effects, this sum will reflect the majority of the expected habitat loss from O&M activities. Habitat lost because of emergency O&M activities and small-disturbance activities (see Chapter 3, "Analysis of Habitat Disturbance for Covered Species") will be estimated using the HCP habitat effect methodology and added to habitat losses documented for surveyed activities for the duration of the permit.

Monitoring Compliance with Compensation Requirements

Compliance with the required compensation will be tracked using the database documenting the impacts and the amount and locations of habitat preserved to mitigate impacts. The HCP administrator will include a report on impacts and the accompanying mitigation in the annual HCP Monitoring Report. The compensation monitoring section of the report will summarize the amount of habitat disturbance by species, the compensation required to mitigate habitat disturbance, and the compensation acreage procured or dedicated to offset those effects.

The report will also summarize a running total of disturbance impacts and compensation over the life of the project. This documentation will be used to verify if PG&E is meeting its commitment to achieve a level of compensation that meets or exceeds the requirements of the plan. The report will indicate if

credits acquired in previous years are being applied to the current year's compensation. The compensation element of the HCP Monitoring Report will provide details of compensation actions, including copies of deeds for all land purchases and contracts for compensation transactions. Furthermore, the report will describe anticipated actions to acquire additional lands in advance of impacts. This will help ensure that the Biological Goals and their objectives are achieved. Efforts to acquire mitigation for years 5 through 10 of the permit will begin 1 year in advance of the anticipated use of remaining compensation, and compensation will always stay ahead of impacts.

Monitoring Compensation Effectiveness

Mitigation Banks

No additional monitoring of compensation effectiveness will be required for lands purchased through agency-approved mitigation banks. Purchases from an approved mitigation bank are considered sufficient to demonstrate the long-term maintenance of suitable compensation lands because assurances are in place to ensure that banks meet their management obligations.

Non-Mitigation Bank Compensation Lands

Two types of monitoring will occur to evaluate whether compensation lands achieve their desired results. These include monitoring of proposed acquisition parcels to ensure the habitat is suitable for covered species, and ongoing, long-term habitat monitoring to ensure the habitat remains suitable for covered species.

For the first five years and possibly for the entire permit duration, PG&E will work with the Center for Natural Lands Management (CNLM) to identify and purchase compensation lands. CNLM will manage these compensation parcels in perpetuity. In general they will use their experience with sensitive species, knowledge of suitable parcels and the *Upland Species Recovery Plan*, and experience with habitat evaluation and monitoring to identify appropriate parcels. The following three specific selection criteria must be met in order for a site to be suitable for compensation:

1. Overall consistency with the HCP compensation requirements (e.g., surrounding land use is consistent with the species long-term conservation goals); and
2. Species presence as determined by:
    a. Documented species occurrence; or
    b. Previous determination of occupation (e.g., California Energy Commission habitat evaluation); or

c. Proximity to CNDDB records. The quality of a potential site could be partially assessed based on a records search for covered species and the CNNDB; or

d. Where applicable, the proposed site is consistent with the site-specific protection requirements listed in Table 5 of USFWS's September 30, 1998 *Recovery Plan for Upland Species of the San Joaquin Valley, California*; and

3. Suitability as determined by:

a. Biologist indicating the property is suitable for the species proposed for coverage; or

b. Biologists qualitative assessment about the presence, suitability for presence, or ability of the site to support presence including vegetation structure and habitat suitability of the site, and observations of tail drags, scat, seed stacks or other signs of covered species presence; or

c. Previous determination of occupation or suitability (e.g., California Energy Commission habitat evaluation).

Parcels that meet these criteria are suitable for compensation, though USFWS and DFG will have final approval over all land selected for compensation. USFWS and DFG will work with PG&E and their acquisition partners to ensure appropriate parcels are identified. Wetlands must have demonstrated occupancy for vernal pool crustaceans at the time of acquisition for compensation.

Effectiveness monitoring will be conducted for each compensation parcel (except mitigation banks) that is procured for use as compensation to evaluate its continued suitability as compensation habitat. Site-specific monitoring plans will focus on tracking key habitat attributes in a manner that allows for increased understanding of the natural community, to evaluate ongoing suitability of the habitat, and to evaluate potential effects of any management strategies that may be implemented. Data will be gathered from different trophic levels to provide context on habitat suitability and yield insight into the relationships among members of that community.

These assessments will be performed every year. These assessments will consist of a survey by a qualified biologist of the compensation area and the recording of observations for a list of key variables that determine habitat quality (e.g., vegetation/abiotic factors and sign of presence of small mammals). Vegetation/abiotic factors may include the following response variables: herbaceous cover, herbaceous species composition, bare ground, litter, residual dry matter, and shrub cover. Proposed variables will be listed on a data-collection form that will be included in the draft monitoring plan submitted to USFWS and DFG for approval**.** This type of assessment is similar to the monitoring approach used on National Wildlife Refuges and has been effectively employed by CNLM. Furthermore, this approach is proposed because it is an efficient way to provide data for an extensive area and because it provides useful information for overall compensation area management. PG&E's monitoring

program focuses on maintaining suitable habitat within the appropriate range of the species; it does not propose to monitor for species occupancy.

Where acquisitions are made adjacent to existing preserves and monitoring and management plans for these preserves are underway, monitoring of the new lands would be integrated into the overall monitoring strategy for the larger preserve.

Monitoring of plant compensation parcels would need to be conducted annually to guide site management. Monitored variables would include:

- A qualitative assessment of the general condition of the entire site (condition of fencing and signs, evidence of ORV trespass, etc.);
- A sample of permanently marked plots or transects for which vegetation structure is quantified (e.g., residual dry matter, herbaceous and shrub cover and species composition); and
- Habitat mapping for invasive plants and target plant species every 5th year.

Target values will be established for each monitored variable to guide management practices. These management practices (e.g., grazing) should be adjusted to account for site conditions and annual variability in rainfall.

Reporting Requirements

The monitoring data will be synthesized in an annual report to USFWS and DFG. This report will present the results of all analysis of data collected during the previous period. At a minimum it will include:

- a summary of the status of the biological goals and objectives;
- the number of activities completed;
- the number and percentage of activities for which each AMM was applied;
- the number and percentage of activities for which compliance with AMMs were and were not achieved;
- an assessment of AMM implementation and any changes made to improve implementation of AMMs;
- total habitat losses for each species by region and by land-cover type;
- a readjustment of estimates of habitat loss for emergency and small-disturbance effects activities;
- documentation of compliance with compensation requirements;
- a list of 3rd party contractors subject to the provisions of the HCP;
- a description of compensation-area monitoring (to be provided every fifth year); and

- a list of adaptive management recommendations (described later in this chapter).

Monitoring data will be entered into a database and archived. Several measures will be implemented to ensure that information in the database is complete and accurate. The trained person performing data entry, who will work under the direction of the HCP administrator, will review all submitted data forms to ensure that data forms are complete and legible. Following data entry, the trained staff person will check that data were accurately entered for all species and all sites surveyed. Also, for quality control, the database will be designed such that:

- look-up tables with pull-down lists will be used for fields requiring unique values (e.g., species name);
- numeric values of acres of temporary and permanent disturbance that are entered manually (e.g., habitat acreage) will be tested against preset maximum and minimum values to ensure that data are within valid ranges; and
- survey results cannot be finalized if mandatory data (e.g., date) are missing.

USFWS and DFG staff are entitled to inspect PG&E's work areas and training records.

Adaptive Management Program

The HCP Adaptive Management Program (AMP) incorporates the four elements USFWS recommends for adaptive management strategies in HCPs (65 FR 35252):

- Identify uncertainties and the questions that need to be addressed to resolve uncertainties.
- Develop alternative strategies and determine which experimental strategies to implement.
- Integrate a monitoring program that is able to detect the necessary information for conservation-strategy evaluation.
- Incorporate feedback loops that link implementation and monitoring to a decision-making process.

Implementation

The AMP is an integral component of the HCP and will be implemented by PG&E. PG&E responsibilities for implementing the AMP include:

- gathering monitoring data and maintaining databases;
- assessing results of avoidance, minimization, and compensation measures;
- identifying the need to modify avoidance, minimization, and compensation measures;
- funding implementation of the AMP;
- identifying the need for changes to the HCP avoidance, minimization, and compensation measures and implementing changes that are within the authorization of the HCP incidental take permit; and
- recommending changes to USFWS and DFG that may require permit modification.

Addressing Uncertainty

Currently some uncertainty exists about the number of O&M activities, the size of disturbance created by each activity, and the effect of these activities on habitat for covered species. Implementing the consistent, area-wide program identified in this HCP will provide greater certainty with respect to tracking the total number of O&M activities that occur, where these activities occur, the disturbance created by each activity, and the implementation of AMMs to reduce habitat and species effects.

Evaluating Alternative Strategies

Alternative conservation strategies provided in this HCP include the use of a multi-stage reporting program, the use of multiple AMMs, and the use of multiple types of conservation lands to ensure that species effects are minimized and compensated for. Flexibility and feedback are incorporated into the HCP to allow for improvements in the plan in response to monitoring of the effectiveness of these different strategies.

Feedback Loops

There are several types of feedback loops integrated into the HCP. These feedback loops provide mechanisms to adjust:

- the estimates of the average area of habitat disturbed by each activity such that compensation will always precede and exceed impacts,
- the percentage of disturbed habitat that is considered suitable for species occupancy,
- the frequency of implementation of AMMs,

- the amount of compensation land provided (based on above information), and
- the management of suitable compensation lands.

To ensure that the disturbance estimates are accurate and the AMMs are effective, PG&E will conduct an audit of activities every third year for the first 10 years. An auditing study will be designed during the first year of HCP implementation to include samples of small- and large-disturbance activities and sites where species were documented as present or not present in preactivity surveys. The sample size will be between 50 and 200 activities, large enough to provide a rigorous evaluation of disturbance estimate sizes, and large enough to determine whether alternative or revised AMMs could be implemented. PG&E may also conduct additional assessments to ensure disturbance accounting is accurate.

Revise estimate of disturbance for each activity. The estimates of the average area of land-cover disturbed by each activity will be adjusted with concurrence of USFWS and DFG based on data collected during the first 3 years, including the first year of the audits. Adjusting these estimates will achieve the following: help provide a better forecast of which activities may need preactivity surveys (e.g., if additional activities need to be monitored or additional preactivity surveys are needed) and better predict future compensation needs.

Revise estimates of suitable habitat. The percentage of disturbed habitat considered suitable may also be revised with concurrence of USFWS and DFG based on preactivity surveys after the first 3 years, including the first year of the audits. Preactivity surveys will provide useful information on the quality and type of habitat being disturbed and the likelihood that species are present. Adjusting these estimates will help provide a better forecast of which activities are most likely to affect species and also project future compensation needs.

Adjust frequency of AMM implementation. The frequency (including duration and location) of implementation of AMMs may be revised with concurrence of USFWS and DFG based on the database results from the first 3 years and the first year of the audits. If the AMMs are being implemented less than 80% of the time for all activities and less than 90% of the time for activities where species were identified as being on-site, PG&E will investigate the reasons. These percentages account for PG&E's limited ability to implement AMMs in certain situations, specifically related to emergency maintenance, conflicting statutory requirements, and the physical locations of structures. Adjusting the frequency, location, and duration of AMMs will help ensure that the measures are being applied in locations where they will best minimize impacts on covered species.

Adjusting the type of AMMs. If the audit reveals that alternative avoidance measures could be implemented and a biologist is able to identify additional species-specific protection measures that are practicable, PG&E will develop, expand, or integrate new AMMs to address the species' concerns. Any changes in AMMs will be implemented with the concurrence of USFWS and DFG.

Management of Suitable Compensation Lands. If the habitat evaluation surveys indicate habitat values are declining for covered species, PG&E or their designated land manger will evaluate and test techniques to improve habitat conditions. For example, vegetation reduction techniques may be needed following high rainfall years to maintain habitat suitable for blunt-nosed leopard lizards, kangaroo rats, antelope squirrels and other desert-adapted species of the San Joaquin Valley. Subsequent management actions will be evaluated for their effectiveness and used to shape future management decisions.

General Assessment. After the first several years of HCP implementation, PG&E, USFWS, and DFG will have a more detailed understanding of the activities, species, AMMs, and overall program estimates. This information will be used to determine whether the overall compensation program is sufficient. As part of this process, PG&E will ensure that compensation is always maintained in advance of project effects for wildlife and more common plants. Efforts to acquire future increments of compensation will begin at least 1 year in advance of the anticipated use of the remaining compensation. Compensation for the rarest of plants will occur as close as possible to the time of disturbance, but will not occur more than 2 years after the disturbance. The rarest plants are described in Chapter 5 as those with having negligible or very small effects.

Consistency with Recovery Plans

The Compensation Strategy is based, in part, on the following final recovery plans:

- U.S. Fish and Wildlife Service. 1998. *Recovery Plan for Upland Species of the San Joaquin Valley, California*. Portland, OR: Region 1.
- U.S. Fish and Wildlife Service. 2002. *California Red-Legged Frog (*Rana aurora draytonii*) Recovery Plan*. Portland, OR.

Additional recovery plans could be developed or approved for other species that are federally listed or for covered species that could be listed over the 30-year life of the HCP. Draft recovery plans currently in preparation include the *Draft Recovery Plan for the Giant Garter Snake*, the *Draft Recovery Plan for Vernal Pools of Northern and Central California*, and the *Draft Recovery Plan for 15 Plants of the South Sierra Nevada Foothills*. The AMP allows for, but does not require, revisions of goals and avoidance, minimization, and compensation measures to incorporate recovery strategies identified in new or revised recovery plans. PG&E will incorporate conservation measures identified in future or revised recovery plans when such measures

- are expected to improve the effectiveness of the Compensation Strategy in achieving goals,
- can be achieved in the HCP plan area, and

- are compatible with Compensation Strategy goals and do not significantly increase the costs incurred in accomplishing those goals.

Emergency Management

Where emergency situations, such as downed power lines, require actions by PG&E, PG&E will have full and immediate access to the problem area to undertake any repair activities necessary to protect human life, property, and/or covered species and their habitats. In such cases, PG&E will work with USFWS and DFG to identify appropriate actions, schedule, and funding sources to characterize and redress any adverse effects on covered species and their habitats.

In the event a PG&E compensation area is threatened by wildfire, floods, or other catastrophic event, local emergency response personnel are legally required to have full and immediate access to these areas to undertake appropriate measures necessary to protect human life, property, and/or covered species and their habitats. To the maximum extent practicable, for compensation areas overseen by PG&E, PG&E will notify and coordinate with personnel designated by the permitting agencies to identify appropriate emergency response activities to avoid or reduce adverse effects of the activities on covered species and their habitats. Where time does not permit such coordination, PG&E will immediately notify the permitting agencies following the emergency actions when such actions have adversely affected covered species or their habitats.

Overview of Changed and Unforeseen Circumstances

Section 10 regulations require that an HCP specify the procedures to be used for dealing with changed and unforeseen circumstances that may arise during the implementation of the HCP. *Changed circumstances* is defined in 50 C.F.R. 17.3 as changes in circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by plan developers and USFWS/DFG and that can be planned for (e.g., the listing of a new species, or a fire or other natural catastrophic event in areas prone to such events). Changed circumstances will be addressed through the Adaptive Management provisions or as described below.

Unforeseen circumstances is defined in 50 C.F.R. 17.3 as changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers and USFWS at the time of the HCP's negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species. Remedial measures are proposed for both changed and unforeseen circumstances and these measures differ from adaptive management in that remedial measures are predetermined and defined actions that must be taken in the event of a changed or

unforeseen circumstance. Adaptive management, by definition, does not include predetermined actions, but rather identifies new responses based on the outcome of management actions. Remedial measures may, however, be modified based on the adaptive management procedure.

PG&E has made a concerted effort to anticipate the avoidance, minimization, and compensation measures necessary to conserve the covered species and their habitats. PG&E has relied on the best scientific and commercial information available concerning the covered species and their habitats. The HCP is intended to reduce the potential for adverse changed or unforeseen circumstances on covered species and their habitats. However, notwithstanding the provisions of the HCP, should adverse changes or unforeseen circumstances result in or threaten a substantial change in the population of any covered species or the overall quality of any habitat of that species, as determined pursuant to the procedures outlined below, PG&E and USFWS will cooperate to resolve the adverse impacts in accordance with this section.

Specific Changed and Unforeseen Circumstances

The following text references PG&E. However, if mitigation is purchased through a mitigation bank, or if mitigation is purchased and managed by a conservation entity, the responsibilities below will be carried out by that organization.

Vandalism

Vandalism or other intentional, destructive, illegal human activities are considered changed circumstances. For example, destruction of preserve fences and illegal dumping are considered vandalism. If one of these circumstances occurs, PG&E (or its designated mitigation entity [e.g., CNLM]), with the concurrence of USFWS and DFG, will determine the extent of damage to the preserve(s) and identify and implement an appropriate response.

Remedial Measure for Vandalism

In the event the compensation lands are vandalized or otherwise damaged by illegal human activities and the vandalism results in known or suspected impacts on covered species, PG&E will notify USFWS and DFG of the damage within 60 days. The likelihood of such occurrences depends on the preserves' location and history of such events in the region; however, adequate fencing and appropriate signage help ensure that these events are minimized. PG&E will prioritize its endowment maintenance money to repair vandalism that occurs.

Unforeseen Circumstances for Vandalism

Because of the expected geographic dispersion of the preserves within the San Joaquin Valley, it is unlikely that large-scale preserve destruction or illegal dumping would affect a substantial portion of the preserves. If one of the

circumstances described above occurs and results in damages to more than 20% of the total preserve lands, an unforeseen circumstance will have occurred.

Fire

The changed circumstances associated with the effects of fire can be considerable for preserves that include a restoration component. However, as this plan does not propose restoration and as the biological goals and objectives associated with this plan focus on acquiring, protecting, managing, and maintaining lands for the benefit of covered species to achieve compensation for project habitat effects, fire and drought represent naturally occurring conditions that more appropriately must be managed according to general adaptive principles rather than specific performance standards.

Despite this, fire can be reasonably anticipated to occur within 50 years of issuance of the permit. However, the source of the fire threat is dependent on the source of ignition: human mechanisms (vehicles, cigarettes, etc.) and natural mechanisms (lightning strike). In general, the fire threat is predominantly low throughout the Plan Area. Some areas, particularly grasslands, are classified as a moderate threat. Fewer areas, specifically oak woodlands and the foothills on the east and west portions of the Plan Area, may be characterized as having a high or very high fire threat. These classifications were developed by the State of California, Department of Forestry and Fire Protection (CDF) and are derived from a combination of fire frequency (how often an area burns) and expected fire behavior under severe weather conditions. Fire frequency is derived from 50 years of fire history data. Fire behavior is derived from fuels and terrain data(http://frap.cdf.ca.gov/data/frapgismaps/select.asp). A GIS analysis of national wildlife preserve lands and CDF data indicates that the majority of these lands could experience a low severity fire every 0–35 years. Therefore, it is assumed that two to three fires could occur in the first 50 years of preserve management. Because of the low fuels and gentle terrain expected on the preserved lands, and quick response of fire crews, these fires are expected to be of low severity. These intermittent fires are unlikely to pose long-term adverse effects on species, and therefore whether any additional management is needed will be considered in the context of general adaptive management.

It is challenging to have a prescriptive scenario for when a changed circumstance may occur because localized effects on covered species will depend on the proximity to a local seed source, the parcel size, the type of habitat, and the species habitat requirements. A general threshold is proposed for changed circumstances. For this HCP, fires that damage up to 75% of grassland mitigation areas and up to 50% of shrub mitigation areas are considered changed circumstances.

Remedial Measure for Fire

Fires are natural events that can result in significant adverse consequences to covered species and their habitats. The likelihood of such occurrences depends on the preserves' location and history of such events in the region; the magnitude

of the effects depends on the severity and duration of the event, and habitat affected. When a changed circumstance occurs the preserve manger will assess the specific event and site condition and determine, in coordination with DFG and USFWS, whether a response is needed. In most instances a fire will have a localized effect on species in a preserve, and management tools to help their recovery from a specific event on a given site are limited.

Overall these effects are expected to be minor because mitigation lands are expected to be fire-adapted. In the event the damage is significant and results in known or suspected impacts on covered species, PG&E will notify USFWS and DFG of the damage within 60 days of a fire. PG&E, in coordination with USFWS and DFG, will prioritize its endowment maintenance money to take corrective action to make the habitat suitable again, including but not limited to replanting vegetation. Additional funding is provided in a line item in the endowment cost estimate of annual maintenance costs.

Unforeseen Circumstances for Fire

As described above, a high severity fire is unlikely to occur within the permit term. More than two fires that damage more than 75% of grassland mitigation areas and more than 50% of shrub mitigation areas are considered unforeseen circumstances.

Floods

Floods are natural events that can result in significant adverse consequences to covered species and their habitats. The likelihood of such occurrences depends on the preserves' location and history of such events in the region; the magnitude of the effects depends on the severity and duration of the event, and habitat affected.

Floods are not anticipated to occur on most preserve lands because most preserves are not expected to be located within floodplains. However, preserve lands containing bank swallow, riparian brush rabbit, or riparian woodrat may experience flooding by virtue of their location in riparian areas.

Floods that damage up to 50% of a riparian mitigation area are considered a changed circumstance. When a changed circumstance occurs, the preserve manager will assess the specific event and site condition and determine, in coordination with DFG and USFWS, whether a response is needed. In most instances a flood will have a localized effect on species in a preserve and management tools to help their recovery from a specific event on a given site are limited.

Remedial Measure for Floods

Overall these effects are expected to be minor because mitigation lands are expected to be flood-adapted. In the event the damage occurs from flooding, PG&E will notify USFWS and DFG of the damage within 60 days of the flood. PG&E will prioritize its endowment maintenance money, in coordination with

DFG and USFWS, to take corrective action to make the habitat suitable again, including but not limited to replanting vegetation. Additional funding is provided in a line item in the endowment cost estimate of annual maintenance costs.

Unforeseen Circumstances for Floods

Because mitigation in riparian areas is expected to be partially flood-adapted, floods that damage more than 50% of riparian mitigation areas are considered unforeseen circumstances.

Landslides and Wind/Water Erosion

Landslides are not anticipated to occur on preserve lands because preserves are not expected to be located on steep slopes, particularly those near faults. Wind and water erosion are not anticipated in the San Joaquin Valley at a magnitude that could affect covered species on preserve lands because preserve sites are not expected to be located in highly erosive environments.

Remedial Measures for Landslides and Water/Wind Erosion

No remedial measures are expected because of the limited potential for landslides and wind/water erosion.

Unforeseen Circumstances for Landslides and Wind/Water Erosion

Landslides and wind and water erosion are considered unforeseen circumstances.

Drought

Drought can be reasonably expected to occur within 100 years of issuance of the permit. The North American record of past drought (i.e., the paleoclimatic record of drought) provides a range of natural variability of drought over hundreds to thousands of years (http://www.ncdc.noaa.gov/paleo/drought/drght_final.html). This data indicate that in the past 100 years, there has not been a prolonged drought. However, shorter-term droughts of 6 consecutive years when the mean annual rainfall is less than 50% of normal have occurred three times in the past 100 years. These events could be reasonably expected to occur a similar number of times in the next 100 years based on historical and projected water conditions in the San Joaquin Valley. These cyclical droughts are unlikely to pose long-term adverse effects on species and, therefore, whether any additional management is needed will be considered in the context of general adaptive management.

Remedial Measure for Drought

Overall these effects are expected to be minor because mitigation lands are expected to be drought-adapted. PG&E will notify USFWS and DFG of potential or pending droughts in the annual report. PG&E will prioritize its endowment maintenance money, in coordination with DFG and USFWS, to take corrective action to make the habitat suitable again, including but not limited to

replanting vegetation. Additional funding is provided in a line item in the endowment cost estimate of annual maintenance costs.

Unforeseen Circumstances for Drought

Because a prolonged drought has not occurred in the past 100 years, a drought lasting more than 6 consecutive years when the mean annual rainfall is less than 50% of normal is considered an unforeseen circumstance.

Invasive Species

It is possible that nonnative plant and/or animal species could occur in or be introduced into the conservation areas and reduce or affect the quality of the habitat for covered species. While this possibility is low because the management plan developed for the preserve will include measures to prevent such occurrences or introductions, additional measures may be needed.

Remedial Measure for Invasive Species

If an invasive plant/animal occurs or is introduced and results in substantial impacts on habitat in a conservation area that cannot be adequately handled under the existing operating budget, PG&E will prepare a report that describes the extent of the problem, the range of remedial actions, and the cost for funding a control program. PG&E will prioritize its endowment maintenance money, in coordination with USFWS and DFG, to take appropriate corrective actions. Additional funding is provided in a line item in the endowment cost estimate of annual maintenance costs.

Unforeseen Circumstances for Invasive Species

Invasion by exotic species or habitat or species-specific disease that threatens covered species or their habitats, that *cannot be effectively controlled* by currently available methods or technologies, with USFWS and DFG concurrence, or that cannot be effectively controlled without resulting in greater harm to other covered species than to the affected covered species are considered unforeseen circumstances.

Emergency Facility Maintenance

Emergency maintenance of PG&E facilities, including those in and near preserves, may damage habitat in preserves. The occurrence of this event will depend on the proximity of the preserve to PG&E's facilities and an emergency event. It is expected to occur infrequently, if ever, and species effects are expected to be low because of the localized nature of emergency repairs.

Remedial Measure for Emergency Facility Maintenance

If PG&E's emergency activities damage habitat in preserves, PG&E will repair, at its own expense, or otherwise restore the habitat to predisturbance conditions. This restoration could include reseeding, replanting, or recontouring disturbance

sites and providing sufficient monitoring money to verify that the disturbance area recovers.

Unforeseen Circumstances for Emergency Facility Maintenance

There are no unforeseen circumstances for emergency facility maintenance.

Multiple Changed Circumstances

There is a small possibility that multiple changed circumstances could occur within the same year or within a 5-year period. Implementing numerous remedial measures at one time could compromise the long-term mitigation endowment.

Remedial Measure Regarding Multiple Changed Circumstances

If multiple changed circumstances occur in temporal proximity, such that the response by PG&E, USFWS, or DFG will be significantly delayed by lack of available personnel, PG&E will confer with USFWS and DFG to prioritize the necessary analyses. The prioritization process will first consider those species, habitats, or key areas that are at highest risk of additional impacts. The outcome of the analysis will be the development of appropriate measures to minimize, to the extent practicable, the occurrence of adverse effects resulting from the changed circumstances on species, habitats, or key compensation areas. The measures developed will be implemented and funded by PG&E. Ongoing management activities may continue until new measures resulting from the analyses are developed. However, in consultation with USFWS and DFG, measures will be promptly implemented to minimize adverse effects before completion of the analysis, to the extent feasible.

New Species Listings—Covered Species

If currently unlisted species that are addressed in the HCP as Covered Species are listed subsequent to issuance of the HCP's associated Section 10(a)(1)(B) permit, no action is required of PG&E under ESA. This is because all Covered Species are named on the federal permit and, under the terms of the permit, permit coverage for any unlisted Covered Species will become effective upon the final listing of any such species under the ESA. Under CESA, a covered species which becomes listed would be subject to separate confirmation by DFG that substantial evidence demonstrates that the Section 2081 Permit will continue to meet the standards in California Fish and Game Code Section 2081 (b) and Title 14 of the California Code of Regulations, Section 783.4 for the Additional State Protected Species.

New Species Listings—Uncovered Species

Currently unlisted species that are not addressed as Covered Species in the HCP will not be included in the permit and will not be treated as such in the event of listing. PG&E will be notified by USFWS and DFG of potential listings of species not covered by the HCP but that could be affected by the program. Upon receipt of such notice, PG&E may enter into negotiations with USFWS regarding necessary modifications, if any, to the HCP to revise or amend the applicable federal permit to cover the newly listed species. If PG&E elects to pursue a revision or amendment of the applicable permit, USFWS will provide technical assistance to PG&E in identifying any modification to the HCP that may be necessary to revise or amend the applicable federal permit and the State 2081 Management Authorization.

In determining whether any further conservation or mitigation measures are required to revise or amend the applicable permit for authorization of incidental take of such uncovered species, USFWS and DFG will take into account the conservation and mitigation measures already provided in the HCP.

Once a species is proposed for listing or a petition for listing is found to be warranted, USFWS or DFG will identify necessary measures to avoid the likelihood of jeopardy to or take of the uncovered species (*no take/no jeopardy* measures). To the extent that USFWS, DFG, or PG&E determines that any such species would likely be taken or jeopardized, or the critical habitat, if any, of such species adversely modified or destroyed, as a result of the covered activities, PG&E will implement "no jeopardy/no take/no adverse modification" measures identified by USFWS or DFG until such time as PG&E's federal permit is amended to obtain coverage for those species or until USFWS notifies PG&E that such measures are no longer needed.

Other Considerations for Unforeseen Circumstances

Before making the determination that an event constitutes an unforeseen circumstance, USFWS will consider the following factors:

- percentage of the range of a covered species adversely affected by the HCP,
- percentage of the range of a covered species compensated for by the HCP,
- ecological significance of that portion of the range affecte d by the HCP,
- the level of knowledge about the affected species,
- the degree of specificity of the pertinent avoidance, minimization, and compensation measures under the HCP, and
- whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected species.

If USFWS determines that an unforeseen circumstance has occurred, the following remedial measures will be implemented as needed.

Remedial Measure Regarding Notification

USFWS will provide written notice to PG&E detailing the facts regarding the unforeseen circumstance involved, the anticipated impact on the covered species and its habitat, the importance to the affected species of PG&E's actions under the HCP, and all information and data that support the determination. In addition, the notice will include any proposed conservation measures that are believed to be necessary to address the unforeseen circumstance, an estimate of the cost of implementing such conservation measure, and the likely effects on the implementation and success of the HCP.

USFWS will bear the burden of demonstrating that any unforeseen circumstance has occurred and is having, or is likely to have, a significant adverse impact on a covered species or its habitat. The findings of USFWS must be clearly documented and be based on the best scientific and commercial data available regarding the status and habitat requirement of the species. In addition, based on the results of an analysis of the changed or unforeseen circumstance and the information provided by PG&E, USFWS will provide justification and approval for any reallocation of funds or resources necessary to respond to the unforeseen circumstance within the existing commitments of the HCP.

Remedial Measure Regarding Funding

By law, PG&E, as an ESA Section 10(a) permittee, is not responsible to bear the costs to implement any additional mitigation needed to address effects of unforeseen circumstances, if it has fully implemented the requirements of the approved HCP. USFWS is required to pay for any actions that are required to achieve conservation or enhancement of a species that is being adversely affected by an unforeseen circumstance. Additional conservation measures will not involve payment of additional compensation by PG&E. However, PG&E will attempt, within the financial limits of the approved HCP, to adjust the HCP conservation strategy as needed and address unforeseen circumstances.

Revisions and Amendments

It may be necessary for USFWS, DFG or PG&E to clarify provisions of the HCP, the IA, or the permits (i.e., 10(a)(1)(B) permit, 2081 permit, programmatic 1600 permit) to address issues that arise with respect to the administration of the process, or to be more specific regarding the precise meaning and intent of the language contained in those documents. Such clarifications can take two forms: minor amendments and major amendments. Any minor or major amendment will be in accordance with applicable legal requirements, and all revisions and amendments will be circulated to the HCP signatories. The HCP may be amended only with the written consent of PG&E, USFWS, and DFG.

Minor Amendments

Minor amendments to the federal permit, state permit, implementing agreement, and the HCP may include but are not limited to the following:

- Corrections of typographical, grammatical, and similar editing errors in the HCP and the implementing agreement that do not change the intended meaning;
- Correction of any maps or exhibits to correct errors in mapping;
- Minor changes to survey, monitoring or reporting protocols;
- Changing any measure(s) in the conservation strategy to respond to a changed circumstance;
- Correction of any tables or appendices in the HCP to reflect previously approved amendments to the HCP or the federal and state permits; and
- Amendments to the state permit that would not significantly modify the scope or nature of the covered activities or the minimization, mitigation or monitoring measures in the state permit, as determined by DFG.

PG&E, USFWS, or DFG may propose a minor amendment to the federal and state permits, the implementing agreement and the HCP by providing written notice to all other parties. Such notice will include a statement of the reason for the proposed amendment and an analysis of its environmental effects, if any, including any effects on covered activities and on covered species, and any other information required by law. The Parties will respond in writing to the proposed amendment within sixty (60) days of receipt of such notice.

USFWS or DFG may object to a proposed minor amendment only upon a written statement that the federal and state permits, implementing agreement, or the HCP, after giving effect to such amendment, would not meet the requirements of Section 10(a)(2)(B) of ESA or Section 2081 of California ESA. USFWS and DFG may not propose or approve a minor amendment that results in adverse effects on the environment that are new or significantly different from those analyzed in connection with the HCP; or additional take not analyzed in connection with the HCP.

Where possible, before rejecting a proposed minor amendment, USFWS and DFG will first consult with PG&E and suggest reasonable conditions or alterations to the proposal which, if agreed to by PG&E, would permit USFWS and DFG to approve the proposed minor amendment.

PG&E may object to a proposed minor amendment upon any reasonable basis. If the USFWS and DFG reasonably object to a minor amendment, and the objection

is not resolved by any conditions or alterations, the proposed amendment will be processed as a major amendment of the federal and state permits.

Major Amendment

All changes to the federal and state permits, the implementing agreement, and the HCP that do not qualify as minor amendments may be processed as major amendment in accordance with all applicable laws and regulations, including but not limited to ESA, NEPA, California ESA and CEQA. The party proposing the major amendment will provide a statement of the reasons and an analysis of its environmental effects, if any, including its effects, if any, on covered species and covered activities under the HCP. USFWS and DFG will use their best efforts to process the proposed major amendment within one hundred eighty (180) days of submission of the application, except where longer times are required by law. PG&E may, in its sole discretion, reject any major amendment proposed by USFWS or DFG. PG&E's discretion to reject any major amendment proposed by DFG will not be interpreted as a limitation on or a waiver of DFG's authority to amend the state permit as required by law regardless of whether PG&E concurs with such amendment.

New Minor Construction

During the term of the federal and state permits, PG&E may need to engage in minor construction activities that are not specifically included as covered activities. These activities may be compelled to respond to population increases that were not reasonably foreseeable at the time of the preparation of the HCP, or to comply with new federal or state regulatory mandates that are enacted during the term of the federal and state permits.

Nothing in the implementing agreement, the HCP, or the federal and state permits limits PG&E's right to engage in new minor construction in the Plan Area that is not specifically included as a covered activity. Nothing in the federal and state permits, the implementing agreement, or the HCP requires PG&E to amend the HCP to include such minor construction, as long as any take of covered species is authorized separately. PG&E acknowledges DFG would prefer to process and provide take authorization for new minor construction through an amendment of the state permit. DFG will respond to and process any proposed amendment of the state permit for new minor construction pursuant to section 783.6, subdivision (c), of Title 14 of the California Code of Regulations. Unless such new minor construction is added to the state or federal permit or the HCP through either the minor or major amendment processes, however, these activities will be not be covered by the fderal or state permits.

Adding New Minor Construction to the HCP

Based upon the analysis in the HCP of the impacts of minor construction activities on covered species in the plan area, it is likely that most new activities that are substantially similar to the covered activities will result in similar impacts, and therefore, adding such activities to the HCP and implementing them pursuant to the conservation strategy of the HCP will not likely result in adverse effects to the covered species different from those analyzed in connection with the original HCP.

PG&E may seek take authorization from USFWS and DFG for new minor construction in the plan area pursuant to the amendment process and controlling law. USFWS and DFG may provide take authorization to PG&E for such new minor construction as a major or minor amendment of the federal and state permits. Any such activities that PG&E successfully includes for coverage under the federal and state permits through the minor or major amendment process will thereafter be deemed a covered activity. All subsequent references to the HCP will be deemed to include a reference to such new minor construction. All provisions of the implementing agreement, the HCP, and the federal and state permits that apply to the plan area will apply to those new minor construction activities. No modification or other change to any provision of the implementing agreement, the HCP, and the federal and state permits, including levels of authorized take, will be implied, unless such provision is specifically amended in writing during the amendment process.

PG&E may propose to add new minor construction, by providing to USFWS and DFG a proposal for new minor construction that includes:

- A map showing that the new minor construction is within the plan area;
- A concise description of the new minor construction;
- A discussion, based upon the best currently available information, of the land-cover types, the potential habitat, and any known occurrences of covered species in the area to be affected by the new minor construction;
- A statement describing how the new minor construction will be implemented by PG&E in accordance with all applicable measures in the conservation strategy detailed in the HCP;
- An analysis of whether the proposed take authorization for new minor construction and related major or minor amendments are consistent with the federal and state permits;
- An analysis of whether the proposed take authorization for new minor construction will result in significant impacts not analyzed or mitigated to less than significant under the HCP, EIS/EIR, or federal and state permits; and
- Any other information required by law.

USFWS and DFG will provide any reasonable objection in writing to PG&E within sixty (60) days of receipt of a proposal for new minor construction, specifying the reasons why in their judgment the proposal is incomplete or inadequate.

A major amendment will be required to finally approve the addition of the new minor construction to the HCP and federal and state permits only if there is substantial evidence to demonstrate that the proposed addition will result in new significant environmental effects or a substantial increase in the severity of previously identified significant effects. The analysis of potential effects intended to provide the opportunity to offer substantial evidence to support a conclusion that supplemental environmental review under NEPA or CEQA is not required to approve the proposal for new minor construction, and that a minor amendment is appropriate.

If PG&E elects not to provide the analysis of potential effects, USFWS and DFG may, in their discretion, treat the proposal for new minor construction as a major amendment.

Chapter 7

Implementation Costs and Funding

Overview

This chapter provides an overview of the cost to implement the HCP and the source of funding to meet those costs. PG&E conducted an extensive financial analysis of its existing and projected costs to identify a feasible program that can be implemented. The general assumptions and estimates are provided below.

Cost to Implement HCP

The cost to implement the HCP is estimated at $42.6 million over the 30-year permit term with inflation. These costs are divided into three categories:

- Implementation and Training
- Compensation
- Surveys and AMMs

The methodology and costs associated with these program elements is described below.

Implementation and Training

Implementation of the HCP includes systematic changes to PG&E's biological project management and tracking systems. These changes will require PG&E's environmental awareness training be expended to reach thousands of employees and hundreds of contractors, and specific project management and tracking trainings of several hundred employees.

Implementation and training costs include:

- HCP administrative time (coordination, reporting, adaptive management, agency meetings);
- staff time to attend tailboard trainings;

- training and materials development;
- audits of effects every third year;
- database entry and database maintenance; and
- new materials and resources associated with the HCP.

These costs are summarized in detail in Table 7-1. PG&E staff attendance at an expanded environmental awareness training class is included in PG&E's existing staff overhead costs.

Compensation

Implementation of the San Joaquin Valley O&M HCP includes compensation for the effects of PG&E's O&M activities on covered species. Compensation costs include:

- mitigation acreage requirements for each habitat type in the north, central, and south San Joaquin Valley;
- land values and mitigation bank costs;
- real estate transaction costs; and
- an endowment to cover O&M costs associated with compensation lands (including biological monitoring, patrolling, fence repair, controlled burning, and controlling exotic plants).

These costs are summarized in detail in Table 7-2 and Table 7-3 and described as follows.

Mitigation requirements were developed for each region: north, central, and south San Joaquin Valley based on the impact analysis. The mitigation requirements were based on the estimate of the type and amount of land disturbed within each region over the next 30 years. This estimate assumed that the total mitigation requirements would include approximately 1,300 acres of grassland, 30 acres of threatened and endangered plant habitat, and 17 acres of wetlands. Based on the impact analysis it was estimated that 27% of the total mitigation requirement would occur in the northern region, 38% in the central region, and 35% in the southern region. It was further assumed that 85% could be acquired through fee-purchase and 15% through mitigation banks.

An average land value for mitigation land types was developed for each region. The anticipated impacts indicate that the majority of mitigation would occur in grassland habitat. Land values were initially based on information published by the American Association of Farm Managers and Rural Appraisers (2002). The high values from each county were averaged in each region. Values in the north region averaged $1,650/acre, $713/acre in the central region, and $456/acre in the south region. However, based on PG&E's experience with land purchases the cost per acre was increased to the following amount in each region: $2,000/acre

Table 7-1. Implementation and Training Costs

Administrative Costs	Costs	Assumptions
Administrator	$150,000	1 FTE
Audit	$30,000	Audit of the HCP program every 3rd year.
Assessment	$26,667	Assessment of selection of activities (10 activities per headquarter*8 headquarters *3.33 hours each*$100/hr) (200% first year, 150% second year, then annually)
Staff time for Database Entry	$30,000	1,200 activities*15 min/60min/hr*$100/hr
Staff time for Regional Oversight	$7,500	Additional regional oversight (5% FTE)
Staff time for Tailboard Trainings	$70,000	700 staff attend an average of 1 hour of tailboards over the course of the year in year 1, 10 and 20; 175 staff attend an average of 1 hour of tailboards in other years.
Trainers	$33,000	20 trainings of 3 hour trainings per year plus 8 hrs travel and prep @$150/hr in year 1, 10 and 20; 75% less in other years.
Training Materials	$2,730	150 copies @ $8/copy (for technical personnel), 300 flip books for field use @ $3 each, and 350 HCP Database manuals @ $1.80 each in year 1, 10, and 20; 75% less in other years
Software	$12,500	50 staff have new software @ $250 each in years 1, 10 and 20; 50% less in other years.
Hardware	$12,500	50 staff have new GPS @ $250 each in years 1, 10 and 20; 50% less in other years.

Table 7-2. Compensation Cost Variables

Compensation Variable	Costs	Assumptions
Purchase Approach		*First 5 years:* 85% - Fee-title (184 acres) 15% Mitigation Bank (33 acres) Wetland mitigation (2.83) Plant mitigation (5 acres)
North SJV Fee-title Grassland	$2,000/ac	27% of project impacts
Central SJVFee-title Grassland	$1,500/ac	38% of project impacts
South SJV Fee-title Grassland	$1,000/ac	35% of project impacts
Mitigation Bank for Grassland	$4,500/ac	Based on existing bank costs and potential in-lieu fee costs.
Mitigation Bank for Wetland	$75,000/ac	Based on existing bank costs and PG&E's experience. Approximately 17 acres over 30 years.
Mitigation for Plants – Fee-title	$8,000/ac	Based on existing bank costs for grassland plus additional costs because of unique nature of sites. Approximately 30 acres over 30 years.
Real Estate Transaction Costs	22%	Based on fee-title purchase by land conservation organization.
Endowment Interest Rate	4.5%	Based on estimate from land conservation organizations.
Annual Operating Costs	$11,122	Based on $9,208 of annual costs (184 acres times $50/ac for surveys, patrols, maintenance, changed circumstances, and other expenses), $921 in annual revenue (92 acres at $10/ac), 22% admin. and management costs ($1,823) and 10% contingency ($1,011).
Endowment	$247,152	Amount needed to manage 1st 5 years mitigation (184 acres of fee-title land) in perpetuity based on operating costs.

Table 7-3. PG&E's San Joaquin Valley O&M HCP Compensation Cost Estimate

Purchase 1/6 of Grassland, Plants and Wetland Every 5 Years (Year 1[2006], Year 6[2011], Year 11[2016], Year 16 [2021], Year 21[2026], and Year 26 [2031]).

	Grassland	Plants	Wetland
Total Acreage ->	1300	30	17

Year ->	2006	2011	2016	2021	2026	2031
Initial and Capital Costs	$926,858	$926,858	$926,858	$926,858	$926,858	$926,858
Total Annual Costs	$11,122	$11,122	$11,122	$11,122	$11,122	$11,122
Endowment Required	$247,152	$247,152	$247,152	$247,152	$247,152	$247,152
Endowment Per Acre ->	$1,342	$1,342	$1,342	$1,342	$1,342	$1,342
Contribution Total	$1,174,010	$1,174,010	$1,174,010	$1,174,010	$1,174,010	$1,174,010
Total Combined Contributions	$7,044,057					
Endowment interest rate ->	4.5%					

		Grassland acres	Grassland Fee Purch $/acre	Grassland Easement $/acre	Grassland Bank$/ acre	Wetland Bank $/acre	Plant Bank $/acre
27%	Northern	351	$2,000	$1,500	$4,500	$75,000	$8,000
38%	Central	494	$1,500	$1,125	$4,500	$75,000	$8,000
35%	Southern	455	$1,000	$750	$4,500	$75,000	$8,000
	Total	1300					
0%	PG&E Lands	0					
0%	Easement Purchase	0					
85%	Fee Purchase	1105					
15%	Bank	195					

Initial Capital Requirements	Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
	Initial Capital Costs	$690,654	$0	$0	$0	$0	$690,654	$0	$0	$0	$0	$690,654	$0	$0	$0	$0	$690,654	$0	$0	$0	$0	$690,654	$0	$0	$0	$0	$690,654	$0	$0	$0	$0
22%	Initial Capital Admin & Management Costs	$151,944	$0	$0	$0	$0	$151,944	$0	$0	$0	$0	$151,944	$0	$0	$0	$0	$151,944	$0	$0	$0	$0	$151,944	$0	$0	$0	$0	$151,944	$0	$0	$0	$0
10%	Initial Capital Contingency	$84,260	$0	$0	$0	$0	$84,260	$0	$0	$0	$0	$84,260	$0	$0	$0	$0	$84,260	$0	$0	$0	$0	$84,260	$0	$0	$0	$0	$84,260	$0	$0	$0	$0
	Total Capital Costs	$926,858	$0	$0	$0	$0	$926,858	$0	$0	$0	$0	$926,858	$0	$0	$0	$0	$926,858	$0	$0	$0	$0	$926,858	$0	$0	$0	$0	$926,858	$0	$0	$0	$0
	Acreage Estimates																														
	Totals->	217					217					217					217					217					217				
	PG&E Lands	0					0					0					0					0					0				
	Easement Purchase	0					0					0					0					0					0				
	Fee Purchase	184					184					184					184					184					184				
	Bank	33					33					33					33					33					33				
	Acreage Set Aside	217					217					217					217					217					217				
	Cumulative Acreage Set Aside	217	217	217	217	217	433	433	433	433	433	650	650	650	650	650	867	867	867	867	867	1,083	1,083	1,083	1,083	1,083	1,300	1,300	1,300	1,300	1,300

Table 7-3. Continued

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Initial Capital Requirements	Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Per Acre K Costs	Total Initial Capital Requirements	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
	Land Acquisition - Grasslands	$415,133					$415,133					$415,133					$415,133					$415,133					$415,133				
	Land Acquisition - Wetland Mitigation	$212,500					$212,500					$212,500					$212,500					$212,500					$212,500				
	Land Acquisition - Plant Mitigation	$40,000					$40,000					$40,000					$40,000					$40,000					$40,000				
	Site Construction Activities	$0					$0					$0					$0					$0					$0				
$75	Initial Biotic Surveys	$13,813					$13,813					$13,813					$13,813					$13,813					$13,813				
$25	Habitat Restoration	$4,604					$4,604					$4,604					$4,604					$4,604					$4,604				
$25	Other Capital Expenditures	$4,604					$4,604					$4,604					$4,604					$4,604					$4,604				
	Total Capital Requirements	$690,654	$0	$0	$0	$0	$690,654	$0	$0	$0	$0	$690,654	$0	$0	$0	$0	$690,654	$0	$0	$0	$0	$690,654	$0	$0	$0	$0	$690,654	$0	$0	$0	$0
Annual Ongoing Requirements		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
	Annual Revenues	$921	$921	$921	$921	$921	$1,842	$1,842	$1,842	$1,842	$1,842	$2,763	$2,763	$2,763	$2,763	$2,763	$3,683	$3,683	$3,683	$3,683	$3,683	$4,604	$4,604	$4,604	$4,604	$4,604	$5,525	$5,525	$5,525	$5,525	$5,525
	Annual Costs	$9,208	$9,208	$9,208	$9,208	$9,208	$18,417	$18,417	$18,417	$18,417	$18,417	$27,625	$27,625	$27,625	$27,625	$27,625	$36,833	$36,833	$36,833	$36,833	$36,833	$46,042	$46,042	$46,042	$46,042	$46,042	$55,250	$55,250	$55,250	$55,250	$55,250
	Net Costs	$8,288	$8,288	$8,288	$8,288	$8,288	$16,575	$16,575	$16,575	$16,575	$16,575	$24,863	$24,863	$24,863	$24,863	$24,863	$33,150	$33,150	$33,150	$33,150	$33,150	$41,438	$41,438	$41,438	$41,438	$41,438	$49,725	$49,725	$49,725	$49,725	$49,725
22%	Annual Administrative & Management Costs	$1,823	$1,823	$1,823	$1,823	$1,823	$3,647	$3,647	$3,647	$3,647	$3,647	$5,470	$5,470	$5,470	$5,470	$5,470	$7,293	$7,293	$7,293	$7,293	$7,293	$9,116	$9,116	$9,116	$9,116	$9,116	$10,940	$10,940	$10,940	$10,940	$10,940
10%	Annual Contingencies	$1,011	$1,011	$1,011	$1,011	$1,011	$2,022	$2,022	$2,022	$2,022	$2,022	$3,033	$3,033	$3,033	$3,033	$3,033	$4,044	$4,044	$4,044	$4,044	$4,044	$5,055	$5,055	$5,055	$5,055	$5,055	$6,066	$6,066	$6,066	$6,066	$6,066
	Total Annual Costs	$11,122	$11,122	$11,122	$11,122	$11,122	$22,244	$22,244	$22,244	$22,244	$22,244	$33,365	$33,365	$33,365	$33,365	$33,365	$44,487	$44,487	$44,487	$44,487	$44,487	$55,609	$55,609	$55,609	$55,609	$55,609	$66,731	$66,731	$66,731	$66,731	$66,731
Per Acre Revenues	**Itemized Annual Revenues**	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
	Agricultural Leases	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Table 7-3. Continued

Initial Capital Requirements		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
$10	Grazing Leases (on 1/2 of Grassland)	$921	$921	$921	$921	$921	$1,842	$1,842	$1,842	$1,842	$1,842	$2,763	$2,763	$2,763	$2,763	$2,763	$3,683	$3,683	$3,683	$3,683	$3,683	$4,604	$4,604	$4,604	$4,604	$4,604	$5,525	$5,525	$5,525	$5,525	$5,525
	Oil & Gas Leases	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Mineral Leases	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Easement Income	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Water Sales	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Mitigation Bank	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Other	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	TOTAL ITEMIZED ANNUAL REVENUES	$921	$921	$921	$921	$921	$1,842	$1,842	$1,842	$1,842	$1,842	$2,763	$2,763	$2,763	$2,763	$2,763	$3,683	$3,683	$3,683	$3,683	$3,683	$4,604	$4,604	$4,604	$4,604	$4,604	$5,525	$5,525	$5,525	$5,525	$5,525
Per Acre Costs	**Itemized Annual Costs**	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
	Land Leasing/ Rental	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
$10	Biotic Surveys	$1,842	$1,842	$1,842	$1,842	$1,842	$3,683	$3,683	$3,683	$3,683	$3,683	$5,525	$5,525	$5,525	$5,525	$5,525	$7,367	$7,367	$7,367	$7,367	$7,367	$9,208	$9,208	$9,208	$9,208	$9,208	$11,050	$11,050	$11,050	$11,050	$11,050
$10	Habitat Maintenance/ Changed Circum.	$1,842	$1,842	$1,842	$1,842	$1,842	$3,683	$3,683	$3,683	$3,683	$3,683	$5,525	$5,525	$5,525	$5,525	$5,525	$7,367	$7,367	$7,367	$7,367	$7,367	$9,208	$9,208	$9,208	$9,208	$9,208	$11,050	$11,050	$11,050	$11,050	$11,050
	Water Management	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
$10	General Maintenance	$1,842	$1,842	$1,842	$1,842	$1,842	$3,683	$3,683	$3,683	$3,683	$3,683	$5,525	$5,525	$5,525	$5,525	$5,525	$7,367	$7,367	$7,367	$7,367	$7,367	$9,208	$9,208	$9,208	$9,208	$9,208	$11,050	$11,050	$11,050	$11,050	$11,050
$5	Reporting	$921	$921	$921	$921	$921	$1,842	$1,842	$1,842	$1,842	$1,842	$2,763	$2,763	$2,763	$2,763	$2,763	$3,683	$3,683	$3,683	$3,683	$3,683	$4,604	$4,604	$4,604	$4,604	$4,604	$5,525	$5,525	$5,525	$5,525	$5,525
$5	Office Maintenance	$921	$921	$921	$921	$921	$1,842	$1,842	$1,842	$1,842	$1,842	$2,763	$2,763	$2,763	$2,763	$2,763	$3,683	$3,683	$3,683	$3,683	$3,683	$4,604	$4,604	$4,604	$4,604	$4,604	$5,525	$5,525	$5,525	$5,525	$5,525
$5	Field Equipment	$921	$921	$921	$921	$921	$1,842	$1,842	$1,842	$1,842	$1,842	$2,763	$2,763	$2,763	$2,763	$2,763	$3,683	$3,683	$3,683	$3,683	$3,683	$4,604	$4,604	$4,604	$4,604	$4,604	$5,525	$5,525	$5,525	$5,525	$5,525
	Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
$5	Other	$921	$921	$921	$921	$921	$1,842	$1,842	$1,842	$1,842	$1,842	$2,763	$2,763	$2,763	$2,763	$2,763	$3,683	$3,683	$3,683	$3,683	$3,683	$4,604	$4,604	$4,604	$4,604	$4,604	$5,525	$5,525	$5,525	$5,525	$5,525
	TOTAL ITEMIZED ANNUAL COSTS	$9,208	$9,208	$9,208	$9,208	$9,208	$18,417	$18,417	$18,417	$18,417	$18,417	$27,625	$27,625	$27,625	$27,625	$27,625	$36,833	$36,833	$36,833	$36,833	$36,833	$46,042	$46,042	$46,042	$46,042	$46,042	$55,250	$55,250	$55,250	$55,250	$55,250

in the north region, $1,500/acre in the central region, and up to $1,000/acre in the south region.

Mitigation costs for grasslands at mitigation banks were based on a telephone survey of mitigation areas and were assumed to be the same in all three regions, $4,500/acre. Perpetual management of these lands was assumed to be included in this purchase price. Purchases from wetland mitigation banks were estimated at $75,000/acre and plant mitigation areas at $8,000/acre.

Real estate transaction costs were estimated for fee-title and easement purchases. The costs were estimated as 22% of the fee-title or easement purchase cost based on the Center for Natural Lands Management PAR software estimates. The transaction costs included title searches, inspections, legal assistance, title insurance, commissions, and land surveys.

The cost analysis assumed that mitigation lands and easements either purchased, or presently owned by PG&E, would require some form of long-term operation and maintenance (including biological resource evaluation). The cost of operation and maintenance of these lands would be met by establishing a non-wasting perpetual endowment. Based on discussions with CNLM, a review of PAR analyses for similar lands, and costs provided in Table 7-3, annul operational costs were estimated to be $11,122 for 184 acres of land, or $60.45 per acre per year. The annual operational cost of $11,122 was divided by a 4.5% capitalization rate, to arrive at $247,152 for an endowment. In other words, an endowment of $247,152 is needed and will be provided, to generate an annual income of $11,122.

Activities supported by the endowment may include, but are not limited to, minor biological surveys, patrolling, fence repair, controlled burning, and controlling exotic plants. Specific ongoing annual costs were estimated as follows: biotic surveys ($10/acre), general maintenance ($10/acre), habitat maintenance/changed circumstances ($10/acre), reporting ($5/acre), office maintenance ($5/acre), field equipment ($5/acre) and miscellaneous expenses ($5/acre).

Surveys and Avoidance and Minimization Measures

Survey costs were extrapolated based on HCP survey estimates and past PG&E expenditures on similar survey and permitting efforts. Moderate and small size activities occurring frequently (i.e., those with the potential to cause minor effects) have the greatest influence on overall survey costs. Implementing surveys for activities having very limited effects (i.e., less than 0.1 acre) would increase survey costs by an order of magnitude and are not practicable. For example, PG&E currently spends approximately $200,000 annually for preactivity surveys in the HCP area. Under the HCP, this is expected to increase an additional $255,000/year. If biological surveys were required for all small activities, the surveys would cost more than $3 million per year.

Similarly, avoidance and minimization costs were based on the need for additional biologists and estimated implementation frequencies. AMMs will need to be implemented on various schedules depending on the activity size, the survey size, and the likelihood that covered species habitat is present. PG&E estimated these costs at approximately $110,000 per year. Extensive new AMMs such as seasonal restrictions or large geographic area restrictions would increase the cost of AMMs by an order of magnitude, approximately $1 million per year, and are not practicable. Implementation of AMMs will also result in increased labor time on some jobs. Pre-activity surveys, AMM costs, and additional labor associated with the program are provided in Table 7-4.

Table 7-4. Surveys and AMM Costs

Surveys and AMM Costs	Annual Costs[1]	Assumptions:
Pre-activity Surveys	$255,500	500 activities surveyed at $511 each
AMM Material Costs	$110,000	$220 per job for 500 activities
Increased Labor	$75,000	$150 per job for 500 activities
Total	$440,500	

[1] Implementation costs are estimated to be 150% ($660,750) in year 1 and 125% ($550,625) in year 2 due to program start-up.

Other Program Costs

Other program costs included in the cost estimate are Burrowing Owl survey and inventory costs ($190,000 in year 1, $38,000 in years 2-5, and $5,000 in subsequent years), the Streambed Alteration Agreement avoidance measures ($15,000) and supplemental VELB planning and avoidance measures ($5,000). These costs reflect additional biological surveys and AMM costs associated with these specific resource topics.

Summary

Total program costs for program implementation and training, surveys and AMMs, compensation, and other costs are shown in Table 7-5.

Funding Sources

PG&E is fully able to fund all costs of the HCP, including implementation and mitigation costs. Each participating line of business has started budgeting for HCP implementation costs and the compensation costs.

PG&E's costs for compliance with all aspects of the HCP are fully covered by funds paid by our gas and electric customers. Collection of these funds is

Table 7-5. PG&E's San Joaquin Valley O&M HCP Total Program Costs (with 2.5% Inflation)

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Implementation and Training															
Administrator		$150,000	$153,750	$157,594	$161,534	$165,572	$169,711	$173,954	$178,303	$182,760	$187,329	$192,013	$196,813	$201,733	$206,777
Adaptive Management - Auditor Oversight		$0	$0	$31,519	$0	$0	$33,114	$0	$0	$34,791	$0	$0	$36,552	$0	$0
Adaptive Management - Auditor Surveys		$53,333	$42,025	$28,017	$28,717	$29,435	$30,171	$30,925	$31,698	$32,491	$33,303	$34,136	$34,989	$35,864	$36,760
Staff Time for Database Entry		$59,972	$47,256	$31,504	$32,292	$33,099	$33,927	$34,775	$35,644	$36,535	$37,449	$38,385	$39,345	$40,328	$41,336
Staff Time for Regional Oversight of HCP		$15,000	$11,531	$7,880	$8,077	$8,279	$8,486	$8,698	$8,915	$9,138	$9,366	$9,601	$9,841	$10,087	$10,339
Staff Time for Training Classes		$70,000	$17,938	$18,386	$18,846	$19,317	$19,800	$20,295	$20,802	$21,322	$85,288	$22,401	$22,962	$23,536	$24,124
Trainers		$33,000	$8,456	$8,668	$8,884	$9,106	$9,334	$9,567	$9,807	$10,052	$41,212	$10,561	$10,825	$11,095	$11,373
Training Materials		$2,730	$700	$717	$735	$753	$772	$791	$811	$832	$3,409	$874	$895	$918	$941
Software		$12,500	$6,406	$6,566	$6,731	$6,899	$7,071	$7,248	$7,429	$7,615	$15,611	$8,001	$8,201	$8,406	$8,616
Hardware		$25,000	$12,813	$13,133	$13,461	$13,798	$14,143	$14,496	$14,859	$15,230	$31,222	$16,001	$16,401	$16,811	$17,231
Subtotal	*$0*	*$421,536*	*$300,875*	*$303,983*	*$279,276*	*$286,258*	*$326,529*	*$300,750*	*$308,268*	*$350,766*	*$444,190*	*$331,971*	*$376,823*	*$348,777*	*$357,497*
Surveys and AMMs															
Preactivity Surveys		$337,969	$281,641	$225,313	$230,945	$236,719	$242,637	$248,703	$254,920	$261,293	$267,826	$274,521	$281,384	$288,419	$295,630
AMM Material Costs		$162,190	$135,158	$108,127	$110,830	$113,601	$116,441	$119,352	$122,335	$125,394	$128,529	$131,742	$135,035	$138,411	$141,872
Increased Labor		$111,488	$92,906	$74,325	$76,183	$78,088	$80,040	$82,041	$84,092	$86,194	$88,349	$90,558	$92,822	$95,142	$97,521
Subtotal	*$0*	*$611,646*	*$509,705*	*$407,764*	*$417,958*	*$428,407*	*$439,117*	*$450,095*	*$461,348*	*$472,882*	*$484,704*	*$496,821*	*$509,242*	*$521,973*	*$535,022*
Compensation															
Initial and Capital Costs	$1,533,000						$362,860					$1,186,456			
Endowment	$567,000						$0					$316,375			
Subtotal	*$2,100,000*	*$0*	*$0*	*$0*	*$0*	*$0*	*$362,860*	*$0*	*$0*	*$0*	*$0*	*$1,502,831*	*$0*	*$0*	*$0*
Other															
WBOW Surveys		$5,000	$5,125	$5,253	$5,384	$5,519	$5,657	$5,798	$5,943	$6,092	$6,244	$6,400	$6,560	$6,724	$6,893
Streambed Alteration Agreement Measures		$15,000	$15,375	$15,759	$16,153	$16,557	$16,971	$17,395	$17,830	$18,276	$18,733	$19,201	$19,681	$20,173	$20,678
VELB Planning and Avoidance		$5,000	$5,125	$5,253	$5,384	$5,519	$5,657	$5,798	$5,943	$6,092	$6,244	$6,400	$6,560	$6,724	$6,893
HCP Development Costs	$2,100,000		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal	*$2,100,000*	*$210,000*	*$25,000*	*$25,625*	*$26,266*	*$26,922*	*$27,595*	*$28,285*	*$28,992*	*$29,717*	*$30,460*	*$31,222*	*$32,002*	*$32,802*	*$33,622*
Subtotal of HCP Costs	**$4,200,000**	**$1,243,182**	**$1,058,182**	**$836,205**	**$738,013**	**$724,156**	**$742,260**	**$1,156,792**	**$779,837**	**$799,333**	**$854,107**	**$960,115**	**$2,363,626**	**$918,866**	**$904,372**

Table 7-5. Continued

Year	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Totals
Implementation and Training																	
Administrator	$211,946	$217,245	$222,676	$228,243	$233,949	$239,798	$245,792	$251,937	$258,236	$264,692	$271,309	$278,092	$285,044	$292,170	$299,474	$306,961	$6,585,405
Adaptive Management - Auditor Oversight	$38,403	$0	$0	$40,347	$0	$0	$42,389	$0	$0	$44,535	$0	$0	$46,790	$0	$0	$49,158	$397,598
Adaptive Management - Auditor Surveys	$37,679	$38,621	$39,587	$40,576	$41,591	$42,631	$43,696	$44,789	$45,909	$47,056	$48,233	$49,439	$50,674	$51,941	$53,240	$54,571	$1,212,097
Staff Time for Database Entry	$42,370	$43,429	$44,515	$45,628	$46,768	$47,938	$49,136	$50,364	$51,623	$52,914	$54,237	$55,593	$56,983	$58,407	$59,867	$61,364	$1,362,984
Staff Time for Regional Oversight of HCP	$10,597	$10,862	$11,134	$11,412	$11,697	$11,990	$12,290	$12,597	$12,912	$13,235	$13,565	$13,905	$14,252	$14,609	$14,974	$15,348	$340,614
Staff Time for Training Classes	$24,727	$25,345	$25,979	$26,628	$27,294	$106,513	$28,676	$29,393	$30,127	$30,881	$31,653	$32,444	$33,255	$34,087	$34,939	$35,812	$962,767
Trainers	$11,657	$11,948	$12,247	$12,553	$12,867	$51,469	$13,519	$13,857	$14,203	$14,558	$14,922	$15,295	$15,677	$16,069	$16,471	$16,883	$456,137
Training Materials	$964	$988	$1,013	$1,039	$1,064	$4,258	$1,118	$1,146	$1,175	$1,204	$1,234	$1,265	$1,297	$1,329	$1,363	$1,397	$37,735
Software	$8,831	$9,052	$9,278	$9,510	$9,748	$19,496	$10,241	$10,497	$10,760	$11,029	$11,305	$11,587	$11,877	$12,174	$12,478	$12,790	$297,951
Hardware	$17,662	$18,104	$18,556	$19,020	$19,496	$38,991	$20,483	$20,995	$21,520	$22,058	$22,609	$23,174	$23,754	$24,348	$24,956	$25,580	$595,903
Subtotal	*$404,837*	*$375,595*	*$384,985*	*$434,956*	*$404,475*	*$563,083*	*$467,340*	*$435,575*	*$446,464*	*$502,161*	*$469,067*	*$480,793*	*$539,603*	*$505,134*	*$517,762*	*$579,864*	*$12,249,192*
Surveys and AMMs																	
Preactivity Surveys	$303,020	$310,596	$318,361	$326,320	$334,478	$342,840	$351,411	$360,196	$369,201	$378,431	$387,892	$397,589	$407,529	$417,717	$428,160	$438,864	$9,600,521
AMM Material Costs	$145,418	$149,054	$152,780	$156,600	$160,515	$164,528	$168,641	$172,857	$177,178	$181,608	$186,148	$190,802	$195,572	$200,461	$205,472	$210,609	$4,607,259
Increased Labor	$99,959	$102,458	$105,019	$107,645	$110,336	$113,094	$115,922	$118,820	$121,790	$124,835	$127,956	$131,155	$134,434	$137,794	$141,239	$144,770	$3,166,973
Subtotal	*$548,398*	*$562,108*	*$576,160*	*$590,564*	*$605,328*	*$620,462*	*$635,973*	*$651,872*	*$668,169*	*$684,873*	*$701,995*	*$719,545*	*$737,534*	*$755,972*	*$774,871*	*$794,243*	*$17,374,753*
Compensation																	
Initial and Capital Costs		$1,342,367					$1,518,765					$1,718,343					$7,661,791
Endowment		$357,949					$404,987					$458,205					$2,104,516
Subtotal	*$0*	*$1,700,316*	*$0*	*$0*	*$0*	*$0*	*$1,923,751*	*$0*	*$0*	*$0*	*$0*	*$2,176,548*	*$0*	*$0*	*$0*	*$0*	*$9,766,307*
Other																	
WBOW Surveys	$7,065	$7,241	$7,423	$7,608	$7,798	$7,993	$8,193	$8,398	$8,608	$8,823	$9,044	$9,270	$9,501	$9,739	$9,982	$10,232	$219,514
Streambed Alteration Agreement Measures	$21,195	$21,724	$22,268	$22,824	$23,395	$23,980	$24,579	$25,194	$25,824	$26,469	$27,131	$27,809	$28,504	$29,217	$29,947	$30,696	$658,541
VELB Planning and Avoidance	$7,065	$7,241	$7,423	$7,608	$7,798	$7,993	$8,193	$8,398	$8,608	$8,823	$9,044	$9,270	$9,501	$9,739	$9,982	$10,232	$219,514
HCP Development Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,100,000
Subtotal	*$35,324*	*$36,207*	*$37,113*	*$38,040*	*$38,991*	*$39,966*	*$40,965*	*$41,990*	*$43,039*	*$44,115*	*$45,218*	*$46,349*	*$47,507*	*$48,695*	*$49,912*	*$51,160*	*$3,197,568*
Subtotal of HCP Costs	**$988,559**	**$2,674,226**	**$998,258**	**$1,063,561**	**$1,048,795**	**$1,223,510**	**$3,068,030**	**$1,129,437**	**$1,157,673**	**$1,231,150**	**$1,216,280**	**$3,423,235**	**$1,324,644**	**$1,309,801**	**$1,342,546**	**$1,425,268**	**$42,587,820**

authorized by the California Public Utilities Commission and the Federal Energy Regulatory Commission for the ongoing operation, maintenance and construction of utility facilities.

Determining Practicability

PG&E has determined that it is impracticable to implement the HCP if the costs exceed $50 million over the 30-year permit term as it could implement project-by-project ESA compliance and mitigation for less than this amount.

Adequacy of Funds

The company is solvent and is able to meet its current financial obligations, including any conditions and obligation of the HCP. PG&E has adequate resources to fulfill all commitments as described in the HCP and the final Implementing Agreement. The Manager of Environmental Affairs Habitat & Species Protection Program will also provide a letter with the annual HCP report to USFWS confirming that the upcoming year's HCP costs are budgeted.

PG&E has provided funding assurances for its mitigation obligation by entering into a land acquisition and management agreement with the Center for Natural Lands Management in December 2004. PG&E placed $2.1 million into a mutually agreed upon compensation lands fund account designed to fulfill the compensation obligations of the HCP. This amount is expected to be sufficient to cover nearly 10-years of compensation requirements (Table 7-5). The agreement includes information on meeting the compensation objectives of the HCP, acquisition requirements, management requirements, and other financial and contractual obligations.

Funds for subsequent 5-year mitigation periods will be budgeted for by each line of business and will be made available in advance of project effects. If PG&E does not implement the terms of the HCP it is violating the permit and the permit can be revoked.

Chapter 8
Alternatives Analysis

Introduction

The ESA requires that Section 10 permit applicants specify in the HCP what alternative actions to the taking of federally listed species were considered and the reasons why those alternatives were not selected. The *Habitat Conservation Planning Handbook* (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1996) identifies two alternatives commonly used in HCPs: (1) an alternative that would reduce take below levels anticipated for the proposed project; and (2) an alternative that would avoid take and hence not require a permit from USFWS (*no-action alternative*). This chapter identifies alternative measures considered that would minimize or avoid the potential for take of each species covered in this HCP.

Description of Alternatives

Two alternatives are currently being advanced in this HCP: the proposed project (obtain a take permit), and the no-action alternative (do not obtain a take permit). The no-action alternative does not meet PG&E's objectives but will be required by federal regulations to be considered as part of the NEPA analysis. These alternatives are briefly described as follows.

Project (Take Permit)

As described in Chapters 1–7, PG&E has proposed a comprehensive plan to avoid, minimize, and compensate for effects on federally and state-listed species. This plan will ensure consistent accounting for potential effects of PG&E's activities on covered species.

No-Action Alternative (No Take Permit—Enhanced Monitoring and Avoidance)

Under this alternative, PG&E would continue to operate and maintain its gas and electric facilities without a Section 10(a)(1)(B) permit issued by USFWS or a Section 2081 Agreement from DFG. PG&E would continue to address threatened and endangered species issues on a case-by-case basis. To further ensure ESA compliance without a take permit, PG&E would enhance its monitoring and avoidance practices by supplementing existing educational programs and developing a checklist for field supervisors to evaluate listed species issues prior to implementation of O&M projects.

However, despite the case-by-case treatment of federally listed species and enhanced monitoring and avoidance, conservation efforts under this alternative would be provided in a piecemeal fashion, and the purchase of conservation lands would be fragmented because of the limited and scattered effects of O&M activities on federally listed species.

Case-by-case consultation with USFWS and DFG would require additional agency and PG&E staff time and could result in variable application of avoidance, minimization, and compensation measures. This approach also adversely affects PG&E's ability to plan and schedule operation, maintenance, and minor construction activities.

Finally, in instances where take could not be altogether avoided while continuing operations, the No Action Alternative could involve the risk of shutting down facilities or not serving power to certain areas.

Alternatives Considered but Eliminated

Alternatives considered but eliminated included changing practices, conducting activity-by-activity permitting, identifying alternative species measures, participating in existing HCPs, and relying solely on compensation. These alternatives and the rationale for their elimination from consideration are discussed below.

Two tiers of screening criteria were used to evaluate whether alternatives should be retained or eliminated. The first tier of screening criteria focused on the size of the disturbance. Specific levels of disturbance included small (<0.1 acre), medium (0.1 to 0.5 acre), and large (>0.5 acre) disturbance as described in Chapter 4 (*Conservation Strategy*). Activities with small disturbances were not carried forward for further screening because of the limited potential for take and additional avoidance measures applied to some of these activities. Activities with medium and large disturbances were carried forward for further screening. The second tier of screening criteria focused on logistical, legal, cost, public safety, effectiveness, and consistency considerations. The screening process is illustrated in Table 8-1 and described below.

Table 8-1. Screening Process for Evaluating the Feasibility of Alternative Means of Avoiding and Minimizing Take of PG&E's O&M Activities

Activity	Tier 1 Screening Criteria[1] Level of Disturbance	Tier 2 Screening Criteria[2] Logistical, Legal, Cost, Public Safety, Effectiveness, and Consistency Standards							
		Feasibility of Implementing Changed Practices							
		Eliminate Activity	Modify Activity	Restrict Activity Seasonally	Conduct Preactivity Surveys for All Activities	Conduct Activity-by-Activity Permitting	Identify Alternative Species Measures	Use Existing HCPs	Rely Solely on Compensation
Gas									
G1. Patrols	S	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
G2. Inspections	S	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
G3. Remedial Maintenance	M	P, E, I	Le, E	Lo, E	Proposed	E	E	I	E
G4. Compressor Station Maintenance	S	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
G5. Pipeline ETS	M	P, E, I	Le, E	Lo, E	E*	E	E	I, E	E
G6. Valve Recoating	L	P, I	Le, E	Lo, E	Proposed	C, Lo, I	E	I, E	E
G7. Valve Replacement	L	P, I	Le, E	Lo, E	Proposed	C, Lo, I	E	I, E	E
G8. Cathodic Protection	L	P, I	Le, E	Lo, E	Proposed	C, Lo, I	E	I, E	E
G9. Pipeline Lowering	L	P, I	Le, E	Lo, E	Proposed	C, Lo, I	E	I, E	E
G10. Pipeline Coating Replacement	L	P, I	Le, E	Lo, E	Proposed	C, Lo, I	E	I, E	E
G11. Pipeline Replacement	L	P, I	Le, E	Lo, E	Proposed	C, Lo	E	I, E	E
G12. Telecom Site Maintenance	M	E, 1	E, 1	E, 1		C, Lo	E	E	E
G13. Vegetation Management	L	P, I	P, Le, E	P, Lo, E	Lo, C*	P, C, E, I	Lo, E	I, E	E
Electric									
E1. Patrols	S	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E2. Inspections	S	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E3. Insulator Washing	S	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E4. Substation Maintenance	S	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E5. Outage Repair	L	P, I	P	P, Lo, Le	Lo*	P, Le, I	Lo, E	I, E	E
E6. Tower Replacement/Repair	M	P, I	P, Le	P	C, Lo, E*	C, Lo, I	E	I, E	E
E7. Trans System Repair (Shoo-Fly)	M	P, I	P, Le	P, Lo, C	C, Lo, E*	C, Lo, I	E	I, E	E
E8. Pole/Equipment Repair/Replacement	M	P, Le, I	P, Lo	P, Lo, C	C, Lo*	C, Lo, I	E	I, E	E
E9. Electric Line Reconductoring	L	P, Le, I	P, Le	P, Lo, C	Proposed	C, Lo, I	E	I, E	E
E10. Vegetation Management									
E10a. Routine Maintenance	S	P, Le, I	P, Lo	P, Lo, Le, C	C, Lo*	C, Lo, I	C, Lo, E	I, E	E
E10b. Pole Clearing	S	P, Le, I	P, Lo	P, Lo, C	C, Lo*	C, Lo, I	C, Lo, E	I, E	E
E10c. Removal Projects	L	P, Le, I	P, Lo	P, Lo, C	Le, Lo*	C, Lo, I	C, Lo, E	I, E	E
E10d. ROW Maintenance	L	P, Le, I	P, Lo	P, Lo, C	Le, Lo*	C, Lo, I	C, Lo, E	I, E	E
E11. Test and Treat (Remedial Maintenance)	M	P, I	P	P, C	C, E*	C	E	I, E	E

Activity	Tier 1 Screening Criteria[1] Level of Disturbance	Tier 2 Screening Criteria[2] Logistical, Legal, Cost, Public Safety, Effectiveness, and Consistency Standards							
		Feasibility of Implementing Changed Practices							
		Eliminate Activity	Modify Activity	Restrict Activity Seasonally	Conduct Preactivity Surveys for All Activities	Conduct Activity-by-Activity Permitting	Identify Alternative Species Measures	Use Existing HCPs	Rely Solely on Compensation
Minor Construction									
G14. Gas Pressure Limiting Station	L	P, Le, I	P, Le	P, Lo, C	Proposed	C, Lo, I	C, E	I, E	E
G15. Gas Valve Installation	L	P, Le, I	P, Le	P, Lo, C	Proposed	C, Lo, I	C, E	I, E	E
G16. Gas Pipeline Construction	L	P, Le, I	P, Le	P, Lo	Proposed	C, Lo, I	C, E	I, E	E
E12. Elec. Pole Line Construction	L	P, Le, I	P, Le	P, Lo	Proposed	C, Lo, I	C, E	I, E	E
E13. Elec. Tower Line Construction	L	P, Le, I	P, Le	P, Lo	Proposed	C, Lo, I	C, E	I, E	E
E14. Elec. Substation Construction	L	P, Le, I	P, Le	P, Lo	Proposed	C, Lo, I	C, E	I, E	E

Notes:

[1] Tier 1 Screening Criteria: Level of Disturbance: S = Small (<0.1 acre) M = Medium (0.1 to 0.5 acre) L = Large (>0.5 acre)

(See definitions of disturbance categories in Chapter 4. If level of disturbance is small, no further evaluation of additional screening criteria is needed.)

[2] Tier 2 Screening Criteria:

Lo = Logistics. Measure would increase level of effort by more than 100%.

Le = Legal. Measure would conflict with existing laws or regulations.

C = Cost. Measure would be cost prohibitive such that the cost exceeds 50% of the cost to currently conduct the activity.

P = Public Safety. Measure would result in an increase in fire or other hazards or an inability to maintain standards.

E = Effectiveness. Measure would be ineffective at reducing overall take of habitat or individuals.

I = Irregular. Measure would result in irregular or inconsistent company practices.

* Compensation for effects is proposed though preactivity surveys are not.

Changed Practices

PG&E considered a suite of changed practices as an alternative to obtaining a take permit while still minimizing effects on covered species. Changed practices that were considered included: eliminating activities, modifying activities, seasonally restricting activities, conducting surveys for all activities, and conducting surveys for a majority of activities.

Eliminating activities is infeasible because FERC and/or CEC mandates most of PG&E's O&M activities for public safety and system reliability. Specific activities could be removed from the permit, but eliminating these activities would still require case-by-case consultation with the resource agencies and could result in inconsistent companywide policies and practices. Additionally this alternative would prove less effective than a single consistent program and could conflict with existing regulations.

Modifying activities (beyond implementing current avoidance and minimization measures) to minimize species effects is also infeasible because most O&M activities are conducted to maintain, repair, or upgrade existing facilities to comply with FERC and CPUC regulations and to maintain public safety. For example, pipeline replacement and recoating is necessary to ensure that facilities continue to operate correctly and maintain public safety. Some of these activities result in a small amount of take, and modifying thousands of activities, or even a portion of these activities, might not reduce the overall take of habitat or individuals. Legal and logistical factors also limit the ability to modify some activities.

Seasonally restricting activities is logistically and economically prohibitive. Maintaining facilities during appropriate seasonal windows to minimize wildlife and plant species effects narrows PG&E's working period to several months per year. This change would result in the underutilization of hundreds of PG&E employees and a reduction in PG&E's ability to operate and maintain its infrastructure, resulting in interrupted service and potentially resulting in a reduction of public safety. Legal factors also limit the ability to seasonally restrict some activities.

PG&E also evaluated the possibility of conducting preactivity surveys for all O&M activities. Conducting surveys for a majority of activities is cost prohibitive and would not appreciably reduce species effects. Preactivity surveys are feasible for certain small activities where species are known, and the medium and large activities throughout the plan area. However, preactivity surveys for all of the small activities is infeasible because of logistic, economic, and in some instances legal considerations.

Activity-by-Activity Permitting

PG&E evaluated the possibility of obtaining incidental take permits for individual O&M activities but rejected the alternative because of cost considerations and the need to prepare multiple HCPs. The sheer volume of activities makes it logistically infeasible, and this alternative could result in inconsistent companywide policies and practices. It was also considered less effective than a single consistent program, and could result in an increased level of take over the project.

Alternative Species Measures

PG&E evaluated the possibility of implementing additional measures to avoid the take of individual species covered in the HCP. However, because most of the project effects are on habitat for covered species (a small portion of which is occupied), additional measures were rejected because of logistic, economic, and effectiveness considerations. Additional more restrictive AMMs, such as complying with firm exclusion areas, are logistically infeasible because in some instances facilities co-occur with habitat for covered species. Implementing system-wide protocol-level surveys are cost prohibitive.

Participate in Existing HCPs in the San Joaquin Valley

Over the past several years, a number of local government entities have been working to develop comprehensive habitat and multi-species habitat conservation plans within the boundaries of their respective jurisdictions. Although these plans provide for the protection and conservation of wildlife habitat and sensitive plant species, they generally address municipal concerns of local land development and the permanent loss of habitat. In contrast, PG&E's facilities span jurisdictional boundaries of a large number of local governments, provide benefits to the state as a whole, and result primarily in the temporary loss of habitat. To ensure uniform, adequate, safe, and reliable operations, PG&E's operations are regulated at the state rather than the local level. Accordingly, utilization of local plans could result in inconsistent companywide policies and practices, and could result in an increased level of take over the project.

Compensation Only

Because of the small, localized nature of many O&M effects, PG&E considered a *compensation only* alternative. This alternative would provide larger tracts of mitigation in exchange for reduced administrative recordkeeping and fewer AMMs. This alternative results in larger tracts of preserved habitat for covered

species and consequently furthers recovery efforts. However, the Section 10 regulations require that the project proponent minimize or avoid effects on federally listed species, so this alternative does not fulfill those requirements and could actually result in an increased level of take over the life of the project.

Impacts of Alternatives

Project Alternative

Implementation of the HCP is expected to result in a consistent program that standardizes implementation throughout the San Joaquin Valley. The HCP provides a complete conservation package that includes surveys for many of PG&E's activities, the development of a robust database system, AMMs that will reduce long-term species effects, compensation for project effects, and regular reporting of PG&Es activities.

No Action Alternative

Implementation of the No-Action Alternative would include enhanced measures to reduce species effects, but would not include a consistent reporting or accounting system (except on a project-by-project basis) and would not include an overall compensation package.

Other Alternatives

PG&E is aware that the USFWS and DFG need to analyze additional practicable alternatives in the NEPA/CEQA document. As it is impracticable to pursue other alternatives as identified above, the following alternative is proposed for consideration in the NEPA/CEQA analysis.

Reduced Number of Covered Species Alternative

This alternative proposes to cover fewer species. Using two criteria, the list would include wildlife species that:

1. are listed under the state or federal ESA; and

2. would be expected to have more than 2 acres of habitat disturbed per year.

Application of these criteria would result in a list of 14 wildlife species. This revised list would not include the listed vernal pool crustaceans, limestone salamander, bank swallow, Buena Vista Lake shrew, riparian brush rabbit, and riparian woodrat. A number of these species have a low chance of take under

PG&E O&M activities, but were included as covered species in the proposed HCP alternative to cover even the low likelihood of take.

The list of covered plants would include 32 species with a moderate to high likelihood of occurrence near PG&E facilities. Therefore, the 10 species unlikely to have occupied habitat near PG&E facilities would not be covered. These include:

Carpenteria californica, *Clarkia tembloriensis* ssp. *calientensis*, *Gratiola heterosepala*, *Lepidium jaredii* ssp.*album*, *Lewisia congdonii*, *Malacothamnus hallii*, *Navarretia myersii*, *Orciuttia pilosa*, *Stylocline citroleum*, and *Tuctoria greenei*.

From PG&E's perspective, this alternative could be beneficial because narrowing the list of covered species could reduce PG&E's obligations to implement avoidance and minimization measures for these species, and thereby reduce costs.

The alternative's drawback to PG&E is that it would provide coverage for fewer species, thereby potentially requiring development of more individual permits for actions that result in take, and increasing the risk of take without authorization. Individual permit requirements could delay activities and potentially increase costs above that of the preferred alternative.

This alternative could result in less protection to the covered species and, subsequently, less compensation.

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Appendix A

Land Cover GIS Metadata

Appendix A
Land Cover GIS Metadata

Background and Purpose

Appendix information provides metadata for the ARC/INFO coverage of land cover produced to aid development of the HCP for PG&E's O&M activities in the San Joaquin Valley. This coverage provided regional-scale data for assessment of the effects of O&M activities on covered species. This assessment resulted in preliminary estimates of temporary and permanent loss of covered species habitat. In turn, these estimates supported development of an appropriate conservation strategy and requisite financing for this HCP. During implementation of the HCP, actual effects on covered species and mitigation requirements will be determined by site surveys preceding O&M activities disturbing more than 0.1 acres.

Extent of Coverage

The coverage boundary was established on the basis of elevation, land cover types, ownership, and land use information. This boundary is defined by the characteristics below.

- The covered area comprises portions of nine counties: San Joaquin, Stanislaus, Merced, Fresno, Kings, Kern, Mariposa, Madera, and Tulare.
- On the east side of the San Joaquin Valley, the boundary in the northern portion of the area follows the San Joaquin and Stanislaus County lines. The remainder of the eastern boundary follows the perimeter of federal lands or the 3,000-foot elevation contour, whichever is lower, along the western Sierra Nevada foothills.
- On the west side of the San Joaquin Valley, the boundary follows the western boundary of San Joaquin, Stanislaus, Merced, Fresno, Kings, and Kern Counties.
- The northern boundary is the northern San Joaquin County line, and the southern limit of the boundary is the 3,000-foot elevation contour north of the Kern County line.

In general, the boundaries were selected by PG&E to include lands that exhibit similar ecological characteristics and that are managed by PG&E's San Joaquin Valley offices. Lands at elevations above 3,000 feet were not included because of ecosystem changes; large tracts of federal lands were not included because these lands are predominantly at higher elevations and are subject to Section 7 of the ESA.

Data Sources

Overview

The land cover map represents the best available data appropriate for a regional assessment of the San Joaquin Valley. This data was from the Department of Conservation's (DOC's) Important Farmland Mapping Program (Department of Conservation 2001); the California Department of Water Resources' (DWR's) Urban Boundaries (California Department of Water Resources 2001); DFG's Wetland Riparian and Vernal Pool GIS Mapping Layers (Ducks Unlimited 1997); and California GAP (GAP) (California GAP Davis et al. 1998). The California GAP was updated with the California Department of Forestry and Fire Protection's (CDF's) Hardwood Rangeland forest types (California Department of Forestry and Fire Protection 1994). Descriptions of these data sources are below, and links to the on-line metadata for each source are provided in the references cited section of this appendix.

Important Farmland

For areas with modern soil surveys this coverage maps farm, grazing and urban land (Department of Conservation 2001). It is based on aerial photographs of various scales and field reconnaissance, and is updated biennially. Only the urban categories were used from this data set. The urban category has a minimum mapping unit of 10 acres, and urban is defined as a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10 acre parcel.

Urban Boundaries

Only the urban land use types were used from this data set. The data cover a range of years (1994–1999), since individual counties are responsible for maintaining land use. These data were derived from air photo interpretation (scale not available) and extensive field visits (California Department of Water Resources 2001).

California Wetland and Riparian GIS

This coverage maps land cover within the Central Valley up to 300 feet in elevation (Ducks Unlimited 1997). It was produced from satellite imagery (primarily from 1993) using image classification techniques. Both summer and winter images were used to improve the classification's accuracy. Classification was performed through a combination of supervised and unsupervised classification techniques, and field data, aerial photography and other ancillary data sources were used in the labeling of spectral clusters.

California GAP

This coverage maps land cover within each of ten major regions of the state (Davis et al. 1998). It was produced from 1990 Landsat Thematic Mapper satellite imagery guided by high altitude aerial photography (1990), vector overlays of existing vegetation and land use maps, and forest inventory data. Upland types were mapped with a minimum mapping unit of 100 hectares, major wetlands were mapped with a 40-hectare-minimum mapping unit, and smaller wetlands were encoded as attributes of upland polygons.

California Hardwood Rangeland Vegetation

This coverage maps vegetation below 5,000 feet in elevation (California Department of Forestry and Fire Protection 1994). It was originally mapped in 1981 from 1:24,000 scale aerial photographs, and then updated using 1990 LANDSAT TM imagery. It consists of 25 meter pixels coded with a cover type, and for woodland and forest cover types, each pixel also is coded with a canopy closure class.

California Vernal Pool GIS

This coverage maps areas of vernal pools throughout the Central Valley. It was produced from aerial photographs (approximately 1:10,400 scale, dates unavailable) and had a minimum mapping unit of approximately 40 acres (Holland 1996). Each polygon was coded vernal pool density and disturbance attributes. This land cover coverage was not incorporated into the PG&E land cover layer, but was later used to estimate the acreage of vernal pools that may be affected by P&E activities.

Assembly of Data Sources into Land Cover Layer

Overview

Integrating the data sources into one coverage involved selecting the best available data source for each location within our coverage boundary, combining these sources into a single image, and then processing this image to produce a vector-based ARC/INFO coverage in the Albers Equal Area Projection, datum NAD27, Spheroid Clark 1866 (units meters).

For urban and other developed land cover types, the Important Farmland coverage was the primary layer. For areas not included in the Important Farmland coverage, the California Hardwood Rangeland Vegetation coverage was used. For areas not covered by the previous two sources, the Urban Boundaries coverage was used. In areas not mapped by any of these three sources, the California GAP coverage was used. The mapping of urban areas superceded the mapping of natural vegetation and agricultural lands because urban areas were primarily based on the Important Farmland coverage, which is the most recent coverage.

For natural vegetation and agricultural lands, different data sources were used below 300 feet in elevation than above 300 feet in elevation. Below 300 feet in elevation, the California Wetland and Riparian GIS coverage was the primary data source (for 40% of total area containing 44% of PG&E facilities). Above 300 feet in elevation, the California Hardwood Rangeland Vegetation coverage was the primary data source (For 44% of total area containing 18% of PG&E facilities). For areas not included in the California Hardwood Rangeland Vegetation Coverage 8% of total area containing 11% of PG&E facilities), the California GAP coverage was used. The Upland Woodland and Forest category from GAP was recoded into Blue Oak/Foothill Pine in the northwest, Valley Oak Woodland in the southwest, and Conifer in the east to more accurately reflect these woodland types. Each of these types comprises a small portion (<2%) the overall plan area.

To produce a vector-based ARC/INFO coverage, the selected data was combined into a single image and recoded to the PG&E land cover classes using the Spatial Modeler in ERDAS Imagine 8.5; this image was then processed and converted into a vector-based format using an ARC/INFO raster-to-vector conversion routine. The steps in this process were designed to preserve the integrity of the original data sources. The Important Farmland and the Urban Boundaries coverages were converted to images at the same resolution (25 meter pixels) as the image-based layers. A raster-to-vector function was used in ArcInfo to convert the vector data to image data.

The full resolution vector-based land cover data was used for analyses involving the electric and gas transmission. As a result of the electric distribution data and full resolution land cover data covering such a large area and large quantity of spatial data, the land cover data set needed to be simplified. To accomplish this an elimination routine was applied to the full resolution image-based land cover

data set. Areas that were less than or equal to 4 contiguous pixels of the same land cover type (2500 square meters or 0.61 acres) were eliminated and filled in with its majority neighboring land cover type.

After all data sets were converted into an image format, the Spatial Modeler in Imagine was used to assemble the data. The specific process was as described in the following sections.

Inaccuracy in analyses based on this coverage potentially could result from mismatching boundaries between multiple data sets, data conversion, variance in source scale of spatial information, elimination of very small land cover units (as described above), and differences in the time period when data sets were completed and published. Although these kinds of inaccuracies may exist, they are unlikely to invalidate the basic conclusions drawn from regional-scale analyses.

Assembly of Urban Boundaries

The specific assembly process in Spatial Modeler was:

1. The California Department of Conservation (CDOC) Important Farmland GIS was the primary layer for the urban category.

2. In counties where CDOC Important Farmland was not mapped, CDF Hardwood Rangelands was used for urban designations (primarily in the uplands).

3. In counties where no CDOC Important Farmland was available and no CDF Hardwood Rangelands was available, DWR Land Use GIS urban designations were used.

4. In counties where no CDOC, CDF, or DWR urban categories were available, the California Gap Analysis urban category was used.

In all cases, DWR land use code of urban residential (UR), urban commercial (UC), urban vacant (UV), urban landscape (UL), and urban industrial (UI) was classified as urban.

Natural Plant Communities and Agricultural Lands

Valley Floor (<300 feet elevation)

DFG California Central Valley Wetland and Riparian GIS was the primary data source. The urban layer superceded the CDFG Wetland and Riparian GIS.

Other Areas

The specific assembly process in Spatial Modeler was:

1. The CDF Hardwood Rangelands was be used as the primary data source outside the area that was occupied by the DFG Wetland and Riparian GIS.

2. Where the two overlap, the CDF data superceded the DFG data.

3. In areas where no CDF data nor DFG data were mapped, California Gap Analysis data was used for the land cover data layer. The Upland Woodland and Forest category from GAP was recoded into Blue Oak/Foothill Pine in the northwest, Valley Oak Woodland in the southwest, and Conifer in the east. Each of these types was relatively small compared to the overall project area.

Land Cover Classification

A classification system for land-cover types was developed for the plan area based on WHR, Holland (1986), Sawyer and Keeler-Wolf (1995), Mayer and Laudenslayer (1988), and recommendations by Jones & Stokes senior wildlife biologists and botanists. This classification was designed to support the impact analysis for covered species in the HCP. It contains 15 land cover types, which are described below, and whose correspondence to the land cover types used by data sources is shown in Table A-1. Plant species nomenclature follows *The Jepson Manual* (Hickman 1993).

Agricultural Fields (AG)

The agriculture land-cover type encompasses all areas where the native vegetation has been cleared for agriculture. This land cover type may include orchards, vineyards, row crops, irrigated pasture crops, and fallow fields.

Blue Oak Woodland (BOW)

The blue oak woodland land-cover type includes woodland dominated by blue oak (*Quercus douglasii*), with included patches of coast live oak (*Quercus agrifolia*), interior live oak (*Quercus wislizenii*), and valley oak (*Quercus lobata*). At higher elevations, foothill pine (*Pinus sabiniana*) becomes frequent. Shrub species found within blue oak woodland include poison-oak (*Toxicodendron diversilobum*), California coffeeberry (*Rhamnus californica*), California buckeye (*Aesculus californica*), holly-leaf cherry (*Prunus ilicifolia*) and manzanitas (*Arctostaphylos* spp.). The herb layer is mainly annual grasses and forbs.

Blue Oak/Foothill Pine (BOFP)

Blue oak and foothill pine form a mixed, open canopy in blue-oak/foothill pine type. Associated tree species include blue oak, interior live oak, California buckeye, and elderberry (*Sambucus mexicana*), with chaparral species such as manzanitas, chamise (*Adenostoma fasciculatum*), and buckbrush (*Ceanothus cuneatus*) in the understory.

Coastal Oak Woodland (COW)

The coastal oak woodland land cover-type includes vegetation such as coast live oak, Pacific madrone (*Arbutus menziesii*), interior live oak, foothill pine, and California blackberry (*Rubus ursinus*).

Conifer (CON)

This land cover-type includes the WHR habitat types Sierran mixed conifer, closed-cone pine-cypress, and Ponderosa pine.

Sierran mixed conifer forest has a multi-layered canopy that includes five conifers: white fir (*Abies concolor*), Douglas-fir (*Pseudotsuga menziesii*), Ponderosa pine (*Pinus ponderosa*), sugar pine, and incense cedar (*Calocedrus decurrens*); and one hardwood, black oak (*Quercus kelloggii*). Shrubs such as deerbrush (*Ceanothus integerrimus*), manzanitas, bitter cherry (*Prunus emarginata*), gooseberries and currants (*Ribes* spp.), and mountain misery (*Chamaebatia foliolosa*) occur in openings.

Closed-cone pine-cypress generally occur on low-nutrient or serpentine substrates, the species in the plan area are Gowan cypress (*Cupressus goveniana*) and knobcone pine. The shrub layer is generally well-developed and includes manzanitas, ceanothus, shrubby oaks, buckthorn, and poison-oak.

Ponderosa pine woodland varies from pure stands of Ponderosa to mixed stands with oaks, Pacific madrone (*Arbutus menziesii*) and other conifers. Associated shrubs include manzanitas, mountain-misery, ceanothus, yerba-santa (*Eriodictyon californicum*), bitter cherry, poison-oak, and Sierra gooseberry (*Ribes roezlii*).

Grassland (G)

Grassland consists of herbaceous vegetation dominated by grasses and forbs. This land-cover type includes a variety of habitat types: annual grassland, perennial grassland, pasture, valley sacaton grassland, alkali meadow, and vernal pools.

Annual grasslands are dominated by introduced annuals, including wild oats (*Avena* spp.), brome grasses (*Bromus* spp.), barleys (*Hordeum* spp.), and annual fescues (*Vulpia* spp.). Common herbs are also introduced annuals such as filarees (*Erodium* spp.) and clovers (*Trifolium* spp.), and native species such as fiddleneck (*Amsinkia* spp.), lupines (*Lupinus* spp.), and owl's-clover (*Castilleja* spp.). These annuals germinate after late fall and winter rains and grow, flower and set seed through spring. Most of these plants die by summer.

Perennial grasslands are dominated by California oatgrass (*Danthonia californica*), sweet vernal grass (*Anthoxanthum odoratum*), brome grasses, and fescues (*Festuca* spp.). The associated herb cover includes native and non-native forbs and native wildflowers.

Pasture is cultivated for grazing, and may be irrigated.

Vernal pools include northern claypan and northern hardpan vernal pools. These communities are dominated by native annual species that germinate, grow, and flower as the pools dry up in the spring. Characteristic species include goldfields (*Lasthenia* spp), downingia (*Downingia* spp), meadowfoam (*Limnanthes alba*), navarettia (*Navarettia* spp.), and popcorn flower (*Plagiobothrys* spp.).

Valley sacaton grassland occurs in the San Joaquin Valley, especially on the fine-textured, usually alkaline soils of the Tulare Lake Basin area, where it used to be extensive. Alkali sacaton (*Sporobolus airoides*), a tussock-forming, native, perennial grass, is the dominant species, and saltgrass and low barley (*Hordeum depressum*) are common.

Alkali meadow is characterized by open to dense perennial grasses and sedges, and occurs on fine-textured, alkaline soils that are usually permanently moist. Typical plants include yerba mansa, sedges, saltgrass, rushes, alkali mallow (*Malvella leprosa*), alkali cord grass (*Spartina gracilis*), and alkali sacaton.

Montane Hardwood (MHW)

This land cover-type includes the WHR habitats montane hardwood, montane hardwood conifer, and montane riparian.

Montane hardwood has a clear hardwood layer with a sparse shrub layer, and may include occasional coniferous trees. The dominant tree in the plan area canyon live oak is (*Quercus chrysoplepis*), with a small component of foothill pine, knobcone pine *(Pinus attenuata*), and Pacific madrone. This habitat type borders mixed conifer, montane hardwood-conifer, and mixed chaparral habitat types.

Montane hardwood conifer consists of a diverse mixture of hardwood and conifer trees, comprising at least one-third conifers and one-third broadleaved trees. The tree canopy is typically dense and multi-layered; characteristic trees in the plan

area include black oak, black cottonwood (*Populus balsamifera*), canyon live oak, ponderosa pine, sugar pine, and incense cedar.

Montane riparian habitat as a narrow band of deciduous broadleaved trees along seeps, streams and rivers. In the plan area characteristic trees include (*Populus tremuloides*), willows, and white alder (*Alnus rhombifolia*).

Open Water (OW)

Open water land-cover types are natural and man-made aquatic habitats that support submerged or floating vegetation, such as lakes, reservoirs, flood control basins, ponds (including stock ponds), sloughs, canals, and rivers. Many of the large water bodies include permanent and seasonal wetland and riparian communities along their edge.

Other Developed and Disturbed Lands (ODD)

This land cover-type includes the barren WHR habitat type include other developed and disturbed lands consisting of perennial weeds, non-native species, and land with urban infrastructure.

Permanent Freshwater Wetland (PFW)

This land cover-type includes freshwater emergent wetland and wet meadow. Dominant vegetation in freshwater wetlands includes cattails (*Typha* spp.), tules and bulrushes (*Scirpus* spp.), sedges (*Carex* spp.), nutsedges (*Cyperus* spp.), arrowhead (*Sagittaria* spp.), baltic rush (*Juncus balticus*), and common reed (*Phragmites australis*), and on more alkali sites, saltgrass (*Distichlis spicata*).

Seasonal Wetland (SW)

Seasonal wetlands support ponded or saturated soil conditions, but generally only during winter and spring. The vegetation is composed of wetland generalists, such as hyssop loosestrife (*Lythrum hyssopifolia*), cocklebur (*Xanthium* spp.), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*) and Italian ryegrass (*Lolium multiflorum*), that typically occur in frequently disturbed sites, such as along streams.

Cismontane alkali marsh – yerba mansa (*Anemopsis californica*), saltgrass, rushes, pickleweed (*Salicornia virginica*), cattails, alkali heath (*Frankenia salina*).

Upland Scrub (US)

This land cover type includes a wide variety of shrub types, including but not limited to alkali desert scrub (including valley/Coast Range Saltbush scrub and Valley sink scrub) and three types of chaparral: mixed, chamise-redshank, and montane.

Alkali desert scrub is similar to the WHR type "Valley/Coast Range Saltbush Scrub and Valley Sink Scrub", and includes both xerophytic and halophytic shrub-dominated communities such as valley/Coast Range Saltbush scrub and Valley sink scrub. These habitat types are dominated by shrubs in the chenopod family, especially all-scale (*Atriplex polycarpa*), and other Atriplex species. Characteristic shrubs of Valley and Coast Range Saltbush scrub include all-scale, arrowscale (*Atriplex phyllostegia*), goldenbush (*Isocoma acradenia* var. *bracteosa*), bladderpod (*Isomeris arborea*), and alkali heath.

Valley sink scrub is an open shrub-dominated community on highly alkaline soils, usually heavy, sticky clay. Alkali playas (or balds) are common. The groundwater table is usually high, and the soil surface is often covered with a salty crust. Characteristic shrubs include iodine bush (*Allenrolfea occidentalis*), bush seepweed (*Suaeda moquinii*), and typical forbs are saltgrass, nitrophila (*Nitrophila occidentalis*), pickleweed (*Salicornia subterminalis*), and alkali sacaton.

Three types of chaparral are distinguished in the plan area, and are characterized by dense stands of evergreen shrubs whose species composition varies greatly with elevation, location, aspect, climate, and substrate. Fire is regular in these communities, and influences structure and species composition. Herbaceous plants include annual and perennial grasses and forbs in small openings in the shrub canopy.

Mixed chaparral is typically dense and diverse. Dominant species include shrubby oaks (*Quercus* spp.), manzanitas, and several species of ceanothus, in mixed or patchy stands. Commonly associated shrubs include chamise, toyon, yerba-santa, birchleaf mountain-mahogany (*Cercocarpa betuloides*), buckeye, silk-tassel (*Garrya* spp.), fremontia (*Fremontia californicum*), and chaparral-pea (*Pickeringia montana*).

Chamise-redshank chaparral is characterized by a dense monolayer dominated by chamise and redshank. Associated shrubs are similar to those in mixed chaparral.

Montane chaparral is characterized by evergreeen shrubs with small amounts of broadleaved species. Typical shrubs include mountain whitethorn (*Ceanothus cordulatus*), manzanitas, bitter cherry, huckleberry oak, mountain-mahogany, and toyon.

Urban (U)

Developed areas include all types of urban development for residential, commercial, industrial, and recreational uses. Developed areas also include sites that have structures, paved surfaces, horticultural plantings, and lawns.

Valley Oak Woodland (VOW)

Valley oak woodland is strongly dominated by valley oak, but may also contain blue oak, California sycamore, black walnut, and boxelder. The canopy layer is typically open, forming a savanna structure rather than woodland. Associated understory shrubs include elderberry, poison oak, toyon, and California blackberry. The herb layer is often dominated by leymus grass (*Leymus triticoides*), and includes a variety of annual and perennial grasses and forbs.

Woody Riparian Habitat (WR)

The woody riparian land-cover type includes valley-foothill riparian and desert riparian habitat types (as defined by WHR). Woody riparian types include Great Valley Cottonwood Riparian Forest and Great Valley Mixed Riparian Forest, and are dominated by trees and shrubs such as Fremont's cottonwood (*Populus fremontii* ssp. *fremontii*), valley oak, sycamore (*Platanus racemosa*), box elder (*Acer negundo*), willows, blackberries (*Rubus* spp.), buttonbush (*Cephalanthus occidentalis*), and California grape (*Vitis californica*).

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Table A-1. Crosswalk between Land Cover Types in PG&E Land Cover Classification and in Data Source Coverages

PG&E Land Cover Type	DFG Land Cover Type(s)[1]	CDF Land Cover Type(s)[2]	GAP Land Cover Type(s)[3]
Natural Vegetation Cover Types			
Blue oak woodland	–	Blue oak woodland	Blue oak woodland
Blue oak/foothill pine	–	Blue oak/foothill pine	Blue oak-foothill pine
			Jeffery pine
Coastal oak woodland	–	Coastal oak woodland	Coastal oak woodland
Conifer	–	Conifer	Closed-cone pine-cypress
			Douglas-fir
			Lodgepole pine
			Ponderosa pine
			Red fir
			Sierran mixed conifer
			White fir
Grassland	Grassland	Grass	Annual grassland
			Pasture
			Perennial grassland
Montane hardwood	–	Montane hardwood	Montane hardwood-conifer
			Montane hardwood
			Montane riparian
Open water	Open Water	Open water	Lacustrine
			Riverine
Permanent freshwater wetland	Permanently flooded palustrine emergent	–	Freshwater emergent wetland
			Wet meadow

Table A-1. Continued

PG&E Land Cover Type	DFG Land Cover Type(s)[1]	CDF Land Cover Type(s)[2]	GAP Land Cover Type(s)[3]
Seasonal wetland	Seasonally flooded estuarine emergent	–	–
Upland scrub	–	–	Alpine-dwarf shrub
			Alkali desert scrub
			Bitterbrush
			Chamise-redshank chaparral
			Coastal scrub
			Desert scrub
			Desert succulent scrub
			Desert wash
			Low sage
			Mixed chaparral
			Montane chaparral
			Sage brush
Valley oak woodland	–	Valley oak woodland	Valley oak woodland
Woody riparian habitat	Riparian woody	–	Aspen
			Desert riparian
			Valley foothill riparian

Table A-1. Continued

PG&E Land Cover Type	DFG Land Cover Type(s)[1]	CDF Land Cover Type(s)[2]	GAP Land Cover Type(s)[3]
Developed & Agricultural Cover Types			
Agricultural fields	Flooded agriculture	–	Cropland
	Seasonally flooded agriculture		Dryland grain crops
	Non-flooded agriculture		Deciduous orchard
	Orchard/vineyard		Evergreen orchard
			Irrigated grain crops
			Irrigated row and field crops
			Irrigated hayfield
			Orchard and vineyard
			Rice
			Vineyard
Other developed and disturbed land	Other	–	Barren
Urban	Other	Urban	Urban

Notes:

[1] The California Wetland and Riparian GIS coverage used this classification.

[2] The California Hardwood Rangeland Vegetation coverage used this classification.

[3] The California GAP coverage used this classification.

Appendix B

Species Selection Process

Table B-1. Analysis of Potential Covered Wildlife Species for PG&E's San Joaquin Valley Habitat Conservation Plan

Common and Scientific Name	Legal Status[a]		Listing Potential[b]	Occurrence in Plan Area[c]	Sufficient Information[d]	Potential to be Affected[e]	Proposed for Coverage[f]
	Federal	State					
Conservancy fairy shrimp *Branchinecta conservatio*	E	–	+	-	+	-	-
Vernal pool fairy shrimp *Branchinecta lynchi*	T	–	+	+	+	+	+
Longhorn fairy shrimp *Branchinecta longiantenna*	E	–	+	-	+	-	-
Midvalley fairy shrimp *Branchinecta mesovallensis*	P	–	+	+	+	+	+
Vernal pool tadpole shrimp *Lepidurus packardi*	E	–	+	+	+	+	+
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T	–	+	+	+	+	+
San Joaquin dune beetle *Coelus gracilis*	SC	–	-	-	-	-	-
Morrison's blister beetle *Lytta morrisoni*	SC	–	-	+	-	+	-
Hopping's blister beetle Lytta hoppingi	SC	–	-	+	-	+	-
Moestan blister beetle Lytta moesta	SC	–	-	+	-	+	-
Molestan blister beetle Lytta molesta	SC	–	-	+	-	+	-
Bohart's blue Philotiella speciosa bohartorum	SC	–	-	-	+	-	-
Kern shoulderband *Helminthoglypta callistoderma*	SC	–	-	-	+	-	-

Common and Scientific Name	Legal Status[a]		Listing Potential[b]	Occurrence in Plan Area[c]	Sufficient Information[d]	Potential to be Affected[e]	Proposed for Coverage[f]
	Federal	State					
California tiger salamander *Ambystoma californiense (A. tigrinum c.)*	C	SSC	+	+	+	+	+
Tehachapi slender salamander *Batrachoseps stebbinsi*	SC	T	+	-	+	-	-
Kern Canyon slender salamander *Batrachoseps simatus*	SC	T	+	-	+	-	-
Limestone salamander *Hydromantes brunus*	SC	T	+	+	+	+	+
Yellow-blotched salamander *Ensatina eschscholtzii croceater*	SC	SSC	-	-	+	-	-
Foothill yellow-legged frog *Rana boylii*	SC	SSC	-	+	+	+	-
California red-legged frog *Rana aurora draytoni*	T	SSC	+	+	+	+	+
Western spadefoot toad *Scaphiopus hammondii*	SC	SSC	-	+	+	+	-
Silvery legless lizard *Anniella pulchra pulchra*	SC	SSC	-	+	-	+	-
Blunt-nosed leopard lizard *Gambelia (Crotaphytus) silus*	E	E	+	+	+	+	+
San Diego horned lizard *Phrynosoma coronatum blainvillii*	SC	SSC	-	-	+	-	-
California horned lizard *Phrynosoma coronatum frontale*	SC	SSC	-	+	+	+	-
Desert tortoise *Gopherus* (*Xerobates*, *Scaptochelys*) *agassizii*	T	T	+	-	+	-	-
Giant garter snake *Thamnophis gigas*	T	T	+	+	+	+	+

Table B-1. Continued

Common and Scientific Name	Legal Status[a]		Listing Potential[b]	Occurrence in Plan Area[c]	Sufficient Information[d]	Potential to be Affected[e]	Proposed for Coverage[f]
	Federal	State					
San Joaquin whipsnake (coachwhip) *Masticophis flagellum ruddocki*	SC	SSC	-	+	-	+	-
Northwestern pond turtle *Clemmys marmorata marmorata*	SC	SSC	-	+	+	+	-
Southwestern pond turtle *Clemmys marmorata pallida*	SC	SSC	-	-	+	+	-
Mountain plover *Charadrius montanus*	PT	SSC	+	+	+	-	-
Western snowy plover (inland population) *Charadrius alexandrinus nivosus*	SC	SSC	-	+	+	+	-
California black rail *Laterallus jamaicensis coturniculus*	SC	T	+	+	+	+	+
White-faced ibis *Plegadis chihi* (rookery site)	SC	SSC	-	+	+	-	-
Long-billed curlew *Numenius americanus*	–	SSC	-	+	+	-	-
Double-crested cormorant *Phalacrocorax auritus*	–	SSC	-	+	+	-	-
Greater sandhill crane *Grus canadensis tabida*	–	T	+	+	+	+	+
Aleutian Canada goose *Branta canadensis leucopareia*	P	–	-	+	+	-	-
Bald eagle *Haliaeetus leucocephalus*	T	E	+	+	+	+	+
Golden eagle *Aquila chrysaetos*	PR	SSC,FP	-	+	+	+	+
Osprey *Pandion haliaetus*	–	SSC	-	-	+	-	-

Table B-1. Continued

Common and Scientific Name	Legal Status[a]		Listing Potential[b]	Occurrence in Plan Area[c]	Sufficient Information[d]	Potential to be Affected[e]	Proposed for Coverage[f]
	Federal	State					
California condor *Gymnogyps californianus*	E	E	+	+	+	-	-
Swainson's hawk *Buteo swainsoni*	–	T	+	+	+	+	+
Sharp-shinned hawk *Accipiter striatus*	–	SSC	-	+	+	+	-
Cooper's hawk *Accipiter cooperii*	–	SSC	-	+	+	+	-
Northern goshawk *Accipiter gentilis*	SC	SSC	-	-	+	-	-
Ferruginous hawk *Buteo regalis*	SC	SSC	-	+	+	-	-
American peregrine falcon *Falco peregrinus anatum*	D	E	+	+	+	-	-
Prairie falcon *Falco mexicanus*	–	SSC	-	+	+	-	-
Merlin *Falco columbarius*	–	SSC	-	+	+	-	-
Northern harrier *Circus cyaneus*	–	SSC	-	+	+	+	-
White-tailed kite *Elanus caeruleus*	–	FP	-	+	+	+	+
California spotted owl *Strix occidentalis occidentalis*	SC	SSC	+	-	+	-	-
Long-eared owl *Asio otus*	–	SSC	-	+	+	+	-
Short-eared owl *Asio flammeus*	–	SSC	-	+	+	-	-

Table B-1. Continued

Common and Scientific Name	Legal Status[a]		Listing Potential[b]	Occurrence in Plan Area[c]	Sufficient Information[d]	Potential to be Affected[e]	Proposed for Coverage[f]
	Federal	State					
Western burrowing owl *Athene cunicularia hypugea*	SC	SSC	+	+	+	+	+
Black swift *Cypseloides niger* (nesting)	–	SSC	-	-	+	-	-
Bank swallow *Riparia riparia*	–	T	+	+	+	+	+
California horned lark *Eremophila alpestris actia*	–	SSC	-	+	+	+	-
Yellow warbler *Dendroica petechia brewsteri* (nesting)	–	SSC	-	-	+	-	-
Yellow-breasted chat *Icteria virens*	–	SSC	-	-	+	-	-
San Joaquin Le Conte's thrasher *Toxostoma lecontei macmillanorum*	–	SSC	-	+	+	+	-
Loggerhead shrike *Lanius ludovicianus*	–	SSC	-	+	+	+	-
Tricolored blackbird *Agelaius tricolor*	SC	SSC	+	+	+	+	+
Southwestern willow flycatcher *Empidonax traillii extimus*	E	E	+	+	+	-	-
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	C	E	+	+	+	-	-
Black-chinned sparrow *Spizella artogularis*	–	SSC*	-	-	-	-	-
Grasshopper sparrow *Ammodramus savannarum*	–	SSC*	-	-	-	-	-
Yellow-headed blackbird *Xanthocephalus xanthocephalus*	–	SSC*	-	+	+	+	-

Table B-1. Continued

Common and Scientific Name	Legal Status[a]		Listing Potential[b]	Occurrence in Plan Area[c]	Sufficient Information[d]	Potential to be Affected[e]	Proposed for Coverage[f]
	Federal	State					
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	E	E	+	+	+	+	+
Giant kangaroo rat *Dipodomys ingens*	E	E	+	+	+	+	+
Short-nosed kangaroo rat *Dipodomys nitratoides brevinasus*	SC	SSC	-	+	+	+	-
Fresno kangaroo rat *Dipodomys nitratoides exilis*	E	E	+	+	-	-	-
Merced kangaroo rat *Dipodomys heermanni dixoni*	SC	–	-	+	-	+	-
Tulare grasshopper mouse *Onychomys torridus tularensis*	SC	SSC	-	+	+	+	-
San Joaquin pocket mouse *Perognathus inornatu*	SC	–	-	+	+	+	-
Buena Vista Lake shrew *Sorex ornatus relictu*	E	SSC	+	+	+	+	+
Mohave ground squirrel *Spermophilus mohavensis*	SC	T	+	-	+	-	-
San Joaquin (Nelson's) antelope squirrel *Ammospermophilus nelsoni*	SC	T	+	+	+	+	+
Riparian (San Joaquin Valley) woodrat *Neotoma fuscipes riparia*	E	SSC	+	+	+	+	+
Riparian brush rabbit *Sylvilagus bachmani riparius*	E	E	+	+	+	+	+
San Joaquin kit fox *Vulpes macrotis mutica*	E	T	+	+	+	+	+
Ringtail *Basariscus astutas*	–	FP	-	+	+	+	-

Common and Scientific Name	Legal Status[a]		Listing Potential[b]	Occurrence in Plan Area[c]	Sufficient Information[d]	Potential to be Affected[e]	Proposed for Coverage[f]
	Federal	State					
Pacific fisher *Martes pennanti pacifica*	SC	SSC	+	+	+	-	-
Pallid bat *Antrozous pallidus*	–	SSC	-	+	-	-	-
Greater western (California) mastiff-bat *Eumops perotis californicus*	SC	SSC	-	+	-	-	-
Fringed myotis *Myotis thysanodes*	SC	–	-	-	-	-	-
Small-footed myotis *Myotis ciliolabrum*	SC	–	-	-	-	-	-
Long-legged myotis *Myotis volans*	SC	–	-	-	-	-	-
Long-eared myotis *Myotis evotis*	SC	–	-	-	-	-	-
Yuma myotis *Myotis yumanensis*	SC	–	-	+	-	-	-
Spotted bat *Euderma maculatum*	SC	SSC	-	+	-	-	-
Pacific western (Townsend's) big-eared bat *Plecotus townsendii townsendii*	SC	SSC	-	+	+	-	-

Notes:

[a] Status Explanations:

Federal

E = listed as endangered under the federal Endangered Species Act (ESA).

T = listed as threatened under the federal ESA.

PE = proposed for federal listing as endangered under the federal ESA.

PT = proposed for federal listing as threatened under the federal ESA.

C = species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded.

P = petitioned for listing as threatened or endangered under the federal Endangered Species Act.

SC = species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.

– = no listing.

State

E = listed as endangered under the California ESA.

T = listed as threatened under the California ESA.

FP = fully protected under the California Fish and Game Code.

SSC = species of special concern in California.

– = no listing.

[b] Listing Potential:

(–) Species is not currently state- or federally listed as threatened or endangered, and has low potential of being listed over the next 5–10 years.

(+) Species is currently state- or federally listed as threatened or endangered, or has the potential to be listed as state- or federally threated or endangered over the next 5–10 years.

[c] Occurrence in Plan Area

(–) Species has not been documented in the plan area and/or the plan area lacks suitable habitat or is outside species range; species is unlikely to occur within plan area.

(+) Species has been documented in the plan area and/or suitable habitat is present; species may occur within plan area.

[d] Potential to be Affected

(–) Species is unlikely to be affected by covered activities.

(+) Species is likely to be affected by covered activities; covered activities may result in take.

[e] Sufficient Information

(–) Sufficient scientific information and data are not available to address species' biological requirements, conservation needs, and compensation options.

(+) Sufficient scientific information and data are available to address species' biological requirements, conservation needs, and compensation options.

[f] Proposed for Coverage

(–) Species not proposed for coverage

(+) Species proposed for coverage

Species are proposed for coverage if all the following criteria are met:

- the species is federally listed or has the potential to be listed in the next 5–10 years,
- the species has a moderate to high likelihood of occurring within the plan area,
- the species is likely to be affected by project activities, and sufficient information is available.
- sufficient information is available.

Table B-2. County Distribution for Wildlife Species Covered under PG&E's San Joaquin Valley Habitat Conservation Plan [a]

Common and Scientific Name	Legal Status[b]		County								
	Federal	State	San Joaquin	Stanislaus	Mariposa	Merced	Madera	Fresno	Tulare	Kings	Kern
Vernal pool fairy shrimp *Branchinecta lynchi*	T	–	X	X	–	X	X	X	X	X	–
Midvalley fairy shrimp *Branchinecta mesovallensis*	P	–	X	–	–	X	X	X	–	–	–
Vernal pool tadpole shrimp *Lepidurus packardi*	E	–	–	X	–	X	X	X	X	X	–
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T	–	X	X	X	X	X	X	X	X	X
California tiger salamander *Ambystoma californiense (A. tigrinum c.)*	C	SSC	X	X	X	X	X	X	X	X	X
Limestone salamander *Hydromantes brunus*	SC	T	–	–	X	–	–	–	–	–	–
California red-legged frog *Rana aurora draytoni*	T	SSC	X	X	–	X	–	X	–	–	X
Blunt-nosed leopard lizard *Gambelia (Crotaphytus) silus*	E	E	–	–	–	X	X	X	X	X	X
Giant garter snake *Thamnophis gigas*	T	T	X	X	–	X	X	X	–	–	–
Swainson's hawk *Buteo swainsoni*	–	T	X	X	–	X	X	X	X	X	X
White-tailed kite *Elanus caeruleus*	–	FP	X	X	–	X	X	X	X	X	X
Golden Eagle *Aquila chrysaetos*	–	SSC, FP	X	X	X	X	X	X	X	X	X
Bald Eagle *Haliaeetus Leucocephalus*	FT, FPD	E, FP	X	X	X	X	X	X	X	X	X

Table B-2. Continued

Common and Scientific Name	Legal Status[b]		County								
	Federal	State	San Joaquin	Stanislaus	Mariposa	Merced	Madera	Fresno	Tulare	Kings	Kern
California black rail *Lateralis jamaicensis coturniculus*	SC	T	X	–	–	–	–	–	–	–	–
Greater Sandhill Crane *Grus canadenis tabida*	–	ST, FP	X	X	–	X	X	X	X	X	X
Western burrowing owl *Athene cunicularia hypugea*	SC	SSC	X	X	–	X	X	X	X	X	X
Bank swallow *Riparia riparia*	--	T	X	–	–	–	–	–	–	–	–
Tricolored blackbird *Agelaius tricolor*	SC	SSC	X	X	–	X	X	X	X	X	X
Buena Vista Lake shrew *Sorex ornatus relictus*	E	SSC	–	–	–	–	–	–	X	–	X
Riparian brush rabbit *Sylvilagus bachmani riparius*	E	E	X	X	–	–	–	–	–	–	–
Riparian (San Joaquin Valley) woodrat *Neotoma fuscipes riparia*	E	SSC	X	X	–	–	–	–	–	–	–
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	E	E	–	–	–	–	–	–	X	X	X
Giant kangaroo rat *Dipodomys ingens*	E	E	–	–	–	–	–	X	–	X	X
San Joaquin (Nelson's) antelope squirrel *Ammospermophilus nelsoni*	SC	T	–	–	–	X	X	X	X	X	X
San Joaquin kit fox *Vulpes macrotis mutica*	E	T	X	X	–	X	X	X	X	X	X

Notes:

[a] Sources of information for county distribution include the following:

California Department of Fish and Games Natural Diversity Database (CNDDB 2001);

Jennings and Hayes 1994 (Amphibian and Reptile Species of Special Concern in California);

Jennings 1996 (Sierra Nevada Ecosystem Project: Status of Amphibians);

USFWS 1998. Recovery Plan for Upland Species of the San Joaquin Valley, California;

C. H. Erickson and B. Denton. 1999. Fairy Shrimps of California's Puddles, Pools, and Playas. Mad River Press, Inc. Eureka, California. 196 pp.

Partners in Flight.

[b] Status explanations:

Federal

E = listed as endangered under the federal Endangered Species Act.

T = listed as threatened under the federal Endangered Species Act.

C = species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list.

SC = species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.

FPD = federally proposed for delisting

P = petitioned for listing as threatened or endangered under the federal Endangered Species Act.

– = no status.

State

E = listed as endangered under the California Endangered Species Act.

T = listed as threatened under the California Endangered Species Act.

FP = fully protected under the California Fish and Game Code.

SSC = species of special concern in California.

– = no status.

Table B-3. Analysis of Potential Covered Plant Species for PG&E's San Joaquin Valley Habitat Conservation Plan

Common and Scientific Name	Legal Status[a] Federal/State/CNPS	Listing Potential[b]	Occurrence in the Plan Area[c]	Potential to be Affected[d]	Sufficient Information[e]	Proposed for Coverage[f]
Yosemite onion *Allium yosemitense*	–/R/1B	+	+	–	+	–
Large-flowered fiddleneck *Amsinckia grandiflora*	E/E/1B	+	+	+	+	+
Ferris's milk-vetch *Astragalus tener* var. *ferrisiae*	–/–/1B	+	–	–	+	–
Alkali milk-vetch *Astragalus tener* var. *tener*	–/–/1B	–	+	–	+	–
Lesser saltscale *Atriplex minuscula*	–/–/1B	+	+	+	+	+
Bakersfield smallscale *Atriplex tularensis*	SC/E/1B	+	+	+	+	+
Big tarplant *Blepharizonia plumosa* ssp. *Plumosa*	–/–/1B	+	+	+		+
Kaweah brodiaea *Brodiaea insignis*	T/–/1B	+	+	–	+	–
Mariposa pussypaws *Calyptridium pulchellum*	T/–/1B	+	+	+	+	+
San Benito evening-primrose *Camissonia benitensis*	T/–/1B	+	+	–	+	–
Sharsmith's harebell *Campanula sharsmithiae*	–/–/1B	–	+	–	+	–
Tree-anemone *Carpenteria californica*	SC/T/1B	+	+	+	+	+
Succulent owl's-clover *Castilleja campestris* ssp. *succulenta*	T/E/1B	+	+	+	+	+
California jewelflower *Caulanthus californicus*	E/E/1B	+	+	+	+	+
Hoover's spurge *Chamaesyce hooveri*	T/–/1B	+	+	+	+	+
San Benito spineflower *Chorizanthe biloba* var. *immemora*	–/–/1B	–	–	–	+	–

Table B-3. Continued

Common and Scientific Name	Legal Status[a] Federal/State/CNPS	Listing Potential[b]	Occurrence in the Plan Area[c]	Potential to be Affected[d]	Sufficient Information[e]	Proposed for Coverage[f]
Slough thistle *Cirsium crassicaule*	SC/–/1B	+	+	+	+	+
Mariposa clarkia *Clarkia biloba* ssp. *australis*	--/--/1B	-	+	+	+	+
Merced clarkia Clarkia lingulata	SC/E/1B	+	+	+	+	+
Springville clarkia *Clarkia springvillensis*	T/E/1B	+	+	+	+	+
Vasek's clarkia *Clarkia tembloriensis* ssp. C*alientensis*	SC/–/1B	+	+	+	+	+
Kern Canyon clarkia *Clarkia xantiana* ssp. *Parviflora*	–/–/1B	–	–	–	+	–
Hispid bird's-beak *Cordylanthus mollis* ssp. *Hispidus*	SC/–/1B	+	+	+	+	+
Palmate-bracted bird's-beak *Cordylanthus palmatus*	E/E/1B	+	+	+	+	+
Mt. Hamilton coreopsis *Coreopsis hamiltonii*	SC/–/1B	–	+	–	+	–
Hospital Canyon larkspur *Delphinium californicum* ssp. *Interius*	SC/–/1B	–	+	–	+	–
Kern mallow *Eremalche parryi* ssp. *Kernensis*	E/–/1B	+	+	+	+	+
Hoover's Eriastrum *Eriastrum hooveri*	T/–/4	+	+	+	+	+
Keil's daisy *Erigeron inornatus var. keilii*	–/–/1B	–	–	–	+	–
Kings River buckwheat *Eriogonum nudum* var. *regirivum*	–/–/1B	–	+	–	+	–
Congdon's woolly sunflower *Eriophyllum congdonii*	–/R/1B	+	+	+	+	+
Delta button-celery *Eryngium racemosum*	SC/E/1B	+	+	+	+	+

Table B-3. Continued

Common and Scientific Name	Legal Status[a] Federal/State/CNPS	Listing Potential[b]	Occurrence in the Plan Area[c]	Potential to be Affected[d]	Sufficient Information[e]	Proposed for Coverage[f]
Spiny-sepaled button-celery *Eryngium spinosepalum*	SC/–/1B	–	+	+	+	–
Tejon poppy *Eschscholzia lemmonii* ssp. *Kernensis*	–/–/1B	+	+	–	+	–
Diamond-petalled poppy *Eschscholzia rhombipetala*	–/–/1B	+	+	–	+	–
Talus fritillary *Fritillaria falcate*	SC/–/1B	–	+	–	+	–
Striped adobe-lily *Fritillaria striata*	SC/T/1B	+	+	+	+	+
Onyx Peak bedstraw *Galium angustifolium* ssp. *Onycense*	–/–/1B	–	+	–	–	–
Bogg's Lake hedge-hyssop *Gratiola heterosepala*	–/E/1B	+	+	+	+	+
Napa western flax *Hesperolinon serpentinum*	–/–/1B	–	+	–	+	–
Coulter's goldfields *Lasthenia glabrata* ssp. *coulteri*	SC/–/1B	–	–	–	+	–
Rayless layia *Layia discoidea*	SC/–/1B	+	+	–	+	–
Pale-yellow layia *Layia heterotricha*	SC/–/1B	+	+	+	+	+
Comanche Point layia *Layia leucopappa*	SC/–/1B	+	+	+	+	+
Legenere *Legenere limosa*	SC/–/1B	+	+	+	+	+
Panoche pepper-grass *Lepidium jaredii* ssp. *album*	SC/–/1B	–	+	–	+	+
Jared's pepper-grass *Lepidium jaredii* ssp. *jaredii*	SC/–/1B	+	+	+	+	-
Congdon's lewisia *Lewisia congdonii*	–/R/1B	+	+	+	+	+

Table B-3. Continued

Common and Scientific Name	Legal Status[a] Federal/State/CNPS	Listing Potential[b]	Occurrence in the Plan Area[c]	Potential to be Affected[d]	Sufficient Information[e]	Proposed for Coverage[f]
Mason's lilaeopsis *Lilaeopsis masonii*	SC/R/1B	+	+	+	+	+
Mt. Hamilton lomatium *Lomatium observatorium*	–/–/1B	–	+	–	+	–
Red-flowered lotus *Lotus rubriflorus*	SC/–/1B	+	+	–	+	–
Mariposa lupine *Lupinuscitrinus* var. *deflexus*	SC/T/1B	+	+	+	+	+
Showy madia *Madia radiata*	–/–/1B	+	+	+	+	+
Hall's bush mallow *Malacothamnus hallii*	–/–/1B	+	+	+	+	+
Kaweah monkeyflower *Mimulus norrisii*	–/–/1B	–	+	–	+	–
Kelso Creek monkeyflower *Mimulus shevockii*	SC/–/1B	–	+	–	+	–
San Joaquin woollythreads *Monolopia (Lembertia) congdonii*	E/–/1B	+	+	+	+	+
Pincushion navarretia *Navarretia myersii* (a.k.a. *N.m.*ssp. *m.*)	–/–/1B	+	+	+	+	+
Prostrate navarettia Navarretia prostrata	–/–/1B	+	+	–	–	–
Piute Mountains navarretia *Navarretia setiloba*	SC/–/1B	+	+	–	+	–
Colusa grass *Neostapfia colusana*	T/E/1B	+	+	+	+	+
Bakersfield cactus *Opuntia basilaris* var. *treleasei*	E/E/1B	+	+	+	+	+
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	T/E/1B	+	+	+	+	+
Hairy Orcutt grass *Orcuttia pilosa*	E/E/1B	+	+	+	+	+

Common and Scientific Name	Legal Status[a] Federal/State/CNPS	Listing Potential[b]	Occurrence in the Plan Area[c]	Potential to be Affected[d]	Sufficient Information[e]	Proposed for Coverage[f]
Mount Diablo phacelia *Phacelia phacelioides*	SC/–/1B	+	+	–	+	–
Hartweg's golden sunburst *Pseudobahia bahiifolia*	E/E/1B	+	+	+	+	+
San Joaquin adobe sunburst *Pseudobahia peirsonii*	T/E/1B	+	+	+	+	+
Keck's checkerbloom *Sidalcea keckii*	E/–/1B	+	+	+	+	+
Arburua Ranch jewel-flower *Streptanthus insignis* ssp. *lyonii*	–/–/1B	–	+	–	+	–
Oil neststraw Stylocline citroleum	–/–/1B	+	+	+	+	+
Mason neststraw *Stylocline masonii*	–/–/1B	+	+	–	+	–
Greene's tuctoria *Tuctoria greenei*	E/R/1B	+	+	+	+	+
King's gold Twisselmania californica	–/–/1B	+	+	+	+	+

Notes:

[a] Status Explanations:

Federal

E = listed as endangered under the federal Endangered Species Act (ESA).

T = listed as threatened under the federal ESA.

SC = species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.

– = no listing.

State

E = listed as endangered under the California ESA.

R = listed as rare under the California Native Plant Protection Act. This category is no longer used for newly listed plants, but some plants previously listed as rare retain the designation.

– = no listing.

CNPS = California Native Plant Society
1B = List 1B species: rare, threatened, or endangered in California and elsewhere.
4 = List 4 species: plants of limited distribution.

[b] Listing Potential

(–) Species is not currently state- or federally listed as threatened or endangered and has low potential of being listed over the next 5–10 years.

(+) Species is currently federally listed as threatened or endangered, or has the potential to be federally listed as threatened or endangered over the next 5–10 years.

[c] Occurrence in Plan Area

(–) Plan area lacking suitable habitat or is outside species range; species unlikely to occur within plan area.

(+) Suitable habitat is present within the plan area; species may occur within plan area.

[d] Potential to be Affected

(–) Unlikely to be affected by covered activities

(+) Likely to be affected by covered activities

[e] Sufficient Information

Sufficient scientific information and data are available to address species' biological requirements, conservation needs, and compensation options.

[f] Proposed for Coverage

Species are proposed for coverage if the following criteria are met:

- the species is federally listed or has the potential to be listed in the next 5 to 10 years,
- the species has a moderate to high likelihood of occurring within the plan area,
- the species is likely to be affected by project activities, and
- sufficient information is available.

(–) Species not proposed for coverage

(+) Species proposed for coverage

Table B-4. Covered Plants By Ecological Distribution and Counties within the Plan area Boundary [a]

	Legal Status[b]			Ecoregional Distribution within the Plan Area			County Distribution within the Plan Area								
Common and Scientific Name	Federal	State	CNPS	East foothills	Valley floor	West foothills	San Joaquin	Stanislaus	Mariposa	Merced	Madera	Fresno	Tulare	Kings	Kern
Large-flowered fiddleneck *Amsinckia grandiflora*	E	E	1B	X			X								
Lesser saltscale Atriplex *minuscule*	–	–	1B		X					X*	X	X	X*		X
Bakersfield smallscale *Atriplex tularensis*	SC	E	1B		X										X
Big tarplant *Blepharizonia plumose*	–	–	1B	X			X	X*							
Mariposa pussypaws *Calyptridium pulchellum*	T	–	1B			X			X		X	X			
Tree-anemone *Carpenteria californica*	–	T	1B			X					X	X			
Succulent owl's-clover *Castilleja campestris* ssp. *Succulenta*	T	E	1B		X	X	X	X	X	X	X	X			
California jewelflower *Caulanthus californicus*	–	E	1B	X	X	X?						X	X*	X*	X
Hoover's spurge *Chamaesyce hooveri*	T	–	1B		X			X		X			X		
Slough thistle *Cirsium crassicaule*	–	–	1B		X		X							X	X
Mariposa clarkia *Clarkia biloba* ssp. *australis*	–	–	1B			X			X						
Merced clarkia *Clarkia lingulata*	SC	E	1B	X					X						
Springville clarkia *Clarkia springvillensis*	T	E	1B			X							X		

Table B-4. Continued

Common and Scientific Name	Legal Status[b]			Ecoregional Distribution within the Plan Area			County Distribution within the Plan Area								
	Federal	State	CNPS	East foothills	Valley floor	West foothills	San Joaquin	Stanislaus	Mariposa	Merced	Madera	Fresno	Tulare	Kings	Kern
Vasek's clarkia *Clarkia tembloriensis* ssp. *calientensis*	–	–	1B			X									X
Hispid bird's-beak *Cordylanthus mollis* ssp. *Hispidus*	–	–	1B		X					X					X
Palmate-bracted bird's-beak *Cordylanthus palmatus*	E	E	1B		X		X*				X	X			
Kern mallow *Eremalche parryi* ssp. *Kernensis*	E	–	1B	X	X										X
Hoover's eriastrum *Eriastrum hooveri*	T	–	4		X	X						X	X	X	X
Congdon's woolly sunflower *Eriophyllum congdonii*	–	R	1B			X			X						
Delta button-celery *Eryngium racemosum*	–	E	1B		X		X*	X		X					
Striped adobe-lily *Fritillaria striata*	–	T	1B			X							X		X
Bogg's Lake hedge-hyssop *Gratiola heterosepala*	–	E	1B	X	X	X	X			X	X	X			
Pale-yellow layia *Layia heterotricha*	–	–	1B	X								X		X*	X*
Comanche Point layia *Layia leucopappa*	–	–	1B		X										X
Legenere *Legenere limosa*	–	–	1B		X		X	X*							
Panoche pepper-grass *Lepidium jaredii* ssp. *album*	–	–	1B	X								X			

Common and Scientific Name	Legal Status[b]			Ecoregional Distribution within the Plan Area			County Distribution within the Plan Area								
	Federal	State	CNPS	East foothills	Valley floor	West foothills	San Joaquin	Stanislaus	Mariposa	Merced	Madera	Fresno	Tulare	Kings	Kern
Congdon's lewisia *Lewisia congdonii*	–	R	1B			X			X			X			
Mason's lilaeopsis *Lilaeopsis masonii*	–	R	1B		X		X								
Mariposa lupine *Lupinus citrinus* var. *deflexus*	–	T	1B			X			X						
Showy madia Madia radiata	–	–	1B			X	X	X				X		X	X
Hall's bush mallow *Malacothamnus hallii*	–	–	1B	X				X		X					
San Joaquin woollythreads *Monolopia (Lembertia) congdonii*	E	–	1B	X	X							X		X	X
Pincushion navarretia *Navarretia myersii* (a.k.a. *N.m.*ssp. *m.*)\	–	–	1B		X					X					
Colusa grass *Neostapfia colusana*	T	E	1B		X			X		X					
Bakersfield cactus *Opuntia basilaris* var. *treleasei*	E	E	1B		X										X
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	T	E	1B		X	X		X*		X	X	X	X		
Hairy Orcutt grass *Orcuttia pilosa*	E	E	1B		X			X		X	X				
Hartweg's golden sunburst *Pseudobahia bahiifolia*	E	E	1B		X			X		X	X	X			

Common and Scientific Name	Legal Status[b]			Ecoregional Distribution within the Plan Area			County Distribution within the Plan Area								
	Federal	State	CNPS	East foothills	Valley floor	West foothills	San Joaquin	Stanislaus	Mariposa	Merced	Madera	Fresno	Tulare	Kings	Kern
San Joaquin adobe sunburst *Pseudobahia peirsonii*	T	E	1B		X	X						X	X		X
Keck's checkerbloom *Sidalcea keckii*	E	–	1B			X						X	X		
Oil neststraw *Stylocline citroleum*	–	–	1B	X											X
Greene's tuctoria *Tuctoria greenei*	E	R	1B		X	X	X*	X*		X	X*	X*	X*		
King's gold Twisselmania californica	–	–	1B		X									X	

Notes:

[a] Sources of information for county distribution include the following:
California Department of Fish and Games Natural Diversity Database (CNDDB 2002);
USFWS 1998. Recovery Plan for Upland Species of the San Joaquin Valley, California;
CNPS 2001. Inventory of rare and endangered plants of California; and
CalFlora: Information on California plants for education, research and conservation. [web application]. 2002. Berkeley, California: The CalFlora Database [a non-profit organization]. Available: http://www.calflora.org/

[b] Status explanations:
X* = Extirpated
(X) = May no longer be extant

Federal
E = listed as endangered under the federal Endangered Species Act.
T = listed as threatened under the federal Endangered Species Act.
– = no status.

State

E = listed as endangered under the California Endangered Species Act.

T = listed as threatened under the California Endangered Species Act.

R = listed as rare under the California Native Plant Protection Act. This category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation

– = no status.

CNPS = California Native Plant Society

1A = List 1A species: plants presumed extinct in California

1B = List 1B species: rare, threatened, or endangered in California and elsewhere

4 = List 4 species: plants of limited distribution.

Appendix C

Covered Species Descriptions

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Covered Animal Species Descriptions

Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)

Conservation Considerations

Status

Federal: Threatened
State: None
Other: None

Distribution

Vernal pool fairy shrimp (VPFS) is found from Shasta County in the north throughout the Central Valley and west to the central Coast Ranges. Additional populations in the Agate Desert region of Oregon near Medford have also been reported. Disjunct populations occur in San Luis Obispo, Santa Barbara, and Riverside Counties. Most known locations are in the Sacramento and San Joaquin Valleys and along the eastern margin of the central Coast Ranges (Eng et al. 1990).

Population Trend

Approximately two-thirds of the grasslands that once supported vernal pools in the Central Valley had been destroyed by 1973, with an associated loss of nearly 90% of vernal pool habitat. In subsequent years, a substantial amount of the remaining habitat for vernal pool crustaceans has been destroyed, with estimates of habitat loss ranging from 2% to 3% per year. Current data indicate vernal pool grasslands are being lost in the southern San Joaquin Valley at a rate of approximately 1% per year. (Holland 1978.)

Threats

Principle threats that face VPFS are the conversion of vernal pool habitat to agricultural uses and urban development and stochastic extinction due to the small and isolated nature of remaining populations (59 Federal Register [FR] 180 48136–48153). Because of the limited and disjunct distribution of vernal pools, any reduction in habitat quantity could adversely affect VPFS populations. Isolated populations are more susceptible to inbreeding depression, which can result in local extinction or reduced fitness (U.S. Fish and Wildlife Service 1996). Habitat fragmentation can isolate and reduce population size, resulting in a process of progressive population extinction. Small or isolated populations are more susceptible to extinction from random environmental disturbance. Recolonization opportunities are also diminished when physical barriers, such as development or lack of vernal pool habitat, isolate populations from one another.

Activities that change the ponding duration, alkalinity, and pH of vernal pools beyond the tolerance range of VPFS can adversely affect this species. Such activities include damaging or puncturing the hardpan (the water-restrictive layer at vernal pool bottom); filling in the vernal pool; introducing nonnative, undesirable plants; and the destruction or degradation of upland habitats that contribute runoff to vernal pools (U.S. Fish and Wildlife Service 1996; Eriksen and Belk 1999). The introduction of fish into vernal pool habitats, either by intentional stocking or through natural or agricultural flooding, also threatens the survival of VPFS. Opportunistic fish such as mosquito fish (*Gambusia affinis*), which was originally introduced to control mosquito populations, consume fairy shrimp and can eliminate populations (U.S. Fish and Wildlife Service 1996).

Conservation and Management

The U.S. Fish and Wildlife Service reduced the listing status of VPFS from endangered to threatened in the 1994 final ruling (59 FR 180 48136–48153). No critical habitat designation has been made for this species.

Biology

Habitat Requirements

Vernal pool fairy shrimp inhabit rain-filled, ephemeral pools (i.e., vernal pools) that form in depressions, usually in grassland habitats (Eng et al. 1990). Pools must pond long enough for the species to complete its life cycle. Pools occupied by vernal pool fairy shrimp tend to have grass or mud bottoms and clear to tea-colored water and are often in basalt flow depression pools in unplowed grasslands. Water characteristics, such as alkalinity, total dissolved solids, and pH, are some of the most important factors in determining the distribution of fairy shrimp (Eriksen and Belk 1999). VPFS also occur in other wetlands that provide habitat characteristics similar to those of vernal pools; these other

wetlands include alkaline rain-pools, ephemeral drainages, rock outcrop pools, ditches, stream oxbows, stock ponds, vernal swales, and some seasonal wetlands. Occupied habitats range in size from rock outcrop pools as small as 0.83 square meter (1 square yard) to large vernal pools up to 4.5 hectares (11 acres); the potential ponding depth of occupied habitat ranges from 3 to 122 centimeters (1.2 to 48 inches) (U.S. Fish and Wildlife Service 2001).

VPFS and other fairy shrimp have been observed in artificial depressions and drainages where water ponds for a sufficient duration. Examples of such areas include roadside ditches and ruts left behind by off-highway vehicles or other heavy equipment. Soil compaction resulting from construction activity can sometimes create an artificial hardpan, or restrictive layer, that allows water to pond and form suitable habitat for fairy shrimp.

VPFS is not found in riverine, marine, or other permanent waters (59 FR 180 48136–48153).

Reproduction and Demography

Vernal pool fairy shrimp are omnivorous filter feeders that indiscriminately filter particles of the appropriate size from their surroundings. Diet consists of bacteria and plant and animal particles, including suspended unicellular algae and metazoans. (Eriksen and Belk 1999.)

Following insemination by the male, the female fairy shrimp releases eggs from lateral pouches into the ovisac and the eggs are fertilized. Following fertilization, embryonic and cyst development begins. The embryo and the protective shell together are termed the cyst. Cysts are expelled from the brood pouch of the female or are retained by the female until her death. Cysts are capable of withstanding heat, cold, and prolonged desiccation. The cysts survive in the dry pool bottom throughout the summer and fall months and hatch when the vernal pools fill with rainwater. Early stages of VPFS develop rapidly into adults, reaching sexual maturity in as little as 18 days. (Eriksen and Belk 1999.) VPFS populations often disappear early in the season, long before the vernal pools dry up (USDI Fish and Wildlife Service 2001.) At 139 days, this species has the shortest maximum longevity of any Central Valley fairy shrimp, although they generally disappear from pools much sooner (Eriksen and Belk 1999).

Three to six hatches may occur within a season if conditions are suitable. Eriksen and Belk (1999) maintained that the exact environmental cues for hatching are unknown for most species of fairy shrimp. However, it is generally accepted that the cues must include the return of moisture to the cysts' location. In addition, temperature is believed to play a large role. Gallagher (1996) and Helm (1998), cited in Eriksen and Belk (1999), observed vernal pool fairy shrimp to hatch when water temperatures dropped below 50EF (10EC). Maturity was reached in about 18 days when water temperatures rose to at least 68EF (20EC). If water remained at a temperature of 59EF (15EC), the fairy shrimp took 41 days to reach maturity. When an occupied pool fills multiple times in the same or subsequent seasons, some, but not all of the eggs (cysts) may hatch. The egg

bank in the soil may consist of eggs from several years of breeding; fairy shrimp cysts may remain viable for decades and possibly centuries. (Belk 1996; Eriksen and Belk 1999.)

Movement

Consumption of fairy shrimp by predators aids in the dispersal of the species. Enzymes in the predators' digestive system do not break down the membranous layers of the cyst; rather the predators expel the cysts in their excrement, often outside the point of consumption. If conditions at the new location are suitable, these transported cysts may hatch and potentially establish a new population. Cysts may also be transported in mud or dirt that gets stuck to the feet of other animals passing through occupied vernal pool habitat. (Eriksen and Belk 1999.)

Ecological Relationships

A wide variety of animals feed on fairy shrimp: birds, fish, amphibians, other fairy shrimp, dragonfly larvae, backswimmers (*Hemiptera:Notonectidae*), and predaceous diving beetles (*Coleoptera:Dytiscidae*) (Eriksen and Belk 1999). Vernal pool fairy shrimp rarely co-occurs with other fairy shrimp species in the genus *Branchinecta* but often co-occurs in larger pools with California linderiella (*Linderiella occidentalis*) and, on the Santa Rosa Plateau in Riverside County, with *Linderiella santarosae*. Where it is found with other fairy shrimp species, vernal pool fairy shrimp are never the most abundant species (59 FR 180 48136–48153). VPFS has also been observed co-occurring with vernal pool tadpole shrimp.

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Midvalley Fairy Shrimp (*Branchinecta mesovallensis*)

Conservation Considerations

Status

Federal: None; petition for listing pending
State: None
Other: None

Distribution

Midvalley fairy shrimp is endemic to California Central Valley grassland vernal pools from Sacramento to Fresno Counties (Belk and Fugate 2000). Fewer than 30 occurrences of this species are known to date, of which 20 are between Mather Field and Galt in Sacramento County. Other locations include Jepson Prairie, Travis Air Force Base and Vacaville areas in Solano County; San Joaquin County north of Lodi; the Byron Airport in Contra Costa County; Virgina Smith Trust (Haystack Mountain) and Arena Plains National Wildlife Reserve in Merced County; central Madera County; and northern Fresno County (Eriksen and Belk 1999; Belk and Fugate 2000; Rogers in prep.).

Within the plan area, the California Natural Diversity Database (CNDDB) reported several records for Merced County near the proposed University of

California Merced campus (California Natural Diversity Database 2002). A comprehensive survey for this species has not been conducted, and therefore the locations of all extant populations are not known.

Population Trend

Midvalley fairy shrimp are threatened by the same activities as other vernal pool invertebrates. These threats include the conversion of vernal pool habitat to agricultural lands, urban development, and stochastic extinction exacerbated by the small and isolated nature of remaining populations (U.S. Fish and Wildlife Service 1994). Although only recently described, midvalley fairy shrimp has probably declined over its range as a result of agricultural, suburban, and industrial conversion of its habitat (Eriksen and Belk, 1999; Belk and Fugate 2000). Because of the limited and disjunct distribution of vernal pools and the even more limited distribution of midvalley fairy shrimp, any reduction in vernal pool habitat quantity could adversely affect this species.

Threats

The primary threats to midvalley fairy shrimp are habitat destruction from urban development, flood control activities, and the conversion of natural lands to agricultural uses. Development activities that do not directly affect vernal pool habitat may still cause habitat destruction or modification as a result of hydrological changes associated with the diversion of watershed runoff or with additional runoff from outside the natural watershed (Center for Biological Diversity and VernalPools.org 2001). Additional threats include activities that damage the impermeable clay and/or hardpan layers of the habitat bottom, filling of the habitat, and introduction of nonnative plants.

Conservation and Management

At present, there is no management direction for the conservation of midvalley fairy shrimp. On August 14, 2001, the Center for Biological Diversity and VernalPools.org jointly submitted a petition to the U.S. Fish and Wildlife Service (USFWS) to list midvalley fairy shrimp as endangered under the federal Endangered Species Act (ESA). To date, no formal designation has been made for this species.

Biology

Habitat Requirements

Midvalley fairy shrimp require seasonally ephemeral aquatic habitats that pool in the winter and spring (i.e., vernal pools). Most occupied vernal pools have been

small (<202 square meters [2,174 square feet]); shallow (10.1 centimeters [4 inches] average ponding depth); and grassy or clay-bottomed (Helm 1996; Eriksen and Belk 1999), although some occurrences have been in roadside ditches and railroad toe-drains (Eriksen and Belk 1999; Rogers in prep). Midvalley fairy shrimp are adapted to habitats that are inundated for short time periods. Accordingly, they can complete their life cycles (cyst to adult with fertilized eggs) in as little as 4 days, especially under extreme circumstances, such as years with below average rainfall (Rogers in prep.). This characteristic allows midvalley fairy shrimp to use habitats that are extremely unstable hydrologically (i.e., habitats that fill and dry quickly, or "flashy" pools).

Other than the general requirements described above, little is known about specific habitat requirements for midvalley fairy shrimp. Midvalley fairy shrimp have been found co-occurring with *Linderiella occidentalis* in the Lodi and Galt areas (Rogers in prep). They also have been reported co-ocurring with vernal pool fairy shrimp (*Branchinecta lynchi*) on three occasions, when they were probably washed into the vernal pool fairy shrimp habitat by abnormally high rainfall (Eriksen and Belk 1999).

Reproduction and Demography

Beyond inundation of the habitat, the specific cues for hatching are unknown (Eriksen and Belk 1999), although temperature is believed to play a large role. Typically, midvalley fairy shrimp mature in approximately 16 days when water temperatures reach at least 20°C (Eriksen and Belk 1999). However, midvalley fairy shrimp can hatch, mature, and produce viable cysts in 4 days under extreme circumstances (Rogers in prep).

Ecological Relationships

Predator consumption of fairy shrimp cysts aids in distributing populations of fairy shrimp (Eriksen and Belk 1999). Midvalley fairy shrimp are prey to amphibians, waterfowl, and shorebirds. Predators expel the cysts in their excrement, generally at some distance from the point of consumption. If conditions are suitable, these transported cysts may hatch at the new location and potentially establish a new population. Cysts are also transported in mud carried on the feet of animals, including livestock, that may wade through the habitat (Rogers in prep).

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Vernal Pool Tadpole Shrimp (*Lepidurus packardi*)

Conservation Considerations

Status

Federal: Endangered
State: None
Other: None

Distribution

Vernal pool tadpole shrimp (VPTS) is endemic to California's Central Valley; the majority of its populations occur in the Sacramento Valley. This species has also been reported from the Sacramento River Delta east of San Francisco Bay and from a few scattered localities in the San Joaquin Valley from San Joaquin County to Madera County. (Rogers 2001.)

Population Trend

Approximately two-thirds of the grasslands that once supported vernal pools in the Central Valley had been destroyed by 1973, with an associated loss of nearly 90% of vernal pool habitat. In subsequent years, a substantial amount of the remaining habitat for vernal pool crustaceans has been destroyed, with estimates of habitat loss ranging from 2% to 3% per year. Current data indicate vernal pool grasslands are being lost in the southern San Joaquin Valley at a rate of approximately 1% per year. (Holland 1978.)

The U.S. Fish and Wildlife Service (USFWS) listed VPTS as endangered on September 19, 1994, due to its very limited distribution, the small number of remaining populations, and the number and nature of threats to the species' continued existence.

Threats

Threats facing VPTS include the conversion of vernal pool habitat to agricultural uses and urban development and stochastic extinction due to the small and isolated nature of remaining populations (59 Federal Register [FR] 180 48136–48153). Because of the limited and disjunct distribution of vernal pools, any reduction in habitat quantity could adversely affect VPTS. Isolated populations are more susceptible to inbreeding depression, which can result in local extinction or reduced fitness (U.S. Fish and Wildlife Service 1996). Habitat fragmentation can isolate and reduce population size, resulting in a process of progressive population extinction. Small or isolated populations are more susceptible to extinction from random environmental disturbance.

Activities that change the ponding duration, alkalinity, and pH of vernal pools beyond the tolerance range of VPTS can adversely affect this species. Such activities include damaging or puncturing the hardpan (the water-restrictive layer at vernal pool bottom); filling in the vernal pool; introducing nonnative, undesirable plants; and the destruction or degradation of upland habitats that contribute runoff to vernal pools (U.S. Fish and Wildlife Service 1996; Eriksen and Belk 1999).

Conservation and Management

The U.S. Fish and Wildlife Service elevated the VPTS to endangered species status in the 1994 final ruling (59 FR 180 48136–48153). No critical habitat designation has been made for this species.

Biology

Habitat Requirements

VPTS occur in a wide variety of seasonal habitats including vernal pools, ponded clay flats, alkaline pools, ephemeral stock tanks, roadside ditches, and road ruts (Rogers 2001; California Natural Diversity Database 2002). Habitats where VPTS have been observed range in size from small (as small as 2 square meters [22 square feet]), clear, well-vegetated vernal pools to highly turbid alkali scald pools to large (up to 107 hectares [264 acres]) winter lakes (Helm 1998; Rogers 2001). These pools and other ephemeral wetlands must dry out and reinundate for VPTS cysts to hatch. This species has not been reported in pools that contain high concentrations of sodium salts, but may occur in pools with high concentrations of calcium salts.

Typically, VPTS is found in pools that are deeper than 12 cm, retain water for at least 15–30 days (Rogers 2001), and do not have wide daily fluctuations in temperature. The average ponding depth of wetlands in which VPTS occurs is 15.2 (Helm 1998). Adult tadpole shrimp populations generally persist until the habitat dries up.

Reproduction and Demography

Vernal pool tadpole shrimp reproduce asexually (Longhurst 1955; Lynch 1972; Rogers in prep.). All reproducing individuals produce cysts (resting eggs), which are shed as the animal moves about. The cysts generally hatch within 3–4 days of the pool being inundated with water and can reach maturity within 15 days. (Rogers in prep.) VPTS are comparatively long-lived, with populations lasting until their pools dry out or until water temperatures reach 10–15EC. Populations in some ponds may survive up to 6 months (Helm 1998). When the ponds dry out, the cysts enter into diapause and remain in the soil through the dry season until the ground is inundated by water in subsequent rainy seasons. Cysts may hatch at various times, anywhere from 1 hour to 3 weeks after the pools are inundated.

Movement

VPTS disperse primarily through transport of cysts. This most commonly occurs either through consumption of gravid adults by predators (e.g., waterfowl, gulls, shorebirds, amphibians) and subsequent excretion of the cysts or by transport of cysts that adhere to the feet of predators or other animals, such as sheep, cattle, and pigs, that walk through occupied habitat when it is wet. Depending on the movement pattern of these animals, the cysts may be transported to new locations where, if conditions are suitable, they may establish new vernal pool tadpole shrimp populations (Rogers in prep.).

Ecological Relationships

Tadpole shrimp are omnivores, feeding on plants, various zooplankton (e.g., *Daphnia*, copepods), and insect larvae, while digging through sediments at the bottom of their ponds. In addition, vernal pool tadpole shrimp consume fairy shrimp, including both vernal pool fairy shrimp (*Branchinecta lynchi*) and mid-valley fairy shrimp (*Branchinecta mesovallensis*). While they do not actively seek out these species, tadpole shrimp will consume fairy shrimp if they are present at the bottom of the pool where the tadpole shrimp are foraging.

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Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)

Conservation Considerations

Status

Federal: Threatened
State: None
Other: None

Distribution

Valley elderberry longhorn beetle (VELB) is endemic to the upland riparian areas of the Central Valley. The U.S. Fish and Wildlife Service (USFWS) recognizes the range of this beetle to include the American, San Joaquin, and Sacramento River watersheds and tributaries of these watersheds below elevations of 914 meters (3,000 feet). The taxon's range accordingly includes most of the California Central Valley north into Shasta County and south to Kern County (Barr 1991).

Population Trend

Currently, less than 1% of the original upland riparian habitat remains in the Central Valley, mostly distributed in small, isolated fragments (Collinge et al. 2001). Although VELB is widespread across its range, it has been extirpated from many historically occupied drainages. The extant VELB population has a scattered distribution and local populations can be exceedingly isolated.

Threats

Habitat specialists such as VELB are particularly sensitive to habitat loss and fragmentation. Urban and agricultural development, aggregate mining, and flood control practices such as damming and channel maintenance have damaged or eliminated a high percentage of the upland riparian forests that once occurred in California, reducing and fragmenting the available habitat for the beetle (Barr 1991). Invasive predators such as Argentine ants (*Linepithema humile* Mayr) (Hymenoptera:Formicidae) pose an important threat to insect herbivores, and the sessile nature of juvenile VELB makes the species particularly vulnerable (Huxel 2000).

Conservation and Management

Critical habitat for valley elderberry longhorn beetle has been designated in two areas along the American River in the greater Sacramento metropolitan area (Barr 1991). USFWS has prepared a recovery plan for the valley elderberry longhorn beetle (U.S. Fish and Wildlife Service 1984). The plan does not identify specific management objectives for achieving recovery of the beetle; however, it does identify the following interim objectives: (1) protect three known populations along the American River, the Merced River, and Putah Creek; (2) survey for the presence of populations along selected Central Valley rivers; (3) protect remaining habitat areas within the taxon's suspected historical range; and (4) determine the number of sites and populations necessary to allow delisting of the species.

In a presentation at the 2001 Riparian Habitat Conference, Huxel et at. (2001) made the following recommendations for the recovery of VELB: (1)continue mitigation efforts, especially those directed towards restoring the species to locations where it is currently extirpated but historically occurred; (2) improve mitigation techniques and mitigation site choice to ensure viable elderberry habitat and recolonization by VELB; (3) use only local elderberry plants that have been previously used by VELB to avoid potential differences in phenotypes; (4) investigate the importance of particular juvenile mortality factors, such as Argentine ant, other natural enemies, and pesticide drift; (5) conduct field and laboratory studies on the autecology and life history of both VELB and elderberry; (6) locate and preserve newly discovered VELB habitat; and (7) protect existing VELB habitat.

Biology

Habitat Requirements

VELB is dependent on the host plant, elderberry (*Sambucus* sp.), throughout its life cycle. The larvae bore into the elderberry stems and feed on soft tissues from the pith of the plant. Metamorphosis occurs in a pupal chamber, which is excavated in a large (>1 inch) stem of the shrub during the larval stage. Adult beetles feed on elderberry foliage and flowers.

Adult VELB and characteristic exit holes, formed when the adult emerges from the pupal chamber, have been observed both in riparian habitats and in savanna habitats adjacent to riparian vegetation (Collinge et al. 2001). VELB utilizes both red, or Mexican, elderberry (*Sambucus mexicana*) and blue elderberry (*Sambucus racemosa* var. *microbtrys*) and does not seem to prefer one to the other (Barr 1991). Elderberry co-occurs with other riparian woody plants, including Fremont cottonwood (*Populus fremontii*), California sycamore (*Platanus racemosa*), various willows (*Salix* spp.), wild grape (*Vitis californica*), blackberry (*Rubus* spp.), and poison-oak (*Toxicodendron diversilobum*) (U.S. Fish and Wildlife Service 1984; Collinge et al. 2001).

Reproduction and Demography

Adult beetles of this species are only active during the flowering period of the elderberry, typically early March through early June. The beetles mate in May and females lay eggs on living elderberry shrubs. Larvae bore through the stems of the shrubs, feeding and creating a characteristic chamber in the center of the stem. After 1 or 2 years, the larva chews a hole to the stem surface and returns to the chamber to pupate. After metamorphosing, the beetle emerges through the circular exit hole (Barr 1991).

Movement

Hanks (1999) found that adult long-horned beetles (*Cerambycidae*) that are specialists on healthy or weakened hosts are able to feed on the foliage of their larval host plant. This close proximity of the adult feeding/mating sites to the available oviposition sites results in the sedentary nature of the species. Collinge et al. (2001) found that colonization of new elderberry sites within occupied drainages is rare and that dispersal between drainages probably does not occur at all.

Ecological Relationships

Current information on VELB habitat indicates that the taxon is found only in association with its host plant, elderberry. Occupancy rates of elderberry shrubs seem to be higher in areas with diverse riparian vegetation, although this may be an indicator of a habitat's relative health and not of a habitat's suitability for VELB.

Huxel (2000) observed a negative relationship between VELB occupancy and the presence of Argentine ant. The invasion of Argentine ant through the riparian corridors of California poses an important threat to the remaining VELB population.

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California Tiger Salamander (*Ambystoma californiense*)

Conservation Considerations

Status

Federal: Endangered (Santa Barbara distinct population segment only)
Candidate (entire population except where listed)
State: None
Other: California Department of Fish and Game Species of Special Concern

Distribution

California tiger salamander is endemic to the San Joaquin–Sacramento River valleys, bordering foothills, and coastal valleys of central California (Barry and Shaffer 1994). The species occurs from Sonoma County and the Colusa–Yolo County line south to Santa Barbara County in the Coast Ranges and from southern Sacramento County south to Tulare County in the Central Valley (Jennings and Hayes 1994). California tiger salamander inhabits low-elevation areas, typically below 427 meters (1,400 feet) (65 Federal Register [FR] 57242, September 21, 2000).

Population Trend

A recent survey suggests that California tiger salamander is in the early stages of range contraction and fragmentation (Fisher and Shaffer 1996) and that if this trend continues, the species is vulnerable to extinction (Barry and Shaffer 1994; Loredo et al. 1996). It has been estimated that California tiger salamanders have disappeared from about 55% of their historic range in California (Jennings and Hayes 1994). In February 1992, the U.S. Fish and Wildlife Service (USFWS)

received a petition to list California tiger salamander as an endangered species. The listing of the species was warranted but was precluded by higher priority listing actions. The Santa Barbara County distinct population segment of California tiger salamander was listed as endangered on September 21, 2000. USFWS recently maintained the candidate status of the entire species (66 FR 54808, October 30, 2001).

Threats

California tiger salamander has been eliminated from much of its former range by agricultural and urban development (Stebbins 1985). Other factors affecting California tiger salamander populations include the introduction of nonnative predators such as fish, bullfrogs (*Rana catesbeiana*), and crayfish (*Procambarus clarki*); loss of dry-season refuge habitat due to land use changes; and poisoning of ground squirrels (Jennings and Hayes 1994). High mortality of California tiger salamanders while crossing roads to reach breeding areas is also a concern (Barry and Shaffer 1994). Of the migrating individuals collected by Twitty (1941), 45% had been killed by passing cars.

Conservation and Management

California tiger salamander is the most vulnerable of the group of amphibians that breed in vernal pools because its long developmental interval to metamorphosis restricts it to pools that are the longest lasting, and therefore often the largest in size. Loss and degradation of complexes of vernal pools that are critical breeding habitat is a significant threat to California tiger salamanders.

California tiger salamanders are dependent on the integrity of large rain pool complexes. Efforts should be made to identify potential breeding sites where this species is known to occur. Efforts should be made to keep California tiger salamander breeding sites free of nonnative predators (e.g., fish, bullfrogs, and crayfish). This may require coordination with agencies in charge of mosquito abatement to avoid the stocking of mosquitofish (*Gambusia affinis*) in these areas (Stephenson and Calcarone 1999).

Biology

Habitat Requirements

California tiger salamander is a lowland species restricted to grasslands and low foothill regions where its breeding habitat (long-lasting rain pools) occurs. Permanent aquatic sites are unlikely to be used for breeding unless they lack fish predators. California tiger salamanders also require dry-season refuge sites in the vicinity of breeding sites (within 1.6 kilometer [1 mile]). (Jennings and Hayes

1994.) Ground squirrel burrows are important dry-season refuge sites for adults and juveniles (Loredo et al. 1996).

Larval California tiger salamanders eat algae and various invertebrates including water fleas, copopods, and fairy shrimp. Larger salamander larvae consume amphibian larvae. (Anderson 1968.) The diet of adult California tiger salamanders probably consists of earthworms, snails, fish, insects, and small mammals (Stebbins 1959).

Reproduction and Demography

Adult California tiger salamanders move from subterranean burrow sites to breeding pools during November–February after warm winter and spring rains (Jennings and Hayes 1994). Male salamanders may arrive at breeding sites sooner than females (Twitty 1941; Loredo and Van Vuren 1996). Eggs are probably laid in January–February at the height of the rainy season (Storer 1925). Eggs are deposited in shallow water attached to grass stalks, dead weeds, or other vegetation under the water surface (Storer 1925; Twitty 1941). Complete development through metamorphosis requires 9–12 weeks (Anderson 1968; Feaver 1971). Oversummering California tiger salamander larvae have been observed by Brad Shaffer (Jennings and Hayes 1994); overwintering larvae have been observed by Jeff Alvarez in numerous stockponds at the Los Vaqueros watershed near Livermore, California (Alvarez in prep.).

Individual California tiger salamanders may survive more than 10 years. These salamanders do not breed until 4 or 5 years of age, and fewer than 50% breed more than once. Low survivorship of metamorphs has been documented within some populations. In these populations fewer than 5% of marked juveniles survived to become breeding adults (65 FR 57242, September 21, 2000.)

Movement

In Santa Barbara County, dispersing juvenile California tiger salamanders have been trapped more than 360 meters (1,200 feet) from their birth pond; adults have been found more than 1.9 kilometers (1.2 miles) from breeding ponds. Most marked salamanders have been recaptured at the pond where they were initially captured. However, in one study, 20% of California tiger salamanders hatched in one pond traveled a minimum distance of 1,900 feet (579 meters) to breed. Nondispersing salamanders tend to stay close to breeding ponds. Dispersal distance appears to be closely tied to precipitation; California tiger salamanders travel farther in years with more precipitation. (65 FR 57242, September 21, 2000.)

California tiger salamanders engage in nocturnal breeding migrations over distances of 1,000 meters (3,281 feet) or more (Jennings and Hayes 1994). Adult migration occurred during the first heavy rain of the season in the San Francisco Bay area (Twitty 1941). Juvenile salamanders migrate at night during the hottest,

driest season, whereas adults migrate during the rainy season (Loredo et al. 1996). Rare summer rains will stimulate relatively large numbers of juveniles to emigrate from ponds (Loredo and Van Vuren 1996).

During winter, California tiger salamanders take refuge in damp places near the surface of the ground during the day and emerge at night to forage (Storer 1925). During dry weather, these salamanders take refuge in ground squirrel burrows, crevices in the soil, or in other burrows (Loredo et al. 1996). Once established in underground burrows, these salamanders may move short distances within burrows or overland to other burrows, generally during wet weather (65 FR 57242, September 21, 2000).

Ecological Relationships

Pacific treefrogs (*Pseudacris [Hyla] regilla*) and western spadefoot (*Scaphiopus hammondii*) larvae compete with California tiger salamander larvae for some algal and invertebrate food items. Large and medium sized California tiger salamander larvae are known to eat smaller California tiger salamander larvae. California tiger salamanders are known to prey on western spadefoot and Pacific treefrog larvae. (Anderson 1968.)

Native predators of California tiger salamanders include great blue herons (*Ardea herodias*), egrets (*Casmerodius albus*), common garter snakes (*Thamnophis sirtalis*), and larger spadefoot larvae (Barry and Shaffer 1994; 65 FR 57242 September 21, 2000). Baldwin and Stanford (1986) observed a western pond turtle (*Clemmys marmorata*) pursuing a California tiger salamander larva and an adult red-legged frog (*Rana aurora*) ingesting a larval California tiger salamander. Other predators of the species include bullfrogs, Louisiana red swamp crayfish, mosquitofish and other introduced fishes (Anderson 1968; Jennings and Hayes 1994; 65 FR 57242, September 21, 2000).

California tiger salamander has a commensal relationship with California ground squirrel (*Spermophilus beecheyi*), in which the salamander benefits from the refuge habitat created by the burrowing activity of the squirrels. In one study, California tiger salamanders showed no avoidance of occupied ground squirrel burrows, suggesting that the squirrels pose no threat to the salamanders. (Loredo et al. 1996.)

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Limestone Salamander (*Hydromantes brunus*)

Conservation Considerations

Status

Federal: None
State: Threatened
Other: U.S. Fish and Wildlife Service Species of Special Concern; Fully Protected under California Fish and Game Code

Distribution

The historical and current distribution of limestone salamander is limited to scattered locations along the Merced River and its tributaries between Briceburg and McClure Reservoir in Mariposa County (Hansen and Tordoff 1994). The species was discovered in 1952 and has only been found in areas adjacent to roads or trails; consequently, other populations that have not yet been located likely exist (Tordoff 1980). An area of 1,600 acres near Briceburg and State Route 140 has been designated as a U.S. Bureau of Land Management Area of Critical Environmental Concern to forestall mining and other developments that would negatively affect limestone salamander. The Limestone Salamander Ecological Reserve, also located near Briceburg, was established in 1975 by the California Department of Fish and Game. (Hansen and Tordoff 1994.)

Population Trend

There are no reliable population estimates for limestone salamander; however, surveys conducted by Tordoff between 1980 and 1983 estimated a population in Hell Hollow at 444 individuals in 1981, 763 in 1982, and as high as 904 individuals in 1983. The increase in population size may have been due to an increase in the number of active salamanders through successively wetter years or to improvements in sampling techniques. These are the first estimates of population size reported for this species. (Lehman 1989.)

Threats

The greatest threat to limestone salamanders is the lack of suitable habitat and the fragile nature of this habitat. Human activities, such as mining or road construction near existing populations, are likely to have a detrimental effect on the species (Zeiner et al. 1988). Alterations of waterflow that provides moisture to the salamander's habitat would negatively affect the species because of its dependence on moist conditions (Hansen and Tordoff 1994).

Conservation and Management

A recovery plan has not been prepared and recovery requirements have not been identified for this species.

Biology

Habitat Requirements

Limestone salamanders spend much of their time underground but are active at night during fall, winter, and early spring rains, except during cold spells. They require moss-covered talus piles and cliff crevices for refugia. Loose rock piles provide a network of crevices into which salamanders can retreat when surface temperatures rise in the spring and summer. Extensive rock cover is a characteristic of all occupied sites. The surrounding habitat consists of oak/buckeye woodland with a thick shrub understory. Limestone salamanders are often found on steep north- to east-facing slopes, which provide shade and the buildup of talus piles. (Tordoff 1980.) Optimal habitat is moist but not wet; the species is accordingly found more often on the slopes of ravines and canyons than on valley floors (Tordoff 1980; Stebbins 1985).

Reproduction and Demography

Little is known about the breeding habits of limestone salamanders but it is thought that eggs are laid in spring and hatch in late fall (Stebbins 1954; Gorman 1956). There are, moreover, no data on their food habits, but they likely forage on insects and other small invertebrates (Zeiner et al. 1988).

Movement

Little is know about the mobility of this species. Tordoff (1980) found one limestone salamander between two occupied sites, approximately 250 meters (820 feet) from ideal habitat.

Ecological Relationships

Because limestone salamanders spend much of their time underground, it is unlikely that adults are frequently taken as prey items. Limestone salamanders may compete with arboreal salamanders (*Aneides lugubris*) in areas where their ranges overlap (Zeiner et al. 1988).

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California Red-Legged Frog (*Rana aurora draytonii*)

Conservation Considerations

Status

Federal: Threatened; Critical Habitat designated April 12, 2001 (66 Federal Register [FR] 14626)
State: None
Other: California Department of Fish and Game Species of Special Concern

Distribution

California red-legged frog is endemic to California and Baja California, Mexico. The historical range of California red-legged frog extends from the vicinity of Point Reyes National Seashore in Marin County on the coast and from the vicinity of Redding, inland, south to northwestern Baja California (Storer 1925; Jennings and Hayes 1985; Hayes and Krempels 1986). California red-legged

frog has been documented in 46 counties in California but now remains in only 26 counties (USDI Fish and Wildlife Service 2000a; 61 FR 25813).

Presently, California red-legged frogs occur primarily in central coastal California from Marin County south to Ventura County (Hayes and Jennings 1988). Within the Plan Area, the current range of California red-legged frog extends into the western portions of San Joaquin, Stanislaus, Merced, Fresno, and Kern Counties (California Natural Diversity Database 2002).

Population Trend

California red-legged frog has sustained a 70% reduction in its geographic range as a result of several factors acting singly and in combination (USDI Fish and Wildlife Service 2000a).

Threats

The decline of California red-legged frog is attributable to a variety of factors. Large-scale commercial harvesting of California red-legged frogs led to severe depletions of populations at the turn of the century. Subsequently, exotic aquatic predators such as bullfrog (*Rana catesbeiana*), crayfish (*Procambarus clarki*), and various species of fish became established and contributed to the continued decline of the species. (Jennings and Hayes 1985.) In addition, habitat alterations such as conversion of land to agricultural and commercial uses, reservoir construction, off-highway vehicle use, and abusive land use practices (e.g., livestock grazing), threaten the remaining populations (Kauffman et al. 1983; Kauffman and Krueger 1984; Bohn and Buckhouse 1986; Jennings and Hayes 1994).

Conservation and Management

The USDI Fish and Wildlife Service (USFWS) published the *Draft Recovery Plan for the California Red-Legged Frog* in January 2000 (USDI Fish and Wildlife Service 2000b). In March 2001, USFWS formally designated Critical Habitat for the taxon. According to the *Final Determinations of Critical Habitat for the California Red-legged Frog; Final Rule* (66 FR 14626; March 13, 2001), two Critical Habitat Units extend into the Plan Area. The East Bay–Diablo Range Unit (#15) includes portions of San Joaquin, Stanislaus, Merced, and Fresno Counties that lie in the foothills of the Diablo Range west of Interstate 5. The Estrella River/Cholame Creek Unit (#20) includes the northwest corner of Kern County, which is in the Saw Tooth Ridge watershed.

To provide guidance in planning for the protection of California red-legged frog, USFWS (1997) issued a protocol for conducting habitat assessments and field surveys for the taxon.

Biology

Habitat Requirements

California red-legged frogs have been found from sea level to about 1,500 meters (5,000 feet). They use a variety of habitat types, including aquatic, riparian, and upland habitats. There is much variation in how the species uses the environment. In many cases, California red-legged frogs may complete their entire life cycle in a particular area without using other components (e.g., a pond is suitable for each life stage and use of upland habitat or a riparian corridor is not necessary). Populations appear to persist where a mosaic of habitat elements is embedded within a matrix of dispersal habitat. (USDI Fish and Wildlife Service 2000a.)

California red-legged frogs breed in aquatic habitats; larvae, juveniles, and adult frogs have been collected from streams, creeks, ponds, marshes, sag ponds, deep pools and backwaters in streams and creeks, dune ponds, lagoons, and estuaries (USDI Fish and Wildlife Service 2000a). Breeding adults are often associated with dense, shrubby riparian or emergent vegetation and areas with deep (>0.7 meter [27 inches]) still or slow-moving water (Hayes and Jennings 1988). However, frogs often successfully breed in artificial ponds with little or no emergent vegetation and have been observed in stream reaches that are not cloaked in riparian vegetation. An important factor influencing the suitability of aquatic breeding sites is the general lack of introduced aquatic predators. (USDI Fish and Wildlife Service 2000a.)

When riparian vegetation is present, California red-legged frogs spend considerable time resting and feeding in it; the moisture and camouflage provided by the riparian plant community may provide good foraging habitat and may facilitate dispersal in addition to providing pools and backwater aquatic areas for breeding. Radiotelemetry studies have shown that individual California red-legged frogs move within the riparian zone from vegetated areas to pools. (USDI Fish and Wildlife Service 2000c.)

The diet of California red-legged frogs is highly variable. Tadpoles probably eat algae (Jennings et al. 1992). Hayes and Tennant (1985) found invertebrates to be the most common food item for adults. Vertebrates such as Pacific tree frog (*Pseudacris [Hyla] regilla*) and California mouse (*Peromyscus californicus*) represented over half of the prey mass eaten by larger California red-legged frogs. Feeding activity probably occurs along the shoreline and on the surface of the water (USDI Fish and Wildlife Service 2000a).

Reproduction and Demography

California red-legged frogs breed November–March, although earlier breeding has been recorded in southern localities. Males appear at breeding sites 2–4 weeks before females. (Storer 1925.) Females deposit egg masses on emergent vegetation so that the masses float on the surface of the water (Hayes and

Miyamoto 1984). Egg masses contain about 2,000–5,000 moderate-sized (2.0–2.8 millimeters [0.08–0.11 inch] in diameter), dark reddish-brown eggs (Storer 1925; Jennings and Hayes 1985). Eggs hatch in 6–14 days (Storer 1925). Larvae undergo metamorphosis 3.5–7 months after hatching (Storer 1925; Wright and Wright 1949, Jennings and Hayes 1990). Males attain sexual maturity by 2 years of age; females are sexually mature by 3 years (Jennings and Hayes 1985).

California red-legged frog larvae experience the highest mortality rates of any life stage. Survival from hatching to metamorphosis has been estimated to range from less than 1% (Jennings et al. 1992) to 1.9% (Cook 1997). Egg predation is infrequent, although eggs are susceptible to being washed away by high stream flows. Adults may live 8–10 years, although the average life span is considered to be much shorter (Jennings et al. 1992).

Movement

California red-legged frog juveniles and adults may disperse from breeding sites at any time of the year. Dispersal sites typically provide forage or cover opportunities and include boulders or rocks and organic debris such as downed trees or logs; industrial debris; and agricultural features such as drains, watering troughs, spring boxes, and abandoned sheds (USDI Fish and Wildlife Service 2000c). California red-legged frogs also use small mammal burrows and moist leaf litter (Jennings and Hayes 1994). The distances that frogs will disperse to reach summer habitat is not fully understood and is currently a topic of study (USDI Fish and Wildlife Service 2000c).

California red-legged frogs have been encountered living in streams, at distances more than 3 kilometers (1.8 miles) from the breeding site, and up to 30 meters (100 feet) from water in adjacent dense riparian vegetation for up to 77 days (Rathbun et al. 1993).

During periods of wet weather, starting with the first rains of fall, some individuals may make overland excursions through upland habitats. Most of these overland movements occur at night. Evidence from marked frogs on the San Simeon coast of California suggests that frog movements of about 1.6 kilometers (1 mile) via upland habitats are possible over the course of a wet season. In addition, California red-legged frogs have been observed to make long-distance migrations following straight-line, point-to-point routes rather than corridors between habitats. California red-legged frogs in northern Santa Cruz County traveled distances from 0.4 kilometer (0.25 mile) to more than 3.2 kilometers (2 miles) without apparent regard to topography, vegetation type, or riparian corridors. (USDI Fish and Wildlife Service 2000c.)

Ecological Relationships

Predatory, nonnative fish and amphibians are particularly significant threats to red-legged frogs. With few exceptions, California red-legged frog has disappeared from virtually all sites where bullfrogs have become established

(Hayes and Jennings 1988). In addition to predation, bullfrogs may also have a competitive advantage over red-legged frogs. Bullfrogs are larger, have more generalized food habits, and have an extended breeding season; moreover, bullfrog larvae are unpalatable to predatory fish. (USDI Fish and Wildlife Service 2000a).

California red-legged frogs appear more capable of persisting in the presence of nonnative fish; however, there is still a strong negative correlation between the abundance of such fish and red-legged frog presence (USDI Fish and Wildlife Service 2000a).

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Blunt-Nosed Leopard Lizard (*Gambelia silus*)

Conservation Considerations

Status

Federal: Endangered
State: Endangered
Other: Fully protected species under the California Fish and Game Code

Distribution

Blunt-nosed leopard lizard is endemic to the San Joaquin Valley. Historically, this species was probably found from Stanislaus County in the north to the Tehachapi Mountains in Kern County in the south. The foothills of the Sierra Nevada and Coast Ranges roughly define the eastern and western boundaries of its distribution, except for populations on the Carrizo Plain and in the Cuyama Valley west of the San Joaquin Valley (U.S. Fish and Wildlife Service 1998.) Blunt-nosed leopard lizard occurs at elevations below 800 meters (2,600 feet) (Montanucci 1970).

No comprehensive survey of this species' entire historical range has been conducted. The current known distribution includes scattered units of undeveloped land on the valley floor and in the foothills of the Coast Ranges. (U.S. Fish and Wildlife Service 1998). In the Plan Area, blunt-nosed leopard lizards have been recorded in Madera, Merced, Fresno, Tulare, Kings, and Kern Counties (California Natural Diversity Database 2002).

Population Trend

Since the 1870s, more than 95% of the original natural communities in the San Joaquin Valley have been converted to agricultural, urban, and industrial uses (U.S. Fish and Wildlife Service 1998). Blunt-nosed leopard lizard habitat in the San Joaquin Valley was reduced from 228,000 acres to 158,000 acres between 1976 and 1980 (California Department of Fish and Game 1992).

Threats

Habitat disturbance, destruction, and fragmentation are the greatest threats to blunt-nosed leopard lizard populations (U.S. Fish and Wildlife Service 1998). Cultivation; habitat modification for petroleum and mineral extraction; pesticide applications; off-highway vehicle use; and construction for transportation, communication, and irrigation infrastructures have resulted in pervasive habitat loss throughout the San Joaquin Valley (Stebbins 1954; Montanucci 1965; U.S.

Fish and Wildlife Service 1980, 1985a; Germano and Williams 1993). These activities present ongoing threats to the survival of blunt-nosed leopard lizards (U.S. Fish and Wildlife Service 1998).

Conservation and Management

A recovery plan was first prepared by the U.S. Fish and Wildlife Service (USFWS) in 1980 and revised in 1985 (U.S. Fish and Wildlife Service 1985b) and 1998 (U.S. Fish and Wildlife Service 1998). Conservation efforts have included habitat and population surveys, studies of population demographics, habitat management, land acquisition, and development of management plans for public lands (U.S. Fish and Wildlife Service 1998). Current recovery efforts focus on three important factors: (1) determining appropriate habitat management and compatible land uses for blunt-nosed leopard lizards, (2) protecting additional habitat for the species in key locations of its range, and (3) determining more precisely how populations are affected by environmental variation (U.S. Fish and Wildlife Service 1998).

Biology

Habitat Requirements

Blunt-nosed leopard lizards are found in sparsely vegetated plains, alkali flats, grasslands, low foothills, canyon floors, and large washes (California Department of Fish and Game 1988). They inhabit areas with sandy soils and scattered vegetation and are usually absent from thickly vegetated habitats (California Department of Fish and Game 1992). On the floor of the San Joaquin Valley, they are usually found in nonnative grassland, valley sink scrub habitats, valley needlegrass grassland, alkali playa, and valley saltbush scrub (U.S. Fish and Wildlife Service 1998). Blunt-nosed leopard lizards use small rodent burrows for shelter, predator avoidance, and behavioral thermoregulation. These burrows may be either abandoned ground squirrel tunnels or occupied or abandoned kangaroo rat tunnels (Montanucci 1965). Each lizard may use several burrows, avoiding those with predators or other leopard lizards.

Blunt-nosed leopard lizards are large, opportunistic predatory lizards, feeding primarily on insects, including grasshoppers, crickets, and moths; and on other small lizards, even of their own species (Montanucci 1965; Kato et al. 1987a; Germano and Williams 1994a).

Reproduction and Demography

Breeding activity of blunt-nosed leopard lizards generally begins within a month after emergence from dormancy, usually the end of April, and continues through the beginning and occasionally to the end of June (U.S. Fish and Wildlife Service

1998). During this time adults pair and frequently occupy the same burrow systems (Montanucci 1965; Germano and Williams 1994b). Two to six eggs are laid in June and July, the numbers being positively correlated with the size of the female. During adverse conditions, reproduction may be delayed up to 2 months, or even forgone for a season. Incubation lasts about 2 months and young hatch from early July through early August (Montanucci 1965; Tollestrup 1982).

Reports on population densities of blunt-nosed leopard lizards include ranges of 0.3–10.8 lizards per hectare (0.1–4.2 per acre) at Pixley National Wildlife Refuge (Uptain et al. 1985) and 3.3 lizards per hectare (1.34 per acre) along the western foothills of the San Joaquin Valley (Tollestrup 1979a). In marginal habitat, population densities generally do not exceed 0.5 per hectare (0.2 per acre) (U.S. Fish and Wildlife Service 1998).

Movement

The seasonal and daily aboveground activity of blunt-nosed leopard lizards is strongly correlated with temperature. Optimal activity occurs when air temperatures are between 23.5°C and 40.0°C and ground temperatures are between 22°C and 36°C (USDI Fish and Wildlife Service 1985a). Some activity may occur at temperatures as high as 50°C (Tollestrup 1976; O'Farrell and Kato 1980; Mullen 1981; Williams and Tordoff 1988).

The home ranges of male blunt-nosed leopard lizards overlap and are generally larger than those of females. The average home range size varies from 0.2 to 1.7 hectares (0.52 to 4.2 acres) for males and from 0.1 to 1.1 hectares (0.25 to 2.7 acres) for females (Tollestrup 1983; Kato et al. 1987b).

Ecological Relationships

Blunt-nosed leopard lizards are polygynous and highly territorial. Males aggressively defend territories using a repertoire of distinct behavioral displays and active aggression against intruders (Tollestrup 1979b, 1983). Blunt nosed-leopard lizards probably compete with California whiptails for food since they have similar diets (Montanucci 1965; Tollestrup 1979b). Potential predators of blunt-nosed leopard lizards include various species of snakes, loggerhead shrike (*Lanius ludovicianus*), American kestral (*Falco sparverius*), hawks, California ground squirrel (*Spermophilus beecheyi*), and coyote (*Canis latrans*) (U.S. Fish and Wildlife Service 1998).

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Giant Garter Snake (*Thamnophis gigas*)

Conservation Considerations

Status

Federal: Threatened
State: Threatened
Other: None

Distribution

Historically, giant garter snake was found throughout the Central Valley from Butte County south to Kern County (U.S. Fish and Wildlife Service 1999). Since the 1940s, the species has been extirpated from the southern end of its range. The current range extends from near Gridley in Butte County to Mendota Wildlife Area in Fresno County (Fisher et al. 1994.) Populations of giant garter snake are limited to ponds, sloughs, marshes, and rice fields of Sacramento, Sutter, Butte, Colusa, and Glenn Counties. Remnant populations also exist along the western border of the Yolo Bypass in Yolo County and along the eastern fringes of the San Joaquin–Sacramento River Delta from the Laguna Creek–Elk Grove region of Sacramento County south to Stockton in San Joaquin County (Hansen 1986; 58 Federal Register [FR] 54053, October 20, 1993). In the central San Joaquin Valley, giant garter snakes also occur in rice fields in Merced and Fresno Counties (U.S. Fish and Wildlife Service 1999).

Population Trend

The current distribution and abundance of giant garter snakes has been reduced significantly from historic levels. Agriculture and flood control measures have extirpated the species from the southern one-third of its range, which comprised the historic Buena Vista, Tulare, and Kern lakebeds. Almost no suitable freshwater habitat remains south of Fresno. (U.S. Fish and Wildlife Service 1999.) The U.S. Fish and Wildlife Service (USFWS) recognizes the existence of 13 populations of giant garter snake (58 FR 54053, October 20, 1993). Some populations may not be viable because they are small, highly fragmented, and restricted to small patches of habitat of limited quality. Populations in the Colusa, Butte, Sutter, and American River basins are associated with rice production and occupy agricultural water delivery and drainage ditches. The largest extant population inhabits the water channels and ditches of agricultural lands in the American River basin at the confluence of the American and Sacramento Rivers. (58 FR 54053, October 20, 1993.)

Threats

Habitat loss to agricultural development and flood control activities has been the primary factor in the decline of giant garter snake populations. Upstream watershed modifications, water storage and diversion projects, and urban and agricultural development cumulatively affect wetland habitat for giant garter snakes on the valley floor. Other factors contributing to the decline of giant garter snakes include interrupted water supply, poor water quality, and contaminants. Small remaining populations are susceptible to predation by mammals, birds, and introduced game fish such as largemouth bass (*Micropterus salmoides*) and catfish (*Ictalurus* spp.). Additional causes of mortality include vehicular traffic, agricultural practices, and maintenance of water channels (e.g., scraping canal banks, mowing, applying herbicides). (U.S. Fish and Wildlife Service 1999.)

Conservation and Management

USFWS published the *Draft Recovery Plan for the Giant Garter Snake* in 1999. Critical habitat has not been designated for this species.

In the American River Basin, California Department of Fish and Game (DFG) biologists are trying to identify wildlife areas that are occupied by this species or that have suitable habitat that should be protected from development. DFG and USFWS are developing a regional management plan for giant garter snake in the American River Basin. DFG is also revising its management plans to require that some water always be present in giant garter snake habitat that is managed by the agency. Furthermore, DFG recommends that farmers and water project supervisors perform periodic maintenance of irrigation ditches only during the species' active period (i.e., when it can escape from such activities) and discourages agricultural practices that eliminate or reduce winter retreat habitat. (Fisher et al. 1994.)

Biology

Habitat Requirements

Giant garter snake is endemic to emergent wetlands in the Central Valley. The species occurs in marshes; sloughs; ponds; small lakes; and low-gradient waterways such as small streams, irrigation and drainage canals, and rice fields. Giant garter snakes require permanent water during the active season (early spring through mid-fall) to maintain dense populations of food organisms. These snakes also require herbaceous emergent vegetation for protective cover and foraging habitat, as well as open areas and grassy banks for basking. Small mammal burrows and other small crevices in upland habitat are required for winter hibernation sites and refuge from floodwaters. (58 FR 54053, October 20, 1993.) All three habitat components (cover and foraging habitat, basking areas,

and protected hibernation sites) are needed for the species to persist in an area. Because of their lack of basking areas, excessive shade, and lack of prey populations, riparian woodlands usually do not support giant garter snake. (Hansen and Brode 1980.) Large rivers and wetlands with sand, gravel, or rock substrates do not support this species (U.S. Fish and Wildlife Service 1999).

The diet of giant garter snakes consists mainly of aquatic prey such as fish and amphibians. Giant garter snakes may concentrate feeding efforts at pooled areas that trap and concentrate prey. Nonnative species preyed upon by giant garter snakes include carp (*Cyprinus carpio*), mosquitofish (*Gambusia affinis*), other small fish, and bullfrog (*Rana catesbeiana*). Native prey species include Sacramento blackfish (*Orthodox microlepidotus*) and Pacific treefrog (*Pseudacris [Hyla] regilla*). (U.S. Fish and Wildlife Service 1999.)

Reproduction and Demography

Giant garter snakes begin to court and mate soon after emergence from overwintering sites. The breeding season lasts from March through May and resumes briefly in September (U.S. Fish and Wildlife Service 1999). Females give birth to live young from late July through early September. Brood size averages 23 young but can range from 10 to 46 (Hansen and Hansen 1990). Sexual maturity is attained at approximately 3 years in males and 5 years in females (U.S. Fish and Wildlife Service 1999).

Population size estimates for giant garter snakes are limited. In one mark-recapture study in the rice lands of the Natomas Basin in Sacramento County, population size was estimated at 1,000 garter snakes in 1 square mile. Population estimates at Colusa National Wildlife Refuge, Badger Creek, and Gilsizer Slough ranged from 119 to 206 individuals (U.S. Fish and Wildlife Service 1999.)

Movement

Giant garter snakes are most active from early spring through mid-fall but activity may vary depending on weather conditions. By November 1, most snakes have moved into winter retreats, where they generally remain inactive during the winter months. On warmer days, giant garter snakes may occasionally bask or move short distances away from hibernation sites. (U.S. Fish and Wildlife Service 1999.)

Radiotelemetry studies have shown that giant garter snakes move very little from day to day. However, activity varies substantially among individuals. Snakes moved up to 8 kilometers (5 miles) at the Colusa Wildlife Refuge following dewatering of habitat during refuge maintenance. Movements of giant garter snakes have ranged from 250 meters (820 feet) to 0.8 kilometer (0.5 mile) in a day. (U.S. Fish and Wildlife Service 1999.)

Ecological Relationships

Likely predators of giant garter snake include raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), opossum (*Didelphis virginiana*), foxes, Northern Harrier (*Circus cyaneus*) and other hawks, egrets, and Great Blue Heron (*Ardea herodias*). Giant garter snakes are not thought to be territorial, though their competitive relationships with other snakes are not well understood. Giant garter snake may coexist with valley garter snake (*T. sirtalis fitchi*) and western terrestrial garter snake (*T. elegans*). Differences in foraging behavior may allow these species to co-occur. (Zeiner et al. 1988; U.S. Fish and Wildlife Service 1999.)

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Swainson's Hawk (*Buteo swainsoni*)

Conservation Considerations

Status

Federal: None
State: Threatened
Other: None

Distribution

Swainson's hawks inhabit grasslands, sage-steppe plains, and agricultural regions of western North America during the breeding season, and winter in grassland and agricultural regions from Central Mexico to southern South America (Woodbridge et al. 1995a; England et al. 1997; Bradbury et al. in prep.). The North American breeding range extends north from California to British Columbia east of the Sierra Nevada and Cascade Ranges, east to Saskatchewan, and south to northern Mexico. Several disjunct populations occur throughout the breeding range, including populations in Alaska, western Missouri, and the Sacramento and San Joaquin Valleys of California. (England et al. 1997.)

In California, the nesting distribution includes Great Basin sage-steppe communities and associated agricultural valleys in extreme northeastern California, isolated valleys in the Sierra Nevada in Mono and Inyo Counties, the Sacramento and San Joaquin Valleys, and at least one known isolated breeding site in the Mojave Desert.

Population Trend

There is no comprehensive estimate of the Swainson's hawk population in North America; however, as many as 845,000 migrants have been counted over Panama City, Panama, during migration. Population declines have been noted in several portions of the species' range, and the current range-wide population is likely reduced from historic times; however, the current overall population trend remains undetermined. (England et al. 1997.)

Since 1980, on the basis of nesting records alone, populations in California appear relatively stable. However, continued agricultural conversion and practices, urban development, and water development have reduced available habitat for Swainson's hawks throughout their range in California; this habitat reduction could potentially result in a long-term declining trend. The status of populations, particularly with respect to juvenile survivorship, remains unclear.

Threats

Early accounts described the Swainson's hawk as one of the most common raptors in California, occurring throughout much of lowland California (Sharp 1902). Since the mid-1800s, native habitats have undergone a gradual conversion to agricultural uses. Today, native grassland habitats are virtually nonexistent in the state, and only remnants of the once vast riparian forests and oak woodlands still exist (Katibah 1983). This habitat loss has caused a substantial reduction in the breeding range and the size of the breeding population in California (Bloom 1980; England et al. 1997). Swainson's hawks are also sensitive to habitat fragmentation (Estep and Teresa 1992). The state currently supports between 700 and 1,000 breeding pairs (Swainson's Hawk Technical Advisory Committee file data), which represents less than 10% of the historic population (Bloom 1980).

Conservation and Management

The Central Valley population (between 600 and 900 breeding pairs) extends from Tehama County southward to Tulare and Kings Counties and is isolated from the rest of the species' range. Extensive banding (Estep 1989, unpublished data; Bloom unpublished data; Woodbridge unpublished data) suggests that no movement occurs between the Central Valley breeding population and other populations. Results of satellite radiotelemetry studies of migratory patterns further suggest little to no interaction between the Central Valley population and other populations of Swainson's hawks (Bradbury et al. in prep.).

Biology

Habitat Requirements

In California, Swainson's hawk habitat generally consists of large, flat, open, undeveloped landscapes that include suitable grassland or agricultural foraging habitat and sparsely distributed trees for nesting (England et al. 1997).

Swainson's hawks usually nest in large native trees such as valley oak (*Quercus lobata*), cottonwood (*Populus fremontia*), and willows (*Salix* spp.), although nonnative trees, such as eucalyptus (*Eucalyptus* spp.), are occasionally used. Nests occur in riparian woodlands, roadside trees, trees along field borders, isolated trees, small groves, trees in windbreaks, and the edges of remnant oak woodlands. In some locales, urban nest sites have been recorded (England et al. 1995). Stringers of remnant riparian forest along drainages contain the majority (87%) of known nests in the Central Valley (England et al. 1997; Schlorff and Bloom 1984). Nests are constructed using materials from the nest tree or nearby trees, are up to 60 centimeters (24 inches) in diameter, and are usually constructed as high as possible in the tree, providing optimal protection and visibility (England et al. 1997).

Swainson's hawks require wide-open landscapes for foraging. Historically, the species used grass-dominated and desert habitats throughout most of lowland California. Over the past century, conversion of much of the historic range to agricultural uses has shifted the nesting distribution into agricultural areas that mimic grassland habitats or otherwise provide suitable foraging habitat. Suitable agricultural crop patterns include a mixture of hay, grain, and row crops with low-lying vegetation that support adequate rodent prey populations.

Under optimal conditions, individual nesting pairs require a minimum of approximately 300 hectares (741 acres) of suitable foraging habitat; however, foraging ranges are geographically and temporally variable and are dependent largely on cover type and phenology and their relationship to prey availability (Fitzner 1978; Bechard 1982; Estep 1989; Babcock 1995).

Reproduction and Demography

Swainson's hawks are entirely diurnal. Adults arrive on the breeding grounds from early March to early April. Courtship and nest construction begin immediately upon arrival. One to four eggs are usually laid in early to mid-April; incubation lasts 34–35 days until mid-May when young begin to hatch. The brooding period typically continues through early to mid-July when young begin to fledge (England et al. 1997). Nestlings fledge at an average of 43 days (range 38–46 days) (Olendorff 1973; Fitzner 1980). Studies conducted in the Sacramento Valley indicate that one or two (occasionally three) young typically fledge from successful nests, with an average of 1.6 young per successful nest (England et al. 1995; Estep in prep.). After fledging, young remain near the nest and are dependent on the adults for approximately 4 weeks, after which they permanently leave the breeding territory (Anderson et al. in prep.).

During most of the breeding season (March–August), nesting pairs maintain a relatively small defended territory around the nest and conduct regular foraging bouts during the day. During the incubation and brooding phases of the nesting cycle (April–June), the male does the majority of the foraging and provisions the female, who provides the primary care of young during incubation and brooding (Fitzner 1980; Estep 1989). Foraging bouts are generally conducted alone; however, inter- and intraspecific foraging groups may form away from the defended territory. Adults generally roost at or near the nest site during inactive periods.

Adults become more gregarious later in the breeding season once young have fledged (July). By mid-August, breeding territories are no longer defended. Approximately 4 weeks following fledging, the young leave the nesting territory and join premigratory groups. The adults also join premigratory groups that remain loosely intact during migration and throughout the wintering season (Anderson et al. in prep.; Bradbury et al. in prep.).

During the breeding season, Swainson's hawks feed primarily on small rodents, including voles (*microtus* sp.), deer mice (*Peromyscus* sp.) house mice (*mus musculus*), and pocket gophers (*Thomomys* sp.). Swainson's hawks typically

forage in large fields that support low vegetative cover (to provide access to the ground) and provide the highest densities of prey (Bechard 1982; Estep 1989). In agricultural regions, these habitats include fields of hay and grain crops; certain row crops, such as tomatoes and sugar beets; and lightly grazed pasturelands. Fields lacking adequate prey populations (e.g., flooded rice fields) or those that are inaccessible to foraging birds (e.g., vineyards and orchards) are rarely used (Estep 1989; Babcock 1995). Food items less frequently taken include reptiles, birds, and insects.

Swainson's hawks forage in open country. The usual foraging technique involves searching for prey from a low-altitude soaring flight (30–90 meters [98–295 feet] above the ground) and attacking prey by stooping toward the ground (Dunston et al. 1978; Estep 1989). Occasionally, Swainson's hawks hunt from perches (e.g., fenceposts, utility poles). In agricultural habitats, foraging ranges are highly variable depending on crop patterns and crop phenology (Bechard 1982; Estep 1989). Seasonal and annual foraging ranges are dependent on changes in vegetative height and density that fluctuate with the pattern of crop maturity and harvest.

Throughout their range, Swainson's hawks are known to exploit prey made available through ground-disturbing activities, particularly in agricultural areas. Swainson's hawks are regularly observed on the breeding and wintering grounds hunting behind farm machinery (Estep 1989; Bradbury et al. in prep.). Bent (1937) first reported this phenomenon in southern California; it was later studied by Caldwell (1986) with respect to prey capture success.

In California, home ranges are dependent largely on crop patterns and phenology, and accordingly exhibit substantial annual and seasonal variation. Reported mean home ranges in the Central Valley range from 2,760 hectares (6,820 acres) (Estep 1989) to 4,038 hectares (9,978 acres) (Babcock 1995). In other portions of the species' range where there is less dependence on agricultural habitats, reported home ranges are smaller (Fitzner 1978; Anderson 1995).

Movement

In California, Swainson's hawks begin their fall migration from late August to mid-September (Bloom 1980; Estep 1989; England et al. 1997). Satellite radiotelemetry studies from 1995 to 2001 have identified migratory routes, timing, and wintering grounds (Woodbridge et al. 1995a; Bradbury et al. in prep.). Based on these and other telemetry studies, all but the Central Valley population migrates along the eastern edge of Mexico through Central and South America to winter in the La Pampa region of Argentina. The Central Valley population winters primarily in Central Mexico and, to a lesser extent, throughout portions of Central and South America. (Bradbury et al. in prep.)

Woodbridge et al. (1995b) noted an average dispersal distance of 8.8 kilometers (5.5 miles) between natal site and subsequent breeding site in northeastern California. In the Sacramento Valley, two birds banded as nestlings and subsequently resighted as breeding adults nested within 3.5 kilometers (2.2

miles) of their natal site (Estep 1989). Much greater dispersal distances from natal sites have been observed in other parts of the range, most notably distances up to 310 kilometers (193 miles) in Saskatchewan (Houston and Schmutz 1995).

A high degree of nest site fidelity has been noted in Swainson's hawks in California. Individuals often use the same nest, the same tree, or a nearby tree in subsequent years. In the Sacramento Valley, mean inter-territory adult movement was approximately 100 meters (328 feet). (Estep in prep.) Less nest site fidelity was noted in northeastern California, where mean inter-territory movements between 1984 and 1994 were 2.2 kilometers (1.4 miles) (Woodbridge et al. 1995b).

Ecological Relationships

There is no information on predation of adult Swainson's hawks; however, nestlings are susceptible to predation by great horned owls (*Bubo virginianus*), American crows (*Corvus brachyrhynchos*), and various mammalian predators (Dunkle 1977; Woodbridge 1991; Estep in prep.).

Swainson's hawks are territorial during the breeding season; however, away from the nest site adults are more tolerant of conspecifics and other raptors. During the prenesting period, adults are highly aggressive around the nest as they reestablish their territorial boundaries. During communal foraging events and from postfledging through migration and wintering periods, adults are gregarious and tolerate conspecifics as well as other raptor species (Fitzner 1978; Estep 1989; England et al. 1997).

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White-Tailed Kite (*Elanus leucurus*)

Conservation Considerations

Status

Federal: None
State: None
Other: Fully protected under California Fish and Game Code

Distribution

California is the distributional center and stronghold of the breeding range of White-tailed Kite in the United States. Breeding occurs primarily in the Central Valley and along the length of the California coast. Outside California, breeding has been regularly documented since 1976 in western Oregon and since the 1980s in southwestern Washington. White-tailed Kites breed commonly in southern Texas, and a small population of regular breeders have been present in southern Florida since at least 1986. Outside the United States, White-tailed Kites are found along the coastal areas of Mexico, Panama, the Caribbean slope,

Colombia, Venezuela, Guyana, Brazil, Paraguay, Uruguay, and northern Argentina. (Dunk 1995.)

Population Trend

White-tailed Kite populations have fluctuated greatly over the past century. Grinnell and Miller (1944) stated that this species was common and widespread in valley and foothill territories before 1895, but by the 1930s it was rare or entirely gone from many areas and some authors predicted extinction in California (Pickwell 1930; Bent 1937). From the 1940s through the 1980s, kite populations increased and their range expanded north into Oregon, south into Central America, and east into Texas (Dunk 1995). Although Breeding Bird Survey Data for several regions and time periods have shown significant declines (Dunk 1995), more recent data for the period 1980–2000 indicate no significant declining trends in California (Sauer et al. 2001).

Declines during the early part of the century were probably the result of habitat loss, shooting (this kite was considered a pest species), and egg collecting (Dunk 1995). Kite populations fluctuate greatly with cycles of prey abundance, which, in turn, are significantly correlated with rainfall (Pruett-Jones et al. 1980). These fluctuations make determination of long-term population trends difficult.

Threats

Degradation and loss of breeding and foraging habitat is probably the most important threat still facing this species (Dunk 1995). Loss of nest trees, increased human disturbance, and disturbance of communal roosting trees have all been identified as potential threats to the species.

Conservation and Management

White-tailed Kite has been designated a *fully protected species* since the 1950s, when populations were low. Information on the effects of large-scale management actions are not available. However, in northern California, White-tailed Kite densities increased substantially when the California Department of Fish and Game bought previously grazed grasslands and largely removed them from grazing, which resulted in a substantial increase in the density of California voles (*Microtus californicus*) (Dunk 1995.)

Biology

Habitat Requirements

White-tailed Kites generally inhabit low-elevation grassland, savannah, oak woodland, wetland, agricultural, and riparian habitats. Some large shrubs or trees are required for nesting and for communal roosting sites. Vegetation structure and prey populations appear to be more important than plant associations in determining suitability. Nest trees range from small, isolated shrubs and trees to trees in relatively large stands. (Dunk 1995.)

Demography

White-tailed Kite is a monogamous species. The breeding season lasts from mid-March through late May. The female incubates the clutch of four or five eggs for 28 days. Females usually produce only one brood per breeding season but may produce two. Estimates of mean reproductive success range from 1.6 to 3.2 young per successful nest. The maximum recorded life span is 5 years 11 months for a banded bird that was shot. (Dunk 1995.)

Kite populations fluctuate greatly with cycles of prey abundance, which correlate significantly with rainfall (Pruett-Jones et al. 1980) .

Movement

Stendell (1972) considered White-tailed Kites to be residents that became nomadic during periods of low abundance of California voles. The idea that kites are nomadic is supported by the dramatic range expansion over the last 40 years (Dunk 1995) and the close correlation between kite populations and California vole abundance documented in northern California (Dunk and Cooper 1994).

Ecological Relationships

White-tailed Kites prey almost exclusively on small mammals (primarily California voles in California), and populations are closely tied to prey abundance (Dunk 1995). Territory size is also proximally controlled by abundance of predators and ultimately by prey abundance (Dunk and Cooper 1994). White-tailed Kites are territorial, and will defend their territories against conspecifics and other raptors. They are also subjected to kleptoparasitism from several raptor species. (Dunk 1995.)

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Golden Eagle (*Aquila chrysaetos*)

Conservation Considerations

Status

Federal: Bald and Golden Eagle Protection Act
State: Fully Protected Species
Other: None

Distribution

The Golden Eagle is distributed worldwide throughout the Northern Hemisphere. Golden eagles are typically associated with the plains of the western United States and are fairly common in our western states, Alaska and western Canada.

In North America, migratory breeding populations are found in northern Alaska east to the Northwest Territories and through parts of the northeastern U.S. The wintering range of migratory populations encompasses much of the central and eastern U.S. Year-round residents are found throughout the western U.S. (Johnsgard 1990).

Population Trend

Golden eagles have been protected in the United States since 1963. During the 1950's, an estimated 20,000 eagles were destroyed by ranchers, particularly sheep farmers who perceived them to be a threat. In the northeastern states, remnant populations declined drastically.

The golden eagle is thought to be stable in most areas of the western United States but declining in southern California. It is presumably stable elsewhere in California.

Threats

Existing threats to the golden eagle in California include loss of both foraging and nesting habitat; human disturbance of nesting birds; and direct fatalities from wind-turbine strikes, electrocution, and poisoning. An analysis of the fatalities of 61 radio-tagged golden eagles recovered in the Diablo Range between January 1994 to December 1997 showed that 37% of all fatalities resulted from turbine strikes, 16% by electrocution, and 5% by lead poisoning (Hunt et al. 1998). Of the remaining fatalities, causes included fledging mishaps (10%) car strikes (5%), territorial fights with other eagles (5%), collision with fences (3%), shootings (2%), botulism (2%), and unknown factors (15%)

Conservation and Management

Golden-eagle management and conservation generally includes habitat management, population enhancement, hazard management, control of human activity in sensitive areas, and education. Cattle ranching can potentially benefit the golden eagle if grazing is maintained at moderate levels that stimulate growth of herbaceous foods used by primary prey species, including ground squirrels and rabbits (Hunt et al. 1995).

Hazard-management efforts being implemented to reduce wind-turbine strikes include replacement of turbine models with fewer larger, but slower, turbines that are less likely to strike soaring or hunting eagles. PG&E and other utilities have implemented extensive measures to reduce incidence of electrocution.

Biology

Habitat Requirements

Golden eagles use nearly all terrestrial habitats of the Western states except densely forested areas. Secluded cliffs with overhanging ledges and large trees are used for nesting and cover. Nest trees include several species of oak (*Quercus* spp.), foothill pine (*Pinus sabianiana* and *P. coulteri*), California bay laurel (*Umbellularia californica*), eucalyptus (*Eucalyptus* spp.), and western sycamore (*Plantanus racemosa*) (Hunt et al. 1998). Preferred territory sites include those that have a favorable nest site, a dependable food supply (medium to large mammals and birds), and broad expanses of open country for foraging. Hilly or mountainous country where takeoff and soaring are supported by updrafts is generally preferred to flat habitats (Johnsgard 1990). Deeply cut canyons rising to open mountain slopes and crags are considered ideal habitat (Beebe 1974).

Breeding densities are directly related to territorial spacing and foraging requirements for the species. Territory size has been estimated to average 124 square kilometers (sq km) in northern California (Smith and Murphy 1973) but can vary largely with habitat conditions. Hunt et al. (1998) report an 820-sq km area near Livermore supporting at least 44 pairs of golden eagles, with a density of 1 pair per 19 sq km. This density is among the highest reported for the species.

Reproduction and Demography

Nest building can occur almost any time of year (Brown 1976). Golden eagles prefer to locate their nests on cliffs or trees near forest edges or in small stands near open fields (Bruce et al. 1982, Hunt et al. 1995, 1998). Mating occurs from late January through August, with peak activity in March through July. Eggs are laid from early February to mid-May. Clutch size varies from 1 to 4 eggs, but a clutch of 2 eggs is most common (Brown 1976, Johnsgard 1990, Hunt et al. 1995). Incubation lasts 43–45 days (Beebe 1974), and the fledging period is about 72–84 days (Johnsgard 1990). The young usually remain dependent on their parents for as long as 11 weeks. Breeding success tends to vary with local prey abundance.

In a 15-year study of golden eagles in Oregon, Thompson et al. (1982) calculated a mean of 1.08 young fledged per breeding territory, 1.7 young fledged per successful nest, and 51% overall nesting success. In Idaho, Beecham and Kochert (1975) showed a similar average of 1.1 young fledged per nesting attempt, 1.8 young fledged per successful nest, and 65% overall nesting success.

There are no published reports of the longevity of Golden Eagles in the wild. Captive Golden Eagles have lived to 48 years, but it unlikely that they live that long in the wild (Brown and Amadon 1968).

Movement

Breeding golden eagles in the central California are mostly resident; juveniles may remain in the vicinity of their natal area until evicted by the parents. Floater non-breeding birds (adults without breeding territories) commonly move about regionally until they find a suitable vacant territory or are able to evict a territorial owner (Brown 1969, Hunt et al. 1995, 1998). Some migrants may temporarily move into areas used by resident birds during the winter.

Ecological Relationships

Golden eagles are top avian predators. They may directly compete with ferruginous hawks and other smaller hawks for small mammals. Territorial interactions with other golden eagles may result in some fatalities.

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Bald Eagle (*Haliaeetus leucocephalus*)

Conservation Considerations

Status

Federal: Threatened; proposed for delisting by the US Fish and Wildlife Service July 4, 1999.
State: Endangered
Other: Fully Protected Species (California Fish and Game Code 3511); Protected under Bald and Golden Eagle Protect Act; California Department of Forestry and Fire Prevention Sensitive; Partners in Flight Priority Bird Species.

Distribution

The bald eagle occurs throughout most of North America with isolated breeding populations in Baja California and northern Mexico. Breeding birds in California are resident, but the winter population is supplemented by migrants from northern areas. Individuals breeding in California may move in search of food. In the San Joaquin Valley, birds occur almost exclusively as wintering migrants between October and March.

Population Trend

Bald Eagle populations were decimated in the 1950s and 60s by the indiscriminate use of pesticides, principally DDT. With the banning of DDT in 1972 and with the species' listing in the lower 48 states, populations have rebounded throughout most of the species range. In addition to a constant upward trend in population, productivity data for the past 10 years show that the target for productivity identified in the recovery plan has been met and remains relatively constant.

Although not all goals have been reached, most population objectives set in the recovery plan have been met or exceeded (US Fish and Wildlife Service 1999). In 1994, populations were estimate at approximately 4,450 occupied breeding areas with 1.16 young produced per occupied area. This estimate reflected a 462% increase over 1974 estimates. In 1998, the population was estimated at 5,748.

In California, the breeding population is continuing to increase in numbers and range. Productivity averaged between 0.97 and 1.1 young produced per occupied territory from 1996 to 1999. Thirty-two new breeding territories were reported in the state between 1996 and 1998. The breeding range has expanded from portions of eight of California's 58 counties in 1981 to 27 counties currently.

Threats

Certain areas within the bald eagle's range continue to have problems with DDT contamination including the Great Lakes, Maine, the Columbia River, and portions of southern California. Other continuing threats include shooting, habitat destruction, electrocution on power poles, human disturbance, or poisoning (by pesticides other than DDT).

A study of nests in Oregon identified the following causes of nest failures: pesticides (32 percent), proximity to nearest-neighbor breeding pairs (11 percent), infertile eggs (7 percent), nestling mortality (3 percent), human disturbance (2 percent), changes in members of a pair (1 percent) and unknown causes (21 percent). In Washington, studies found that the vast majority of wintering bald eagles tolerated human activities at a distance of 300 meters (985 feet), and only half tolerated activity at a distance of 150 meters (492 feet) (Stalmaster and Newman 1978; Buehler 2000). The most disturbing human activity appears to be boating, although hiking and car traffic are also significant disturbances (Buehler 2000).

In the San Joaquin Valley, principal threats to wintering migrants are probably loss of habitat and human disturbance (Anthony et al. 1994).

Conservation and Management

The Pacific States Bald Eagle Recovery Plan (USFWS 1986) covers seven western states including California. The recovery plan calls for at least 800 nesting pairs in the plan area, breeding populations in 80% of the management zones with nesting potential, productivity averaging 1.0 young per occupied nest with an average success rate of 65% per occupied site, and stable or increasing wintering populations. The San Joaquin Valley (Recovery Zone 29) was not assigned a target for number of nesting pairs in recognition of the lack of suitable nesting habitat available in the region. The proposed management direction for this recovery zone was maintenance of the limited wintering habitat that occurs in the valley.

Biology

Habitat Requirements

Bald eagles are mostly found along shorelines of lakes, reservoirs, rivers and streams with an adequate food base, perching areas, and nesting sites (Gerrard and Bortolotti 1988). Perching sites tend to be large trees or snags with heavy limbs or broken tops (USFS pers. comm. 1999). Nest sites are always near bodies of water, usually lakes and rivers that support abundant fish, waterfowl, or other waterbird prey. In some cases, the distance to water is not as critical as the quality of the foraging area defined by diversity, abundance, and vulnerability of the prey base, structure of aquatic habitat, and absence of human development or disturbance (Buehler 2000). In California, bald eagles nest in trees that usually have an unobstructed view of water bodies and are typically the dominant or co-dominant trees in their surrounding stands (Lehman 1979). Lehman et al. (1980) and Anthony et al. (1982) reported that the mean diameter of nest trees in California and Oregon was 104-117 centimeters (41-46 inches) at breast height. Wintering bald eagles sometime forage in grassland areas in California, especially where they can scavenge on lamb carcasses and other carion.

In the San Joaquin Valley migrant bald eagles may occur in small numbers principally along waterways with well-developed riparian corridors. Specific habitats include cottonwood riparian forest, valley oak riparian forest, willow scrub, and freshwater marsh with associated with migrating waterfowl. Nesting has recently been reported in lowland riparian habitat in Merced County.

Reproduction and Demography

Bald eagles are monogamous and thought to mate for life. Courtship displays and nest building begin up to 3 months prior to egg laying. Breeding occurs in open areas near water (Brown 1999). They often select the largest tree in a stand to build a stick platform nest. The nest may be a massive structure, up to twelve feet high, eight and a half feet across, with a wet mass of decaying vegetation in the

center weighing many hundred pounds (Brown and Amadon 1968). The nest is typically located 16-61 meters (50-200 ft) above ground, usually below the tree crown. The species of tree used for nesting is less relevant than the height and size of the tree. The nest is usually located near a permanent water source. In California, 87 percent of bald-eagle nest sites were within 1.6 kilometers (1 mile) of the water. Individuals have been known to use the same nest for up to 35 years. (Brown 1999).

The bald eagle breeds from February through July, with a peak in activity from March to June. The clutch size of the bald eagle is usually two but can vary from one to three, and eggs are laid once annually (Brown 1999). Incubation lasts for approximately 35 days and the semi-altricial young hatch asynchronously (Ehrlich, et al. 1988). The young fledge at about 11-12 weeks, but parental care may extend for another 4-11 weeks.

Movement

Upon leaving the nest site, most juveniles migrate a few hundred miles to wintering areas (US Fish and Wildlife Service 1999). However, there is little information on dispersal in bald eagles because of the length of time (4-5 years) between fledging and sexual maturity. Juvenile marked in northern California migrated north in the fall following to Alaska, where they fed on salmon carcasses. Most juveniles that were color marked in the greater Yellowstone ecosystem were subsequently found breeding within that system. However, two males nested up to 328 kilometers (204 miles) from their natal sites. A mark-recapture study of a breeding population in Texas concluded that birds fledged there may disperse to breeding communities throughout the southern United States (Mabie, et al. 1994).

Ecological Relationships

The bald eagle competes with, and steals prey from, osprey (Zeiner et al. 1990). They also harass and are harassed by golden eagles, other raptors, and corvids (Buehler 2000). Bald eagles have been observed causing a turkey vulture to disgorge its food (Brown and Amadon 1968). Bald eagles defend territories against conspecifics during the breeding season and often behave aggressively toward one another in disputes over food resources.

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California Black Rail (*Laterallus jamaicensis coturniculus*)

Conservation Considerations

Status

Federal: None
State: Threatened

Other: U.S. Fish and Wildlife Species of Concern; fully protected under the California Fish and Game Code

Distribution

California Black Rails breed predominantly in tidal marshes surrounding the larger bays of California from Bodega Bay south, and along the waterways of the Sacramento–San Joaquin River Delta. The majority of the breeding population nests in the northern San Francisco Bay area, but small disjunct populations occur as far south as northwestern Baja California, and small populations are found on the lower Colorado River and in the Salton Trough. It is unclear whether the Colorado River/Salton Trough populations are recently established or are relict populations from wider historical distribution. (Eddleman et al. 1994.) California Black Rails are considered year-round residents; however, Grinnell and Miller (1944) reported a wider distribution in summer than in winter.

Population Trend

California Black Rail has been extirpated as a breeding species on the southern California coast since the 1950s. Evens (1991) reported that a small breeding population still occurred at Morro Bay. (Evens et al. 1991). Although little baseline information is available, California Black Rail populations have suffered drastic declines throughout the taxon's range (Eddleman et al. 1994).

Threats

The greatest threat to California Black Rail is the continued loss and degradation of tidal marsh habitat. Only 15% of the historic tidal marshlands of the San Francisco Bay persist, constituting 90% of the remaining tidal marshlands statewide. Livestock grazing has reduced or eliminated the natural vegetative transition between marsh and upland habitats; this zone provides essential high tide refugia for rails. (Evens et al. 1991.) Loss of this zone renders rails particularly vulnerable to predation by raptors, herons, egrets, owls, and possibly gulls and shrikes (Evens and Page 1985). Diversion of freshwater inflow to the North Bay and toxic contamination contribute to the continuing degradation of tidal marsh habitats. Isolated populations are susceptible to stochastic extinction. (Evens et al. 1991.)

Conservation and Management

A recovery plan has not been prepared and recovery requirements have not been identified for this species.

Biology

Habitat Requirements

California Black Rails inhabit saltwater, brackish, and freshwater marshes. Vegetation can range from almost pure pickleweed (*Salicornia* sp.), to sedges (*Carex* sp.) and saltgrass (*Distichlis* sp.), to bulrush (*Scirpus* sp.) and cattails (*Typha* sp.) (California Department of Fish and Game 1987). They breed in the high portions of marshes where adjacent upland vegetation is available for escape during extreme high tides.

Reproduction and Demography

California Black Rails are primarily carnivorous, gleaning isopods, insects, and other arthropods from the surface of mud and vegetation (Zeiner et al. 1990.) However, Eddleman et al. (1994) cited sources suggesting that some black rails (of unspecified subspecies) have been documented to consume substantial quantities of bulrush seeds, particularly in winter. Although limited data are available, the species appears to exhibit a circadian activity pattern (Zeiner et al. 1990).

Limited information is available on nesting behavior and pair formation (Eddleman et al. 1994). The nest is a deep loose cup at or just above ground level, concealed in dense vegetation near the upper limits of tidal flooding (Zeiner et al. 1990.) Clutch size ranges from three to eight, with a mean of six; there is circumstantial evidence of second clutches or nests. Both parents incubate the eggs; the chicks are semiprecocial. (Eddleman et al. 1994.) Nesting and rearing typically occurs in the late fall and early spring from October 15 to July 15.

Movement

Juveniles disperse widely from the natal site; they may appear in atypical habitat. This trait suggests that the taxon may be capable of colonizing unoccupied suitable habitats. (Eddleman et al. 1994). California Black Rails are sometimes found away from wetlands in late summer and fall, suggesting that some postbreeding movement takes place; further, there is some evidence that rails may winter in areas where they do not breed (Zeiner et al. 1994).

Ecological Relationships

California Black Rails are subject to predation by raptors, herons and egrets, and domestic cats (Evens and Page 1985; Zeiner et al. 1994). As discussed above, habitat modification, especially loss of the marsh/upland ecotone that the birds

require for escape habitat during extreme high tides, renders them particularly susceptible to predation.

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Greater Sandhill Crane (*Grus canadensis tabida*)

Conservation Considerations

Status

Federal: Migratory Bird Treaty Act, USFWS Sensitive Species
State: Threatened
Other: Fully Protected Species (California Fish and Game Code 3511)

Distribution

The greater sandhill crane is the largest of four recognized subspecies of sandhill crane (Walkinshaw 1949). Five populations of greater sandhill crane, all migratory, are recognized in North America. The Central Valley population, estimated at 3,400-6,000 individuals (DFG 1989), nests from northeastern California to British Columbia (USFWS 1978, Pogsdon and Lindstedt 1988). These birds winter in open, marshy areas throughout the Central Valley, along

with the entire Pacific Flyway population of lesser sandhill crane (Grus canadensis) (Pogsdon et al. 1988).

Seven sites in the Central Valley are considered important wintering sites for the greater sandhill crane: Sacramento-San Joaquin River Delta, Chico, Butte Sink, Angel Slough, Modesto, Merced, and Pixley. The most important of these sites is the Sacramento-San Joaquin Delta, which supports as much as 75% of the Central Valley population during late winter (Pogsdon and Lindstedt 1988).

Population Trend

In the Pacific states, the greater sandhill crane was reduced in the late 1800s and early 1900s (Littlefield and Thompson 1979). Habitat destruction and unlimited hunting during and after settlement were major causes of the decline. Current declines in the breeding population of California are attributable to the loss and degradation of important wetland breeding sites in northeastern California (DFG 1989) as well as conversion of wetland habitats in the Central Valley. Pogsdon and Lindstedt (1988) suggest that the distribution of wintering cranes may have been more widespread throughout the Central Valley, but destruction of wetland habitats caused the Central Valley population to concentrate onto the remaining key winter sites. Only an estimated 5% of the original wintering grounds in the Central Valley remain in existence.

Threats

Habitat loss and degradation, especially in the California wintering grounds, are the biggest threats to the greater sandhill crane. Reduced wintering habitat concentrates the birds in smaller areas where their food is less available, and the risk of disease due to overcrowding is higher. In some breeding areas, agricultural practices are a threat – birds often nest in pastures, and these nests along with young birds are often destroyed during mowing. Collisions with powerlines have also been a concern for birds wintering in the foggy Central Valley. Greater sandhill cranes have a low reproductive rate making recovery a challenge (DFG 2003).

Conservation and Management

Resource agencies are acquiring wintering habitat for the sandhill crane in the Central Valley, notably Woodbridge Ecological Reserve in the delta and in the Butte Sink. Resource agencies are promoting conservation easements to farmers and ranchers to maintain the shallow marshes preferred by nesting cranes. At two federal refuges the power-lines have either been buried or marked with orange spheres to reduce collision damage to the crane (CDFG 1991).

Biology

Habitat Requirements

Cranes establish territories in open, wet meadows that are often interspersed with emergent marsh (CDFG 1991). Nests are usually built over shallow water, sometimes in dense aquatic vegetation. These conditions enable young birds to forage for invertebrates during the first few weeks of life. After the young have fledged, cranes move to grain fields and other suitable habitats near roost sites (CDFG 1991). Cereal grain crops such as corn are heavily utilized by the sandhill crane at most of the winter concentration areas, particularly in the Sacramento-San Joaquin Delta near Lodi (DFG 1991). Concentration areas on wintering grounds are within a few miles of secure roost sites that can often accommodate several thousand cranes (DFG 1991).

Reproduction and Demography

Greater sandhill cranes do an elaborate courtship dance - leaping into air, bowing their heads, flapping their wings, tossing vegetation, and singing gurgling duets. They lay two eggs in a large, mounded nest of sticks, grass, and reeds in a marshy area. Both parents incubate the eggs and tend the young. Incubation takes 29-32 days. Upon hatching, the precocial young develop quickly and are soon active and following the parents. Fledging takes 65-75 days. Sandhill cranes are thought to mate for life and return to the same nesting territory year after year. Cranes are long-lived and can live up to 20 years in the wild. (DFG 2003).

Movement

The greater sandhill crane breeds primarily in the northeaster portion of California and winters in the Sacramento and San Joaquin valleys. Greater sandhill cranes begin arriving in the Central Valley in October. During winter, the distribution of the Central Valley population shifts as cranes move between major wintering sites.

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Western Burrowing Owl (*Athene cunicularia hypugnea*)

Conservation Considerations

Status

Federal: None
State: None
Other: U.S. Fish and Wildlife Service species of concern; California Department of Fish and Game species of special concern

Distribution

Western Burrowing Owl is found throughout western North America west of the Mississippi River and south into Mexico; it is resident throughout most of its breeding range (American Ornithologists' Union 1998). The taxon occurs throughout California and the Central Valley (Grinnell and Miller 1944).

Population Trend

Since the 1940s, Western Burrowing Owl numbers have declined in most parts of the state except the Imperial Valley (DeSante and Ruhlen 1995). The species is experiencing precipitous population declines throughout North America; it is also declining throughout most of the western United States, and has disappeared from much of its historical range in California. Nearly 60% of California burrowing owl "colonies" that existed in the 1980s had disappeared by the early 1990s (DeSante and Ruhlen 1995; DeSante et. al. 1997). In the San Francisco Bay Area and the central portion of the Central Valley (from Yolo and Sacramento Counties to Merced County), the Burrowing Owl population has declined by at least 65% since 1986 (Dave DeSante pers. comm.).

Recent studies of Burrowing Owl biogeography suggest that genetically induced problems may threaten the species. One study suggests that small Burrowing Owl populations may be genetically isolated from other populations (Johnson 1992). Another study found a population of burrowing owls near Sacramento to be inbred due to small population size rather than non-random mating (Johnson 1997).

Threats

An immediate threat to Western Burrowing Owl is the conversion of grassland habitat to urban and agricultural uses and the loss of suitable agricultural lands to development. Equally important is the reduction of fossorial (i.e., digging) rodents such as prairie dogs (*Cynomys* spp.) and ground squirrels (*Spermophilus* spp.) across much of the owl's historical range. Eradication programs have decimated populations of these rodents and have in turn disrupted the ecological relationships Burrowing Owls depend on; because Burrowing Owls rely on other animals to dig their burrows, the loss of fossorial rodents limits the extent of year-round burrowing owl habitat. Another cause of population declines is thought to be pesticide use (especially organophosphates in southern Canada), but evidence does not clearly indicate that other contaminants are reducing populations (Gervais et al. 1997). Habitat fragmentation (Remsen 1978) probably increases foraging distances, making hunting less efficient and potentially reducing reproductive success. Fragmentation may reduce the chances that individual male Burrowing Owls will attract mates and could, consequently, decrease reproductive success.

Conservation and Management

Burrowing Owl populations are declining across much of their range (Haug et al. 1993) as habitat destruction and improper use of pesticides affect chick survivorship and dispersal (Winchell 1994). Conversely, some human activities, such as grazing, mowing, and wetland drainage, have had a beneficial effect on Burrowing Owl populations (Haug et al. 1993).

Biology

Habitat Requirements

Burrowing Owls require habitat with three basic attributes: open, well-drained terrain; short, sparse vegetation; and underground burrows or burrow facsimiles. Burrowing Owls occupy grasslands, deserts, sagebrush scrub, agricultural areas (including pastures and untilled margins of cropland), earthen levees and berms, coastal uplands, and urban vacant lots, as well as the margins of airports, golf courses, and roads. (Haug et al. 1993.)

Throughout their range, Burrowing Owls rely on burrows excavated by fossorial mammals or reptiles, including prairie dogs, ground squirrels, badgers, skunks, armadillos, woodchucks, foxes, coyotes, and gopher tortoises (Karalus and Eckert 1987). Where the number and availability of natural burrows is limited (for example, where burrows have been destroyed or ground squirrels eradicated), Burrowing Owls will occupy drainage culverts, cavities under piles of rubble, discarded pipe, and other tunnel-like structures.

Reproduction and Demography

Like other owls, Burrowing Owls breed once per year in an extended reproductive period, during which most adults mate monogamously. Both sexes reach sexual maturity at 1 year of age. Clutch sizes vary, and the number of eggs laid is proportionate to prey abundance; the more prey that is available, the more eggs Burrowing Owls tend to lay. Clutches in museum collections in the western United States contain from one to 11 eggs. Average Burrowing Owl clutch size is usually five to six. (Murray 1976; Baicich and Harrison 1997.)

Burrowing Owls in California typically begin pair formation and courtship in February or early March, when adult males attempt to attract a mate. Beginning in April, eggs are laid at least 1 day apart and are incubated by both adults for about 3–4 weeks. Young owlets are brooded underground for another 3–4 weeks, after which they may occasionally be seen at the burrow entrance in their natal-down plumage. Nestlings emerge asynchronously and tentatively in early June. Nestlings can range widely on foot even before they can fly. The adults guard their brood tenaciously, attacking intruders if provoked. Older nestlings or fledglings may move to nearby satellite burrows as the natal burrow becomes crowded.

During the breeding season, Burrowing Owls spend most of their time within 50–100 meters (162–325 feet) of their nest or satellite burrows during daylight hours (Haug and Oliphant 1990) and forage diurnally in the vicinity of the natal burrow, where they prey on insects in low, open vegetation. Inter-nest distances, which indicate the limit of individual owls' territories, have been found to average between 61 and 214 meters (198 and 695 feet) (Thomsen 1971; Haug and Oliphant 1990).

Depending on assumptions about emigration and immigration, the probability that juvenile burrowing owls will survive to 1 year of age (the age of first breeding) has been estimated between 23 and 93%, and annual adult survivorship between 42 and 93% (Johnson 1997). A wild Burrowing Owl was reported to survive to 8 years 8 months (Kennard 1975).

Movement

Most Burrowing Owls settle near natal areas to breed. There are reports of young dispersing alone and in family groups when leaving breeding areas. Burrowing Owls are known to migrate, though little information on routes, time, or wintering areas is available. (Haug et al. 1993.)

Ecological Relationships

Burrowing Owls often form colonies, but variably exhibit territoriality based on the density of nesting Burrowing Owls within a given area (Haug et al. 1993). The spatial requirements of Burrowing Owls are not well understood. Breeding pairs of Western Burrowing Owls may require a minimum of 2.6 hectares (6.5 acres) of contiguous grassland of high foraging quality to persist (California Department of Fish and Game 1995).

Mammalian predators, such as badger (*Taxidea taxus*), domestic cat (*Felis domestica*), opossum (*Didelphis virginianus*), weasel (*Mustela* spp.), striped skunk (*Mephitis mephitis*) and dogs (*Canis familiaris*), are known to feed on Burrowing Owl young and eggs. Birds that prey on Burrowing Owls include Cooper's Hawk (*Accipiter cooperii*), Swainson's Hawk (*Buteo swainsoni*), Ferruginous Hawk (*Buteo regalis*), Red-tailed Hawk (*Buteo jamaicensis*), Merlin (*Falco columbarius*), Prairie Falcon (*Falco mexicanus*), Peregrine Falcon (*Falco peregrinus*), Great Horned Owl (*Bubo virginianus*), and American Crow (*Corvus brachyrhynchos*) (Wedgwood 1978; Konrad and Gilmer 1984; Millsap and Bear 1988; Martell 1990). Burrowing Owls respond to mammalian predators by aerial attack; they retreat into burrows when confronted with avian predators. Burrowing owls may chase or strike one another to displace intruding conspecifics. Songbirds harass burrowing owls by diving at them. (Haug et al. 1993.)

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Bank Swallow (*Riparia riparia*)

Conservation Considerations

Status

Federal: None
State: Threatened
Other: None

Distribution

Bank Swallow has a holarctic breeding distribution. In the western hemisphere, the species occurs throughout the northern United States and Canada, and locally south to southern New Mexico and Texas (Garrison 1999). In California, Bank Swallows historically occurred along the larger lowland rivers in northern

California, and along the coast and at the mouths of larger rivers (e.g., Los Angeles River) in southern California (Laymon et al. 1988; Garrison 1999). However, the species has been extirpated from southern California, and its statewide range has been reduced by approximately 50% since 1900 (Laymon et al. 1988; California Department of Fish and Game 2000). Currently, 75% of the California population is concentrated on the banks of Central Valley streams, including several colonies on the Sacramento River (California Department of Fish and Game 2000).

Threats

Habitat degradation and loss from flood and erosion control projects is the primary threat to Bank Swallow populations in California (Garrison 1999; California Department of Fish and Game 1995). Wave wash from boats, high winds, and rapidly fluctuating water levels from storms and reservoir releases can cause bank undercutting during the breeding season, possibly causing mortality of eggs and young in Bank Swallow colonies. Loss and modification of wetlands, grasslands, and other open habitats used during migration and at wintering sites has the potential to adversely affect Bank Swallows by reducing insect food resources and roosting habitat. (Garrison 2000.)

Conservation and Management

Bank Swallows in California are dependent on naturally occurring fluvial geomorphologic processes to create and maintain suitable nesting habitat. Specifically, these processes are required to create and maintain suitable nesting habitat. Flood control projects, bank stabilization (i.e., riprap), and water management projects all tend to destroy or inhibit the creation and maintenance of suitable nesting habitat for Bank Swallows. Because these habitats are ephemeral by nature, Bank Swallows tend to exhibit low site fidelity. The combination of low site fidelity and the ephemeral nature of nesting habitat along rivers necessitate a large-scale, riparian ecosystem approach to habitat management for Bank Swallows. (Garrison 2000.)

A recovery plan for Bank Swallow was completed and adopted by the Fish and Game Commission in 1992, but the recommendations have not been implemented (California Department of Fish and Game 2000). Creation of artificial banks and enhancements at occupied banks has been tried with limited success. Creation of artificial burrows appears to be ineffective. (Garrison 1999.)

Biology

Habitat Requirements

In California, Bank Swallows nest in vertical banks, cliffs, and bluffs in alluvial, friable soils. These habitats occur primarily in lowland areas along ocean coasts, rivers, streams, lakes, and reservoirs. Heights of vertical banks at nesting colonies in California averaged 3.3 meters (range 1.3–7.3, n=32). Banks must be vertical enough and tall enough to provide some protection from terrestrial predators. Outside California, Bank Swallows nest in artificial sites such as road cuts and sand and gravel quarries. Foraging habitats around nest sites include wetlands, open water, agricultural areas, shrublands, and occasionally upland woodlands. In migration, Bank Swallows can be found in a variety of open and water-associated habitats. (Garrison 1999.)

Reproduction and Demography

Bank Swallows typically nest in colonies ranging in size from 10 to more than 2,000 nests. Clutches of four to five eggs are laid in April, and three to four young are fledged by July each year. Typically, only one brood per year is raised. The adults and young of the year remain along the riverbanks until they migrate to South America in fall. (Garrison 1999.)

Estimates of annual mortality range from 57 to 60% for adults and from 60 to 80% for juveniles. There are two records of Bank Swallows living at least 9 years. (Garrison 1999.)

Movement

Bank Swallows are migrants that breed primarily in the Central Valley of California and winter in South America. They arrive in California beginning in late March, with the majority of the birds arriving in late April and early May. Fall migration begins in early August. (Garrison 2000.)

Ecological Relationships

A key ecological relationship for Bank Swallow is its relationship with the bank strata needed for successful nesting. The suitability of this microhabitat depends greatly on criteria such as soil moisture, texture, orientation of the bank face, verticality of the bank face, and proximity to foraging areas. Naturally occurring fluvial geomorphologic processes are required to create and maintain suitable nesting habitat. Bank Swallows are preyed upon by a number of species, including raptors, owls, snakes, chipmunks, skunks, and badgers. Predation levels appear to be influenced by habitat conditions. (Garrison 2000.)

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Tricolored Blackbird (*Agelaius tricolor*)

Conservation Considerations

Status

Federal: None
State: None
Other: USDI Fish and Wildlife Service Species of Concern; California Department of Fish and Game Species of Special Concern

Distribution

Tricolored Blackbird breeding colonies have been observed in all Central Valley counties. The vast preponderance of the population occurs in central California, with additional populations in coastal and inland southern California locations, as well as scattered sites in Oregon, western Nevada, and western coastal Baja California. (Beedy and Hamilton 1997, 1999; Hamilton 2000.)

Population Trend

The first systematic, rangewide surveys of the species' population status and distribution were conducted by Neff (1937, 1942), who observed as many as 736,500 adults in a single year (1934) in just eight Central Valley counties. During a 5-year interval, he found Tricolored Blackbirds in 26 California counties; the largest numbers of breeding Tricolored Blackbirds were in the Central Valley. Neff found many large colonies, including one in Glenn County containing more than 200,000 nests (about 300,000 adults) covering almost 24 hectares (60 acres), and several others in Sacramento and Butte Counties that contained more than 100,000 nests (about 150,000 adults). Most of the large colonies were associated with freshwater emergent wetlands in rice-growing areas of California. (Neff 1937.)

DeHaven et al. (1975) conducted population surveys and banding studies of Tricolored Blackbirds in the Central Valley from 1969 through 1972. They concluded that the species' geographic range and major breeding areas were unchanged in the 35 years since Neff's (1937) study. They observed an average of about 133,000 individuals per year, and estimated that the overall population size had declined by more than 50% since the 1930s. It is possible, however, that DeHaven et al. (1975) underestimated the total population size because they did not survey large portions of the southern San Joaquin Valley.

Local, regional, and statewide Tricolored Blackbird populations have experienced serious declines since 1994. These declines are especially alarming because approximately 99% of the global population of this species occurs in California (Beedy and Hamilton 1999).

Volunteer survey results (summarized by Hamilton et al. 1995, Beedy and Hamilton 1997, and Hamilton 2000) have identified several important distribution and population trends for Tricolored Blackbird:

- local, regional, and statewide populations and distributions vary from year to year;
- 60% of all Tricolored Blackbirds located in all years were found in the 10 largest colonies; and
- 70% of all Tricolored Blackbird nests and 86% of all foraging by nesting birds were on private agricultural lands.

Threats

In some places, most historical Tricolored Blackbird breeding and foraging habitats have been eliminated, and there is currently little or no breeding effort where there once were large colonies (Orians 1961; Beedy et al. 1991). In recent years (and possibly historically as well), more than half of all observed nesting efforts by Tricolored Blackbirds occurred in a few large colonies (Hamilton et al. 1995; Beedy and Hamilton 1997). Concentration of such a high proportion of the

known population in a few breeding colonies increases the risk of major reproductive failures, especially if the colonies are situated in vulnerable habitats such as active agricultural fields. Predation is at present (i.e., 1985–1995) a major cause of complete nesting failure at some Tricolored Blackbird colonies (Hamilton et al. 1995; Beedy and Hayworth 1992). Neff (1942) considered poisoning to regulate numbers of blackbirds preying upon crops, especially rice, to be a major source of adult mortality. However, improved harvesting methods, earlier ripening rice varieties, and fewer blackbirds have resulted in few recent reports of blackbird crop depredation, and no control programs are currently operating (Beedy and Hamilton 1999). Tricolored Blackbirds are sensitive to human disturbance of active nesting colonies.

Conservation and Management

Key conservation considerations for Tricolored Blackbird include conversion of suitable habitat and human disturbance. Management efforts could include maintaining known colony sites, limiting human disturbance at nest sites, restricting herbicide and pesticide use in areas occupied by this species, and preservation of areas exhibiting all appropriate characteristics of suitable habitat.

Biology

Habitat Requirements

Tricolored Blackbirds have three basic requirements for selecting their breeding colony sites: (1) open accessible water; (2) a protected nesting substrate, including either flooded or thorny or spiny vegetation; and (3) a suitable foraging space providing adequate insect prey within a few miles of the nesting colony (Hamilton et al. 1995; Beedy and Hamilton 1997, 1999).

Almost 93% of the 252 Tricolored Blackbird breeding colonies reported by Neff (1937) were in freshwater marshes dominated by tules (*Scirpus* sp.) and cattails (*Typha* sp.); the remaining colonies were in willows (*Salix* spp.), blackberries (*Rubus* sp.), thistles (*Cirsium* and *Centaurea* spp.), or nettles (*Urtica* sp.). In contrast, only 53% of the colonies reported during the 1970s were in cattails and tules (DeHaven et al. 1975). An increasing percentage of colonies in the 1980s and 1990s were reported in Himalaya blackberries (*Rubus discolor*) (Beedy et al. 1991; Cook 1996, 1999), and some of the largest recent colonies are in silage and grain fields (Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton 2000).

Tricolored Blackbird foraging habitats in all seasons include annual grasslands; wet and dry vernal pools and other seasonal wetlands; agricultural fields (such as large tracts of alfalfa with continuous mowing schedules and recently tilled fields); cattle feedlots; and dairies. Tricolored Blackbirds also forage occasionally in riparian scrub habitats and along marsh borders. Weed-free row crops and intensively managed vineyards and orchards do not serve as regular foraging sites. (Beedy and Hamilton 1997, 1999).

Most Tricolored Blackbirds forage within 5 kilometers (3 miles) of their colony sites (Orians 1961b), but commute distances of up to 13 kilometers (8 miles) have been reported (Beedy and Hamilton 1999). Short-distance foraging (i.e., within sight of the colony) for nestling provisioning is also common.

Reproduction and Demography

Female Tricolored Blackbirds breed in their first year, but most males apparently defer breeding until they are at least 2 years old (Payne 1969). Nest construction, performed exclusively by females, is usually highly synchronous and may be initiated as early as the day of arrival at the breeding colony (Neff 1937).

Tricolored Blackbird nests are bound to upright plant stems from a few inches up to about 6 feet above water or ground (Baicich and Harrison 1997); however, nests in the canopies of willows and ashes may be more than 12 feet high (Beedy and Hamilton 1999). Tricolored Blackbird nests are rarely built on the ground (Neff 1937).

Egg laying can begin as early as the second day after nest initiation but ordinarily starts about 4 days after the local arrival of Tricolored Blackbirds at breeding sites (Payne 1969). One egg per day is laid, and clutch size is typically three to four eggs (Payne 1969; Hamilton et al. 1995). Incubation lasts 11–14 days (Payne 1969). It begins before clutches are completed, and hatching of eggs within individual nests is asynchronous (Hamilton pers. comms.). Both sexes are known to provision nestlings (Beedy and Hamilton 1999).

Tricolored Blackbirds are opportunistic foragers (Beedy and Hamilton 1999). Animal matter, predominantly insects and spiders, comprises the bulk of the nestling and fledgling diet; adults tend to consume more animal matter in spring and summer, and more vegetable matter, such as seeds and cultivated grains, in fall and winter. Tricolored Blackbirds often forage in croplands, pastures, grassy fields, flooded land, and along edges of ponds. (Zeiner et al. 1990.)

Movement

In late March and early April, Tricolored Blackbirds vacate wintering areas in the Sacramento–San Joaquin River Delta and along coastal central California and arrive at breeding locations in Sacramento County and throughout the San Joaquin Valley (DeHaven et al. 1975).

During the breeding season, Tricolored Blackbirds often exhibit itinerant breeding and move to new breeding locations following previous nesting attempts elsewhere Hamilton (1998). Most Tricolored Blackbirds probably move from the San Joaquin Valley and Sacramento County to the northern Sacramento Valley for second or third nesting attempts. (Hamilton et al. 1995; Hamilton 2000).

Long-term banding studies by DeHaven et al. (1975) demonstrated a major postbreeding season movement into the Sacramento Valley from other breeding locales. Large postbreeding roosts continue to develop in this area from late summer (August) into fall (Hamilton et al. 1995). A substantial but as yet unmeasured number of Tricolored Blackbirds also winter in the northern San Joaquin Valley (Beedy and Hamilton 1999).

Ecological Relationships

As discussed above, predation is a serious threat to this species. Historical accounts documented the destruction of nesting colonies by a diversity of predators, including, but not limited to, wolf (*Canis lupus*), gray fox (*Urocyon cinereoargenteus*), skunks (*Mephitis mephitis*, *Spilogale gracilis*), opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), mink (*Mustela vison*), Swainson's hawk (*Buteo swainsoni*), Cooper's hawk (*Accipiter cooperii*), burrowing owl (*Athene cunicularia*), American crow (*Corvus brachyrhynchos*), and raven (*Corvus corax*) (Heermann 1853; Mailliard 1914; Evermann 1919; Neff 1937).

More recently, Payne (1969) reported predation of Tricolored Blackbird nests by feral cat (*Felis cattus*), northern harrier (*Circus cyaneus*), barn owl (*Tyto alba*), short-eared owl (*Asio flammeus*), and yellow-billed magpie (*Pica nuttallii*). Merlins (*Falco columbarius*) may associate with flocks of wintering Tricolored Blackbirds and have been observed preying on adults (Manolis pers. comm.; Winter pers. comm.). Black-crowned night-herons (*Nycticorax nycticora*) (Hamilton et al. 1995) and coyotes (*Canis latrans*) (Beedy and Hamilton 1999) have also been observed to predate on Tricolored Blackbirds, detrimentally affecting local populations.

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Buena Vista Lake Shrew (*Sorex ornatus relictus*)

Conservation Considerations

Status

Federal: Endangered
State: None
Other: California Department of Fish and Game Species of Special Concern

Distribution

Buena Vista Lake shrew is one of nine subspecies of ornate shrew (*Sorex ornatus*) (U.S. Fish and Wildlife Service 1998). This subspecies is endemic to the southern Tulare Basin in San Joaquin County. Although little is know about the historical distribution of Buena Vista Lake shrew, it was known to occur in wetlands around Buena Vista Lake in Kern County, and probably occurred throughout the Tulare Basin (67 Federal Register [FR] 10101).

Presently, Buena Vista Lake shrew is known to occur on a 33.5-hectare parcel, formerly known as the Kern Lake Preserve, owned by the J. R. Boswell Company. A few additional individuals observed at the Kern National Wildlife Refuge were confirmed through genetic analysis in 2001 to belong to the Buena Vista Lake shrew subspecies. Shrews captured at Cole Levee Ecological Preserve and in the Kern Fan recharge area are presumed to be Buena Vista lake shrews, although genetic tests have not been conducted to confirm this. (67 FR 10101.)

Population Trend

Prior to surveys conducted in 1998 and 1999, only one population of Buena Vista Lake shrews was known to exist. Although additional populations have recently been discovered, the status of these populations is tenuous due to unreliable water sources that support the habitat necessary for the survival of the Buena Vista Lake shrew. Over the past 20 years, a number of surveys have been conducted without success throughout the subspecies' presumed range. (67 FR 10101.)

Remnant patches of suitable riparian and marsh habitat in the Tulare Basin that have not been surveyed may support additional populations of Buena Vista Lake shrew. These areas include the City of Bakersfield's water recharge area near the terminus of the Kern River at Buena Vista Lake, Goose Lake and Jerry Slough, Crighton Ranch at the eastern shore of the historical Tulare Lake, the San Ridge flood basin, Buena Vista Slough, and the Kern River west of Bakersfield (67 FR 10101).

Threats

Conversion of riparian and wetland habitats to agricultural croplands has resulted in the loss of an estimated 95% of potential Buena Vista lake shrew habitat. Rapid agricultural, urban, and energy development has severely reduced and fragmented native habitats throughout the southern San Joaquin Valley (67 FR 10101).

Water diversion is also a major threat to this taxon. Because the natural water table has been significantly reduced by past and present agricultural activities, active water delivery is necessary to maintain riparian and marsh habitat at the

Kern Preserve and the Kern National Wildlife Refuge. These habitats are presently in jeopardy because an adequate supply of water to support ecosystem function within these habitats is not always available due to the high water demand for crop production in dry years. (67 FR 10101.)

Additional threats are hybridization with the closely related southern California ornate shrew (*Sorex ornatus californicus*), which occupies upland areas along the edges of riparian and marsh habitats; selenium poisoning resulting from agricultural irrigation, which has elevated selenium concentrations in the groundwater along the western San Joaquin Valley; pesticide poisoning from runoff by nearby agricultural lands; and a number of environmental risks that are associated with small, restricted populations. (67 FR 10101.)

Conservation and Management

The U.S. Fish and Wildlife Service (USFWS) recently listed Buena Vista Lake shrew as endangered. Although USFWS found that designation of Critical Habitat for Buena Vista Lake shrew is prudent, it was not designated at the time of listing (67 FR 10101). The *Recovery Plan for Upland Species of the San Joaquin Valley, California* (Recovery Plan) includes a recovery strategy for Buena Vista Lake shrew (U.S. Fish and Wildlife Service 1998). However, the recovery criteria for the Buena Vista Lake shrew outlined in the Recovery Plan will be modified based on new findings presented in the final ruling to list the subspecies (67 FR 10101).

Biology

Habitat Requirements

Buena Vista Lake shrews have been found in moist vegetative communities with a mature overstory, a dense riparian understory, and 90–95% ground cover (67 FR 10101). Plant associations include Fremont cottonwood, willows (*Salix* spp.), alkali heath, wild rye grass, and Baltic rush (Brown et al. 1996). This habitat provides the abundant and diverse invertebrate populations upon which Buna Vista Lake shrews forage.

Reproduction and Demography

Little is known about the reproductive strategy of Buena Vista Lake shrew. The reproductive period of this subspecies lasts from February or March through May or June at the onset of the dry season. In good years, when habitat quality and water availability are high, the breeding season may extend later in the year. (67 FR 10101.)

Movement

Buena Vista Lake shrews probably remain within the home range, a small area that contains a suitable nest site and adequate forage, for the majority of their short lives (67 FR 10101). Neither density nor average home range size has been estimated for this taxon.

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Riparian Brush Rabbit (*Sylvilagus bachmani riparius*)

Conservation Considerations

Status

Federal: Endangered
State: Endangered
Other: None

Distribution

Riparian brush rabbit inhabits riparian communities along the lower portions of the San Joaquin and Stanislaus Rivers in the northern San Joaquin Valley, California. Because the subspecies was not described until after it was believed to have been extirpated from most of its historical range, definitive information on its former distribution is lacking. It has apparently been extirpated from the Sacramento–San Joaquin River Delta and most of the lower San Joaquin River and its tributaries: the Stanislaus, Tuolumne, and Merced Rivers (Williams 1986). The range of the subspecies probably extended farther upstream than the Merced River, assuming that suitable habitat historically occurred along the length of the San Joaquin River system (Williams and Basey 1986).

Currently, this taxon is known to occur only in an isolated population at Caswell Memorial State Park, San Joaquin County, along the Stanislaus River; and in the Paradise Cut area of San Joaquin County on Union Pacific Railroad right-of-way

lands (California Department of Fish and Game 2000). Surveys conducted in all potential habitats along the Merced, San Joaquin, Stanislaus, and Tuolumne Rivers during 1985 and 1986 failed to find any additional populations of riparian brush rabbits (Williams 1988).

Population Trend

The most recent estimate of the number of individuals in the Caswell Park population was approximately 213–312 individuals occupying 198 acres in 1993 (Williams 1993). Williams (1988) estimated a population low of 10–25 individuals following severe winter flooding in 1985 and 1986. The flooding during winter 1996–1997 also severely affected the population. Initial attempts to live-capture rabbits during a study begun in 1997 had limited success, indicating an extremely small population. In 1998 live capture success was again very limited, but it improved slightly in 1999. The status of the riparian brush rabbit population in 1999 was declining. (California Department of Fish and Game 2000.)

Threats

Habitat loss has been the primary threat to riparian brush rabbit populations over the last 100 years. Riparian forests along valley floor river systems have been converted to urban, commercial, and agricultural development, and eliminated as a result of wood cutting, reclamation and flood control activities, heavy groundwater pumping, river channelization, dam building, and water diversions. Such activities have led to a statewide loss of nearly 90% of riparian communities. (65 Federal Register [FR] 8881.) By the mid-1980s, the destruction, conversion, and degradation of the San Joaquin Valley riparian forest had resulted in the reduction of this habitat to only 5.8% of its original extent (U.S. Fish and Wildlife Service 1998). Potential threats to remaining populations of riparian brush rabbit include habitat loss to agriculture, wildfire, disease, predation, flooding, clearing of riparian vegetation, and the use of rodenticides. The taxon is at risk from the lack of elevated mounds with protective cover to serve as flood refuges within remaining riparian habitat (65 FR 8881).

Conservation and Management

Riparian brush rabbit is included in the U.S. Fish and Wildlife Service's *Recovery Plan for Upland Species of the San Joaquin Valley, California* (Recovery Plan) (U.S. Fish and Wildlife Service 1998). The Recovery Plan specifies three actions for protection and recovery of riparian brush rabbit: establish an emergency plan and monitoring system to provide swift action to save individuals and habitat at Caswell Memorial State Park in the event of flooding, wildfire, or a disease epidemic; develop and implement a cooperative riparian brush rabbit conservation program; and reevaluate the status of the taxon within 3 years of Recovery Plan approval. A brush rabbit working group began

meeting in 1997 to help guide the conservation efforts for this subspecies (California Department of Fish and Game 2000).

In 2001, the Endangered Species Recovery Program began a captive breeding program for riparian brush rabbits. One reintroduction site is currently active and a second is planned for 2004 (U.S. Fish and Wildlife Service 2002).

Biology

Habitat Requirements

Habitat for riparian brush rabbit consists of riparian forests with a dense understory shrub layer. Common plants in the habitat include California wild rose, Pacific blackberry, wild grape, Douglas' coyote bush, and various grasses (Williams 1988; Basey 1990). Brush rabbits have small home ranges that usually conform to the size of available brushy habitat (Basey 1990).

Reproduction and Demography

Riparian brush rabbits breed from January to May, a shorter breeding season than other cottontails that breed year-round. Gestation takes approximately 27 days, with the female producing litters of up to four young. Riparian brush rabbits have comparatively lower reproductive rates than other cottontail taxa. Five out of six rabbits do not survive to the next breeding seasons (U.S. Fish and Wildlife Service 1998).

Movement

This species rarely moves more than a meter (3 feet) from cover. Riparian brush rabbits will not cross large, open areas; this trait limits their dispersal capabilities (U.S. Fish and Wildlife Service 1998).

Ecological Relationships

Territoriality in brush rabbits is not well defined, although individuals are intolerant of each other if they come into close proximity. Young are more tolerant than adults. Other mammals found in association with riparian brush rabbits include riparian woodrats, western gray squirrels, American opossums, skunks, feral cats, grey foxes, and coyotes. Predators of brush rabbits include various raptors, owls, feral cats, gray foxes, coyotes, and dogs (U.S. Fish and Wildlife Service 1998).

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Riparian Woodrat (*Neotoma fuscipes riparia*)

Conservation Considerations

Status

Federal: Endangered
State: None
Other: California Department of Fish and Game Species of Special Concern

Distribution

Riparian woodrat inhabits riparian communities along the lower portions of the San Joaquin and Stanislaus Rivers in the northern San Joaquin Valley, California. Historical records indicate that the subspecies occurred in riparian communities along the San Joaquin, Stanislaus, and Tuolumne Rivers; along Corral Hollow in San Joaquin County; elsewhere in San Joaquin and Stanislaus Counties; and in Merced County (Hooper 1938; Williams 1986). Before the statewide reduction of riparian communities by nearly 90% (Katibah 1984), riparian woodrat probably ranged throughout the extensive San Joaquin Valley forests along major streams flowing onto the floor of the northern San Joaquin Valley.

Population Trend

Today, riparian woodrat populations are greatly diminished; the only known population is at Caswell Memorial State Park, with a possible second population near Vernalis, San Joaquin County. Williams (1993) estimated a peak population at Caswell of 437 individuals, based on a mean density of 4.8 woodrats per hectare (1.94 woodrats per acre) on 90 hectares (223 acres) of suitable habitat.

Threats

Potential threats to this subspecies include habitat conversion to agriculture, wildfire, disease, predation, flooding, drought, clearing of San Joaquin Valley vegetation, use of rodenticides, and browsing and trampling by ungulates. Riparian communities have been reduced nearly 90% (Katibah 1984) by conversion of San Joaquin Valley forests along valley floor river systems to urban, commercial, and agricultural development; woodcutting; reclamation and flood control activities; heavy groundwater pumping; river channelization; dam building; and water diversion.

Conservation and Management

The U.S. Fish and Wildlife Service prepared a recovery plan for arid-upland and San Joaquin Valley species, including riparian woodrat, for the San Joaquin Valley (USDI Fish and Wildlife Service 1998). Conservation actions outlined in the plan include: surveying and mapping all riparian areas along the San Joaquin River and its major tributaries; developing incentive programs in collaboration with landowners and local levee-maintenance districts for preserving riparian vegetation; developing a plan for restoring riparian habitat and establishing riparian corridors and, if necessary, reintroducing riparian woodrats to suitable habitat; initiating a genetic study to determine inbreeding levels and devising a procedure for ensuring that translocations have no adverse effects on the species; establishing conservation easements to accomplish habitat restoration, linkage, and reintroduction goals; beginning efforts to restore and link riparian habitats

and reintroduce woodrats as appropriate; and reevaluating the status of the woodrat within 3 years of recovery plan approval.

Biology

Habitat Requirements

Riparian woodrats are most abundant where shrub cover is dense and least abundant in open areas. In riparian areas, highest densities of woodrats and their nests are often encountered in willow thickets with an oak overstory. The species is likelier to be present where there are deciduous valley oaks but few live oaks.

Reproduction and Demography

Riparian woodrats are predominantly nocturnal. Their diet is diverse and principally herbivorous, comprising leaves, fruits, terminal shoots of twigs, flowers, nuts, and fungi. The young are born in stick nest structures or "lodges" (constructed on the ground) that are 2–3 feet high and 4–6 feet in diameter. Most lodges are positioned over or against logs (Williams 1993). Unlike other subspecies of dusky-footed woodrat, riparian woodrats occasionally build nests in tree cavities and in artificial wood duck nest boxes (Williams 1986). Riparian woodrats form loosely cooperative societies with a matrilineal social structure (USDI Fish and Wildlife Service 1998).

Movement

Males, unlike females, disperse away from the birth den (USDI Fish and Wildlife Service 1998).

Ecological Relationships

Riparian woodrats are preyed upon by owls, coyotes, bobcats, hawks, and snakes. Other small mammals as well as amphibians and reptiles use woodrat lodges for refuge. (Zeiner et al. 1990.)

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Tipton Kangaroo Rat (*Dipodomys nitratoides nitratoides*)

Conservation Considerations

Status

Federal: Endangered
State: Endangered
Other: None

Distribution

Historically, Tipton kangaroo rat occurred eastward and southward from the southern margins of Tulare Lake along the eastern edge of the San Joaquin Valley floor in Tulare and Kern Counties; and south and west to the foothills of the Tehachapi Mountains, the marshes and open water of Kern and Buena Vista Lakes, and the sloughs and channels of the Kern River alluvial fan. (USDI Fish and Wildlife Service 1998)

Currently, Tipton kangaroo rats are limited to scattered and isolated clusters west of Tipton, Pixley, and Earlimart; around Pixley National Wildlife Refuge, Allensworth Ecological Reserve, and Allensworth State Historical Park in Tulare County; between the Kern National Wildlife Reguge and Delano; in natural lands

surrounding Lamont, Kern County; and at the Coles Levee Ecosystem Preserve and other scattered units in southern Kern County (USDI Fish and Wildlife Service 1998).

Population Trend

In July 1985, Tipton kangaroo rat occupied approximately 3.7% of its historical range. The current acreage of occupied habitat is unknown, but is not suspected to differ greatly from the 1985 estimate. (USDI Fish and Wildlife Service 1998.)

Threats

Reasons for decline of Tipton kangaroo rat are attributed primarily to loss of habitat resulting from agricultural conversion, including cultivation of the alkaline soils of saltbush, valley sink scrub, and relict dune communities. It is possible that the use of rodenticides used to control California ground squirrels has contributed to the elimination of small populations of Tipton kangaroo rats as well.

Conservation and Management

The USDI Fish and Wildlife Service included Tipton kangaroo rat in the *Recovery Plan for Arid Upland and Riparian Species of the San Joaquin Valley, California* (1998). The two key elements for the recovery strategy for this species are: (1) determining how to manage natural lands to enhance habitat for Tipton kangaroo rat in a manner that lessens the frequency and severity of population crashes and the negative impact of competition with Heermann's kangaroo rat (*Dipodomys heermanni*), and (2) consolidating and protecting blocks of suitable habitat to minimize the effects of random catastrophic events on Tipton kangaroo rat populations. The recovery plan specifies the following actions: expand, coordinate, and continue habitat management studies at sites representing the range of existing habitat conditions for the species; initiate studies of competition between Tipton and Heermann's kangaroo rats; design and implement a range-wide population monitoring program that measures population and environmental fluctuations at sites representative of the range of natural land sizes and habitat conditions for the species; inventory and assess existing natural land and drainage-problem parcels contiguous with and near existing protected natural lands and develop a protection plan that ranks parcels according to their potential for supporting Tipton kangaroo rats; develop and implement research on restoration of habitat for Tipton kangaroo rats, including cost-effective mechanisms to protect both natural and restored habitat from flooding; and restore habitat on retired agricultural lands as needed. For more detailed information on these recovery actions, refer to the recovery plan.

Biology

Habitat Requirements

Tipton kangaroo rat occupies arid-land communities. Alluvial fans and floodplain soils ranging from fine sands to clay-sized particles with high salinity are characteristics of suitable habitat. The species occurs in higher densities when associated with sparse-to-moderate shrub cover. Burrow systems are most often located in open areas and are commonly found in slightly elevated mounds, road berms, canal embankments, railroad beds, and bases of shrubs and fences where windblown soils accumulate above the level of surrounding terrain. Terrain not subject to flooding is required for permanent occupancy. Soils with finer texture and higher salinity are more commonly associated with higher density populations than are less saline soils. (USDI Fish and Wildlife Service 1998.)

Reproduction and Demography

Little is known regarding the breeding habits of this species. The breeding season begins in winter and peaks in late March and early April. Females produce one litter. (USDI Fish and Wildlife Service 1998.)

Movement

Tipton kangaroo rats may retreat from burrows during periods of flooding (USDI Fish and Wildlife Service 1998).

Ecological Relationships

Most burrows are dug by the occupant or a predecessor of the same species. Predators of Tipton kangaroo rat include coyote (*Canis latrans*), San Joaquin kit fox (*Vulpes macrotis mutica*), long-tailed weasel (*Mustela frenata*), American badger (*Taxidea taxus*), owls, hawks, and various species of snakes. Increasing fragmentation of the species' range may increase the vulnerability of small populations to predation. (USDI Fish and Wildlife Service 1998.)

References

USDI Fish and Wildlife Service. 1998. *Recovery plan for upland species of the San Joaquin Valley, California*. Region 1, Portland, OR.

Giant Kangaroo Rat (*Dipodymous ingens*)

Conservation Considerations

Status

Federal: Endangered
State: Endangered
Other: None

Distribution

Historically, giant kangaroo rat colonies occurred in extensive areas of continuous habitat in the western San Joaquin Valley, Carrizo Plain, and Cuyama Valley (Grinnell 1932; Hawbecker 1944, 1951). The species occurred along the western edge of the San Joaquin Valley from the base of the Tehachapi Mountains north to an area about 16.1 kilometers (10 miles) south of Los Banos in Merced County, in the Carrizo and Elkhorn Plains and San Juan Creek watershed west of the Temblor Mountains, and in the upper Cuyama Valley. Scattered colonies occurred on steeper slopes and ridges in the Ciervo, Kettleman, Panoche, and Tumey Hills and in the Panoche Valley (U.S. Fish and Wildlife Service 1998).

Currently, giant kangaroo rat populations are highly fragmented and occur in six major geographic areas: the Panoche region in western Fresno and eastern San Benito Counties; the Kettlemen Hills in Kings County; the San Juan Creek Valley in San Luis Obispo County; western Kern County in the Lokern and Elk Hills areas and various other uplands near Taft, Maricopa, and McKittrick; the Carrizo Plain Natural Area in eastern San Luis Obispo County; and the Cuyama Valley in Santa Barbara and San Luis Obispo Counties (Williams 1980, 1992; Goldingay et al.1997).

Population Trend

Giant kangaroo rat populations have declined primarily because of habitat loss to agricultural development (U.S. Fish and Wildlife Service 1998). Prior to the late 1960s, little land within the historical range of giant kangaroo rat had been permanently cultivated. Between 1970 and 1979, completion of the San Luis unit of the Central Valley Project and the California Aqueduct of the State Water Project resulted in the conversion of almost all the natural communities in the western portion of the Tulare Basin to irrigated agriculture. An estimated 1.8% of this species' historical habitat remains (Williams 1992). Populations in remaining habitat fluctuate widely in response to changing weather patterns (Williams 1992). A severe decline in giant kangaroo rat populations apparently began in 1995 (California Department of Fish and Game 2000). Current

population trends for the giant kangaroo rat are stable to declining (U.S. Fish and Wildlife Service 1998; California Department of Fish and Game 2000).

Threats

Although conversion of habitat for giant kangaroo rat has slowed substantially, urban and industrial development, mineral and petroleum extraction, and linear transportation and utility construction continue to destroy and fragment habitat for this species (U.S. Fish and Wildlife Service 1998). A lack of grazing or fire on conservation lands to control vegetation density, which could result in unsuitable habitat conditions for the giant kangaroo rat, may also be a threat (Williams and Germano 1993).

Conservation and Management

A recovery strategy for the giant kangaroo rat has been identified in the U.S. Fish and Wildlife Service's (USFWS's) 1998 *Recovery Plan for Upland Species of the San Joaquin Valley, California* (Recovery Plan). The following is a prioritized list of recovery actions identified by USFWS in the Recovery Plan.

1) Proper land use and management on publicly owned and conservation lands.

2) Continued research on habitat management and habitat restoration.

3) Acquisition and protection of additional lands supporting key populations (seven separate areas have been identified for protection by fee-title acquisition, conservation easements, or other mechanisms).

Biology

Habitat Requirements

Preferred habitat of giant kangaroo rat can be characterized as annual grassland communities with few or no shrubs on gentle slopes with well-drained, sandy-loam soils, typically in areas with scant rainfall that are free from winter flooding. However, giant kangaroo rats can be found in shrub communities on a variety of soil types on slopes up to 22% (USDI Fish and Wildlife Service 1998). Although giant kangaroo rats may colonize agricultural areas that have been fallow for at least a year, they do not occur in cultivated areas. In addition, few burrow systems have been found in remnant patches of habitat along canals, roads, or other rights-of-way (Williams 1992).

Giant kangaroo rat burrow systems, or precincts, are distinctive because of the size and orientation of the holes and because the kangaroo rats clear vegetation for about 5.5 meters (18 feet) around their burrows (Williams 1980). Each

precinct has an average of about seven holes, each measuring 6.4–8.9 cm (2.5–3.5 inches) in diameter. Other characteristics of giant kangaroo rat precincts include tracks of their distinctively large feet, tail drags, "haystacks" of seeds drying near the burrows, and large scat near the burrow entrances. (U.S. Fish and Wildlife Service 1998.)

Giant kangaroo rats are active throughout the year and are primarily nocturnal. They typically emerge from burrows shortly after sunset and forage on the surface to near sunrise, although most activity occurs in the first 2 hours after dark (U.S. Fish and Wildlife Service 1998).

Giant kangaroo rat home ranges vary from about 60 to 350 square meters (646 to 3,767 square feet), with no significant difference between sexes. Territories may be occupied by one animal or by multiple individuals as a family group within precincts. Through trapping efforts and visual counts at precincts, population density has been estimated from 1 to 110 individuals per hectare (1 to 44 per acre). (U.S. Fish and Wildlife Service 1998.)

Movement

Timing and extent of dispersal is variable and may be delayed in years of high population density when most or all burrow systems are occupied. Dispersal of adults with established burrow systems occurs occasionally. (U.S. Fish and Wildlife Service 1998.)

Ecological Relationships

In general, giant kangaroo rats tend to exclude most other nocturnal rodent species. Giant kangaroo rat is considered a keystone species in grassland and shrub communities, in that its presence provides habitat for other plant and wildlife species, including blunt-nosed leopard lizard, San Joaquin antelope ground squirrel, and California jewelflower. It has been shown that primary productivity and plant species composition is different on precincts than off of them. In addition, locally abundant giant kangaroo rats provide significant prey for a variety of carnivore and raptor species, including San Joaquin kit fox. (U.S. Fish and Wildlife Service 1998.)

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San Joaquin Antelope Squirrel (*Ammospermophilus nelsoni*)

Conservation Considerations

Status

Federal: None
State: Threatened
Other: USDI Fish and Wildlife Service Species of Concern

Distribution

San Joaquin antelope squirrel's historical range included the western and southern portions of the Tulare basin, the San Joaquin Valley in Kern County to

near Tipton (Tulare County), the upper Cuyama Valley, and the Carrizo and Elkhorn plains (Williams and Kilburn 1992). Grinnell and Dixon (1918) noted that this species was unevenly distributed and occurred in abundance in only a few localities.

Today, only the Carrizo and Elkhorn plains and western Kern County around Elk Hills support significant populations of San Joaquin antelope squirrels. Smaller populations also inhabit marginal habitat in the foothills at the western edge of the San Joaquin Valley (California Department of Fish and Game 1992). Antelope squirrels are uncommon above elevations of 2,400 feet (Williams and Kilburn 1992).

Population Trend

San Joaquin antelope squirrels no longer occur at many areas containing suitable habitat on the San Joaquin Valley floor (USDI Fish and Wildlife Service 1998).

Threats

Approximately 80% of the original geographic range of San Joaquin antelope squirrel has been converted to agricultural development; no remaining prime habitat remains within the San Joaquin Valley (California Department of Fish and Game 1992).

Conservation and Management

In its *Recovery Plan for Upland Species of the San Joaquin Valley, California*, the USDI Fish and Wildlife Service (1998) lists the following actions as required to conserve San Joaquin antelope squirrel: determine habitat management prescriptions for San Joaquin antelope squirrels on the southern San Joaquin Valley floor, inventory potential habitat, protect additional habitat, develop and implement a population monitoring program, and reevaluate the status of the species within 3 years of recovery plan approval. For more detailed information on these actions, please refer to the Recovery Plan.

Biology

Habitat Requirements

San Joaquin antelope squirrel inhabits dry grasslands with sandy loam soils, widely spaced alkali scrub vegetation, and dry washes. Hawbecker (1953) reported that this species does not occur in areas where the annual rainfall exceeds 9 inches. San Joaquin antelope squirrels' diet varies with availability of specific types of food. They are omnivorous and feed on green vegetation, fungi,

and insects, but also eat seeds when these other sources of food are not available (Williams et al. 1997). This species breeds only once a year, coincidentally with the presence of green vegetation.

Reproduction and Demography

San Joaquin antelope squirrels breed in late winter through early spring. Copulation and conception occur in February or March. The species breeds only once a year; females give birth to young between March and April. Weaning takes place in late April to late May. (Williams et al. 1997; USDI Fish and Wildlife Service 1998.)

Movement

San Joaquin antelope squirrel dispersal is poorly documented (USDI Fish and Wildlife Service 1998).

Ecological Relationships

San Joaquin antelope squirrels reside in burrows that they dig or that have been dug by kangaroo rats. They seek refuge from predators under shrubs and in burrows of giant kangaroo rats. Antelope squirrels require shade to avoid the sun and release excess body heat. California ground squirrels can displace this species. San Joaquin antelope squirrels likely compete with kangaroo rats for seeds and with birds for insects. Various raptors, snakes, foxes, and other mammals prey upon this species. (USDI Fish and Wildlife Service 1998.)

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San Joaquin Kit Fox (*Vulpes macrotis mutica*)

Conservation Considerations

Status

Federal: Endangered
State: Endangered
Other: None

Distribution

Although the precise historical range of San Joaquin kit fox is unknown, it is believed to have extended from Contra Costa and San Joaquin Counties in the north to Kern County in the south. By the 1930s, the range had been reduced to the southern and western portions of the Central Valley (Grinnell et al. 1937). Surveys conducted between 1969 and 1975 extended the known range of San Joaquin kit fox back into portions of its historical range in the northern San Joaquin Valley, including Contra Costa, Alameda, and San Joaquin Counties. Additionally, kit foxes were found in three counties outside the originally defined historical range: Monterey, Santa Clara, and Santa Barbara. (Orloff et al. 1986.)

Currently, the known range of San Joaquin kit fox extends from the southwest corner of San Joaquin County south through the plan area. Occurrences of San Joaquin kit foxes have been recorded for San Joaquin, Stanislaus, Merced, Madera, Fresno, Tulare, Kings, and Kern Counties (U.S. Fish and Wildlife Service 1998; California Natural Diversity Database 2002). No records for San Joaquin kit fox are known for Mariposa County.

Population Trend

The 1983 recovery plan (U.S. Fish and Wildlife Service 1983) estimated the pre-1930 population of adult San Joaquin kit foxes to have been between 8,667 and 12,134 animals. By 1975, the estimated population had fallen to only 6,961 adults, a 20%–43% decline. The present number of San Joaquin kit foxes across the taxon's range is unknown, but is likely to show a continued decline.

Threats

Habitat loss and fragmentation as a result of agricultural, industrial, and urban development, in addition to continued predation and competition from coyotes and other predators, continue to present major threats to the survival of kit foxes in California. Catastrophic events such as extended drought or rain, with a corresponding decline in prey availability, likely have a more significant effect on small isolated populations of kit foxes than on larger, contiguous populations. The role of accidents and disease in kit fox mortality is not well documented, but these factors may become increasingly important as kit foxes are subjected to more contact with humans, their pets, and livestock. Rabies caused several deaths of radio-collared kit foxes at Camp Roberts and may have contributed to the recent decline of kit foxes there (U.S. Fish and Wildlife Service 1998). Increasing noise in the environment from highway traffic, wind generators, and other human-related activities may interfere with foxes' ability to communicate, detect prey, and avoid predators. Many of these factors are likely to act synergistically to further reduce San Joaquin kit fox numbers across their range.

Conservation and Management

The *Recovery Plan for Upland Species of the San Joaquin Valley, California* provides a summary of significant conservation efforts and a recovery strategy for San Joaquin kit fox (U.S. Fish and Wildlife Service 1998). Principal conservation efforts include important kit fox habitat acquisition by the U.S. Bureau of Land Management, the California Department of Fish and Game (DFG), the California Energy Commission, the U.S. Bureau of Reclamation, the U.S. Fish and Wildlife Service (USFWS), and The Nature Conservancy. Key acquisitions include lands in the Carrizo Plain, the Ciervo-Panoche Natural Area, and the Lokern Natural Area. Negotiations for additional acquisition of 60,000 acres of suitable kit fox habitat in western Merced, Stanislaus, and eastern Santa Clara Counties are under way through a multiagency cooperative effort.

Ongoing research on kit fox ecology, behavior, habitat requirements, and management of kit fox habitat is being implemented as mitigation by the California Energy Commission, U.S. Department of Energy (Naval Petroleum Reserves in California), Army National Guard (Camp Roberts) and the Department of Defense (Fort Hunter Liggett). Research on kit fox biology has also been conducted through the research program on the Carrizo Plain Natural Area cosponsored by the Smithsonian Institution and The Nature Conservancy (White and Ralls 1993; White et al. 1994; Ralls and White 1995; White et al. 1996); these research efforts have focused on such topics as dispersal (Scrivner et al. 1987), mortality (Berry et al. 1987), fox movements, and home range dynamics (Zoellick et al. 1987). Management research efforts have been directed toward understanding the benefits and constraints of habitat enhancement, kit fox relocation, supplemental feeding, and coyote control as means of enhancing recovery. In a continuing effort to monitor suitable kit fox habitat changes across the range of the subspecies, large-scale habitat surveys have been conducted on the Carrizo Plain (Kato and O'Farrell 1986; Kakiba-Russell et al. 1991) and the southern San Joaquin Valley (Anderson et al. 1991). Numerous smaller-scale

surveys have been conducted rangewide across all areas of potential kit fox habitat in compliance with the federal Endangered Species Act (ESA), the National Environmental Policy Act, and the California Environmental Quality Act.

Biology

Habitat Requirements

Historically, San Joaquin kit foxes occurred in a variety of native plant communities throughout the San Joaquin Valley, including valley sink scrub, valley saltbush scrub, upper Sonoran subshrub scrub, interior Coast Range saltbush scrub, and annual grassland. Before the rapid expansion of irrigated agriculture in the San Joaquin Valley, valley saltbush scrub was probably the species' prime habitat (Grinnell et al. 1937).

Because agriculture has replaced much of the native Central Valley habitat, San Joaquin kit foxes appear to have adapted to living in marginal areas such as grazed, nonirrigated grasslands; peripheral lands adjacent to tilled and fallow fields; irrigated row crops, orchards, and vineyards; and petroleum fields and urban areas (Morrell 1971; Jensen 1972; O'Farrell 1980; Ralls and White 1991).

San Joaquin kit foxes usually prefer areas with loose-textured soils suitable for den excavation (U.S. Fish and Wildlife Service 1983) but are found on virtually every soil type (U.S. Fish and Wildlife Service 1998). However, dens are usually scarce in areas with shallow soils, due to the proximity to bedrock (O'Farrell and Gilbertson 1979; O'Farrell et al. 1980), impenetrable hardpan layers (Morrell 1972), and high water tables (McCue et al. 1981). Where soils make digging difficult, kit foxes frequently use and modify burrows built by other animals, particularly those of California ground squirrels (Orloff et al. 1986). Structures such as culverts, abandoned pipelines, and well casings may also be used as den sites (U.S. Fish and Wildlife Service 1983).

Although kit foxes may construct their own dens, it is commonly believed that they more often enlarge the burrows of California ground squirrels into suitable dens (Orloff et al. 1986; U.S. Fish and Wildlife Service 1998). Den structure varies across the taxon's range, depending on local topography and soil type. In the southern portion of the range, dens generally have two entrances with ramp-shaped mounds of dirt 1–2 meters (3–6 feet) long in front and are located on slopes of less than 40° (Morrell 1972; Reese et al. 1992). Natal and pupping dens tend to be larger, have more entrances (2–18), and occur on flatter terrain (slopes of about 6°). In the central portion of the range, the dirt apron in front of the den is usually replaced with a long trailing ramp with a runway down the middle. Farther north, dens are generally placed higher than the surrounding terrain on the lower portions of slopes (Orloff et al. 1986).

Kit fox home ranges vary from less than 2.6 square kilometers [km^2] (1 square mile) up to approximately 12 square miles (31 km^2) (Morrell 1972; Knapp 1978;

Zoellick et al. 1987; Spiegel and Bradbury 1992; White and Ralls 1993). Kit foxes may use up to 70 different dens in a year within their home range. They may move between dens four or five times during the summer months and once or twice during the pup-rearing season (Morrell 1972; Hall 1983).

Reproduction and Demography

Kit foxes are believed to be monogamous and can, but generally do not, breed during their first year of adulthood (Morrell 1972). The breeding season begins during September and October when adult females begin to clean and enlarge natal or pupping dens (U.S. Fish and Wildlife Service 1998). Mating and conception occur between late December and March (Egoscue 1956; Morrell 1972; Zoellick et al. 1987). Gestation is 48–52 days, and litters of two to six pups are born between late February and late March (Egoscue 1962; Morrell 1972; Zoellick et al. 1987).

Egoscue (1975) estimated the average age of kit foxes in a Utah population to be about 2 years. Individual foxes may live more than 8 years (U.S. Fish and Wildlife Service 1998), but such longevity is rare. In a population of kit foxes on the Naval Petroleum Reserve #1 in California, animals less than 1 year old outnumbered older foxes 2.8:1 (Berry et al. 1987). In captivity, foxes may live up to 10 years (McGrew 1979; U.S. Fish and Wildlife Service 1998).

The annual adult mortality of kit foxes has been estimated to be approximately 50% (Morrell 1972; Egoscue 1975; Berry et al. 1987; Ralls and White 1995; Standley et al. 1992). Juvenile mortality rates are usually higher, approaching 70% (Berry et al. 1987).

Movement

Foraging kit foxes can range up to 10 miles in a single night during the breeding season and 6 miles during the pup-rearing and dispersal season (Zoellick et al. 1987).

Ecological Relationships

San Joaquin kit foxes are subject to predation and competitive exclusion by larger canids (coyotes, introduced red foxes, and domestic dogs); bobcats; and large raptors such as red-tailed hawk, Swainson's Hawk, and Golden Eagle (Hall 1983; Berry et al. 1987; O'Farrell et al. 1987; White et al. 1994; Ralls and White 1995; California Department of Fish and Game 1987). These species may directly kill kit foxes as prey or during aggressive encounters or may displace them by preemptively excluding them from critical food resources and den sites.

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Covered Plant Species Descriptions

Large-Flowered Fiddleneck (*Amsinckia grandiflora*)

Conservation Considerations

Status

Federal: Endangered
State: Endangered
Other: California Native Plant Society List 1B

Distribution

Large-flowered fiddleneck is endemic to California and is known from only two native occurrences in Alameda and San Joaquin Counties. Populations have been introduced into the species' former range in Contra Costa and San Joaquin Counties. Within the Plan Area, there are two native occurrences and one introduced population in San Joaquin County.

Population Trend

Population size fluctuates from year to year, presumably in response to environmental factors that affect all stages in the plant's life: seed germination and seedling growth; pollination; seed production; and growth of competing plants, particularly nonnative grasses.

Threats

Large-flowered fiddleneck is currently threatened by competition from nonnative annual grasses (California Natural Diversity Database 2002; California Native Plant Society 2001), grazing (California Natural Diversity Database 2002), and possibly alteration of natural fire frequency (California Native Plant Society 2001).

Conservation and Management

Management of large-flowered fiddleneck at the native sites has been intensive, and includes hand-pollination, seed collection, and offsite propagation. Habitat management activities, such as fencing and periodic burning, will be necessary to maintain existing populations. Restoration of native bunchgrass habitat, the original habitat of large-flowered fiddleneck, is one of the recommendations of the Recovery Plan. Further research is needed on pollination and seed biology, including pollination requirements, insect visitors, seed production, seed predation, seed bank dynamics, and effective population size. Current management is focussed on increasing the size of the native populations and searching for suitable reintroduction sites. (U.S. Fish and Wildlife Service 1997.)

Biology

Habitat Requirements

Large-flowered fiddleneck grows in cismontane woodland and valley and foothill grassland at elevations of 275–305 meters (902–1001 feet) (California Native Plant Society 2001). It occurs on neutral to slightly basic soils with a loamy or clayey structure that are high in organic matter (U.S. Fish and Wildlife Service 1997).

Demography

Large-flowered fiddleneck is an annual herb that flowers April–May (California Native Plant Society 2001). Populations fluctuate greatly in size from year to year, presumably in response to environmental factors such as rainfall and temperature (U.S. Fish and Wildlife Service 1997). The species has a heterostylous pollination system, meaning that two types of flowers are produced, differing in the arrangement of the style and stamens. Seed production appears to be low, and seed germination appears to be sensitive to temperature and presence or absence of a litter layer (U.S. Fish and Wildlife Service 1997).

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Lesser Saltscale (Atriplex minuscula)

Conservation Considerations

Status

Federal: None
State: None
Other: California Native Plant Society List 1B

Distribution

Lesser saltscale is a California endemic with most populations found in San Joaquin Valley and one in Sacramento Valley at elevations less than 200 meters (656 feet). There are currently collections representing 18 occurrences in Sutter, Stanislaus, Fresno, Kern, Madera, Merced, King and Tulare Counties, with population sizes ranging from 20 to more than 5,000 plants (Jones & Stokes project files, California Natural Diversity Database 2002). Existing populations are located on private property and California Department of Fish and Game lands, including Kerman Ecological Reserve (California Natural Diversity Database 2002)

Of the 18 occurrences, 17 are in the Plan Area (Jones & Stokes project files).

Population Trend

The overall population trend of lesser saltscale is unknown. Several stable populations are known, but most occurrences have not been relocated to determine their status.

Threats

Lesser saltscale is threatened by habitat loss resulting from agricultural conversion, highway construction, golf course construction, installation of a pipeline, and flooding (waterfowl management) (California Natural Diversity Database 2002).

Conservation and Management

A recovery plan for the species has been prepared by the U.S. Fish and Wildlife Service. The conservation strategy includes surveying unconverted alkali sinks for plants and potential habitat, assessing potential threats, and purchasing protected sites with high species densities. (U.S. Fish and Wildlife Service 1998.)

Biology

Habitat Requirements

Lesser saltscale grows in alkali sinks and on alkaline sandy soils in chenopod scrub and valley and foothill grasslands, often on slickspot margins, at elevations of 15–200 meters (49–656 feet) (California Native Plant Society 2001).

Morphological Characteristics

Lesser saltscale is an annual herb in the goosefoot family (Chenopodiaceae) that blooms May–October (Hickman 1993). The species has entire heart-shaped leaves and many upright reddish stems that grow up to 40 centimeters (16 inches) tall (U.S. Fish and Wildlife Service 1998).

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Bakersfield Smallscale (*Atriplex tularensis*)

Conservation Considerations

Status

Federal: None
State: Endangered
Other: California Native Plant Society List 1B

Distribution

Bakersfield smallscale is endemic to Kern County and is known from only three occurrences (California Natural Diversity Database 2002). The species historically occurred on the borders of alkali sinks and on alkaline plains in the vicinity of Weed Patch in southern Kern County south of Bakersfield along Highway 99 (California Department of Fish and Game 2000). Of the three occurrences reported today, two are extirpated and one is possibly extirpated (California Natural Diversity Database 2002).

First collected in the 1890s, the species had not been seen since the 1930s until rediscovered in 1983 at Kern Dry Lake. Since the discovery, the site had been leased and managed by The Nature Conservancy as the Kern Lake Preserve until the lease was discontinued by the private landowner; today the population is possibly extirpated (California Department of Fish and Game 2000).

All three occurrences are within the plan area.

Population Trend

Population trends of Bakersfield smallscale are dependent on the amount of annual rainfall. The one occurrence at Kern Lake Preserve was reportedly threatened by a series of drought years from 1987 to 1992 (California Department of Fish and Game 2000). Monitoring has revealed very low numbers of plants in the population: 126 (1983); 20 (1984); 721 (1985); 5 (1991); and 0 (1992), the last date for which information is available (California Natural Diversity Database 2002).

According to the California Department of Fish and Game, the status of Bakersfield smallscale as of 1999 is unknown or possibly extirpated (California Department of Fish and Game 2000).

Threats

The Bakersfield smallscale population at the one known location is threatened by land conversion, lowering of the water table, and possible hybridization with bracted saltbush (*Atriplex serenana)* (California Native Plant Society 2001).

The identity of the Kern Lake Preserve population has been questioned because plants collected in the area differ in appearance from those observed historically (California Department of Fish and Game 2000). One opinion is that the plants are hybrids of Bakersfield smallscale and bracted saltbush, which also occurs in the area, and that pure Bakersfield smallscale no longer occurs. Another opinion is that Bakersfield smallscale, as originally described, was never a distinct species but was a variant of bracted saltbush that only appeared in high rainfall years (California Department of Fish and Game 2000).

Conservation and Management

Two different conservation efforts for Bakersfield smallscale are currently being implemented. The first involves the U.S. Fish and Wildlife Service (USWS) negotiating with the landowner to protect the old Kern Lake Preserve site (California Department of Fish and Game 2000). The second entails inclusion of the species in USFWS's *Recovery Plan for Upland Species of the San Joaquin Valley, California*, which was completed in 1998 (California Department of Fish and Game 2000).

Biology

Habitat Requirements

General habitat of Bakersfield smallscale is chenopod scrub at elevations of 90–200 meters (295–656 feet) (California Native Plant Society 2001).

Demography

Bakersfield smallscale is a member of the goosefoot family (Chenopodiaceae). It is an erect, few-branched annual with a scaly surface on the stems, smooth ovate leaves, and small dense clusters of greenish flowers that bloom June–October (California Department of Fish and Game 2000; California Native Plant Society 2001).

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Big Tarplant (*Blepharizonia plumosa*)

Conservation Considerations

Status

Federal: None
State: None
Other: California Native Plant Society List 1B

Distribution

Big tarplant is endemic to California and is known from 36 occurrences in Alameda, Contra Costa, San Joaquin, Stanislaus, and Solano Counties (California Native Plant Society 2001). Within the Plan Area, there are 15 native occurrences in San Joaquin County and one occurrence in Stanislaus County. Twelve of these occurrences are on Lawrence Livermore National Laboratory property (California Natural Diversity Database 2002).

Population Trend

Big tarplant is an annual species; population size fluctuates from year to year. In addition, environmental factors effect all stages in the plant's life: seed germination and seedling growth; pollination; seed production; and growth of competing plants, particularly nonnative grasses (California Natural Diversity Database 2002).

Threats

Big tarplant is currently threatened by competition from nonnative plants, fire suppression activities, proposed drainage construction, cattle grazing, erosion, road maintenance, and residential development (California Native Plant Society 2001; California Natural Diversity Database 2002).

Conservation and Management

A conservation plan has not yet been implemented for this species. A monitoring program at Lawrence Livermore National Laboratory is being conducted to determine the ecological parameters under which the species may be managed (Gregory et al. 2001).

Biology

Habitat Requirements

Big tarplant grows in valley and foothill grasslands in clay to clay loam soils at elevations of 30–505 meters (98–1,657 feet) (California Native Plant Society 2001). This species may benefit from removal of nonnative grasses; populations do well in controlled burn areas on the Lawrence Livermore National Laboratory property (California Natural Diversity Database 2002).

Demography

Big tarplant is an annual herb in the sunflower family (Asteraceae) that grows 3–18 decimeters (12–71 inches) high and blooms July–October (California Native Plant Society 2001).

References

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plumosa (Asteraceae), a California summer annual forb. *Madroño* 48:272–285.

Mariposa Pussypaws (*Calyptridium pulchellum*)

Conservation Considerations

Status

Federal: Threatened
State: None
Other: California Native Plant Society List 1B

Distribution

Mariposa pussypaws is known from seven occurrences distributed over a 1,942-square-kilometer (750-square-mile) area in Fresno, Madera, and Mariposa Counties. According to early botanical literature, Mariposa pussypaws has never been more widely distributed than it is today. (U.S. Fish and Wildlife Service 2002.)

The California Natural Diversity Database reported seven occurrences in 2002. Of these, six occur in the Plan Area and are recent and extant.

Population Trend

In four occurrences, the population trend of Mariposa pussypaws is unknown due to lack of research. Two occurrences in Madera County are reported as decreasing (California Natural Diversity Database 2002).

Threats

The primary factors causing the decline in Mariposa pussypaws are loss of habitat to development, grazing, and vehicles (California Native Plant Society 2001).

Conservation and Management

Mariposa pussypaws is included in the Southern Sierran Foothills Recovery Plan, which is currently under development (U.S. Fish and Wildlife Service 2002).

Biology

Habitat Requirements

Mariposa pussypaws grows in chaparral and cismontane woodland plant communities with granitic sandy or gravelly soils at elevations of 400–1,220 meters (1,312–4,003 feet) (California Native Plant Society 2001).

Demography

Mariposa pussypaws is a small annual herb in the purslane family (Portulacaceae) that blooms April–August (California Native Plant Society 2001).

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California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 01, 2002, update). Sacramento, CA: California Department of Fish and Game.

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Tree-Anemone (*Carpenteria californica*)

Conservation Considerations

Status

Federal: None
State: Threatened
Other: California Native Plant Society List 1B

Distribution

Tree-anemone is endemic to the central and southern Sierra Nevada foothills between the Kings and San Joaquin Rivers in Fresno County and is restricted to elevations of 340–1,340 meters (1,115–4,396 feet) (Hickman 1993; California Natural Diversity Database 2002). The species' total range encompasses approximately 583 square kilometers (225 square miles) (California Department of Fish and Game 2000).

Of 11 occurrences listed in the California Natural Diversity Database, one historic and five recent are within the Plan Area. These occurrences are located on privately owned land, within the Sierra National Forest, and on land of unknown ownership (California Natural Diversity Database 2002).

Population Trend

Since tree-anemone was discovered in the 1840s, at least one-third of its populations have been destroyed (California Department of Fish and Game 2000). One occurrence on the north slope of Davis Mountain in Fresno County appears stable with about 150 plants (California Natural Diversity Database 2002). An occurrence of 40 plants is on the Sierra National Forest in Madera County (Natural Diversity Database 2002). In addition, four to five plants were seen in 1987 just south of Kerckhoff Lake on the San Joaquin River in Fresno County; this location is within 3 kilometers (2 miles) of the Plan Area (California Natural Diversity Database 2002).

As of March 2002, the population trend of tree-anemone is unknown (California Natural Diversity Database 2002).

Threats

Existing tree-anemone populations are threatened by proposed road construction, off-highway vehicle use, logging, hydroelectric operations, residential development, and fire suppression (California Department of Fish and Game 2000). Populations have been lost due to landfill and road construction activities (California Natural Diversity Database 2002).

Conservation and Management

The U.S. Forest Service (USFS) has established the Carpenteria Botanical Area, which includes a portion of the largest tree-anemone population; Backbone Creek Research Natural Area supports another population. The Black Mountain Preserve supports a portion of a tree-anemone population that was transferred from The Nature Conservancy to the Sierra Foothill Conservancy in 1997. Observations of tree-anemone regeneration following the 1989 Powerhouse Fire have prompted Sierra National Forest to consider prescribed burning as a

conservation technique. USFS and U.S. Fish and Wildlife Service staff are investigating incorporation of a prescribed burn plan into a habitat conservation agreement or recovery plan. (California Department of Fish and Game 2000.)

Biology

Habitat Requirements

Tree-anemone grows on well-drained granitic soils and is most abundant on north-facing ravines and drainages in chaparral and cismontane woodland communities at 450–1,000 meters (1,476–3,281 feet). Tree-anemone plants appear to be fire-resistant stump sprouters. Their seeds appear to be fire-dependent; no seedling establishment had been observed in nature until the spring after the 1989 Powerhouse fire. (Hickman 1993; California Department of Fish and Game 2000.)

Demography

Tree-anemone is an erect to spreading evergreen shrub in the mock orange family (Philadelphaceae) that blooms May–July. It can reach 3 meters (10 feet) in height. Tree-anemone has glossy leathery green leaves, pale bark that peels in large sheets in the fall, and large showy flowers with white petals and yellow centers. (California Department of Fish and Game 2000; California Native Plant Society 2001). The spherical fruits are up to 1.5 centimeters (0.6 inches) wide (Hickman 1993.)

References

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Succulent Owl's-Clover (*Castilleja campestris* ssp. *succulenta*)

Conservation Considerations

Status

Federal: Threatened
State: Endangered
Other: CNPS List 1B

Distribution

Succulent owl's-clover is endemic to vernal pool complexes along the lower foothills and valleys in a 106-kilometer (66-mile) stretch of eastern San Joaquin Valley (Fish and Wildlife Service 2002). The species' range extends through northern Fresno, western Madera, eastern Merced, southeastern San Joaquin, and Stanislaus Counties (62 Federal Register [FR] 58, March 26, 1997).

The California Natural Diversity Database lists 63 occurrences; all are in the Planning Area. Of these occurrences, 51 are recent and 12 are historic. (California Natural Diversity Database 2002.)

Population Trend

Of 63 known populations, 32 occur on privately owned land. The species occurs in a few vernal pools on Big Table Mountain near Friant in Fresno County on lands owned privately, by the California Department of Fish and Game (DFG), and by the Bureau of Land Management (California Department of Fish and Game 2000). One account estimated 30,000 plants in 1993 and 100 plants in 1995; another account estimated 1,000 plants in 1997 (California Natural Diversity Database 2002). A population in a vernal pool complex owned by Caltrans in Madera County was reported to comprise 200–400 plants in 1985 and 10 plants in 1993 (California Department of Fish and Game 2000; California Natural Diversity Database 2002). Seven privately owned populations with more than 10 plants in each vernal pool occur on the Flying M Ranch in Merced County; The Nature Conservancy holds a conservation easement on portions of this property. (62 FR 58, March 26, 1997; California Natural Diversity Database 2002).

The overall population trend of succulent owl's-clover is unknown, although one occurrence on the Flying M Ranch is reported as increasing (California Natural Diversity Database 2002). However, DFG reported the status of succulent owl's-clover to be declining as of 1999 (California Department of Fish and Game 2000)

Threats

Succulent owl's-clover is threatened by loss of vernal pool habitat resulting from agricultural conversion, disking of pools, competition from nonnative plants, overgrazing, off-highway vehicle use, inappropriate grazing practices, and urbanization (California Department of Fish and Game 2000).

Conservation and Management

In 1992, DFG purchased land on Big Table Mountain in Fresno County that supports succulent owl's-clover. In 1995, Caltrans purchased a disked vernal pool complex in Madera County for mitigation purposes. As a result of the disturbance, upland plants had invaded the complex, but the pools still support succulent owl's-clover and other rare species. In 1995 a USFWS/DFG–funded habitat characterization study of San Joaquin Valley vernal pools, including pools supporting succulent owl's-clover, was completed. Protection measures for this species are expected to be included in the U.S. Fish and Wildlife Service's *Draft California Vernal Pool Ecosystem Recovery Plan* (California Department of Fish and Game 2000).

Biology

Habitat Requirements

Succulent owl's-clover occurs in drying, often acidic vernal pools with heavy clay soils in valley grassland or woodland habitats at 50–750 meters (164–2,461 feet). (California Native Plant Society 2001; California Natural Diversity Database 2001).

Demography

Succulent owl's-clover, also known as fleshy owl's clover, is a hemiparasitic annual herb in the figwort family (Scrophulariaceae) (Hickman 1993). Its stems are erect, generally 5–25 centimeters (2–10 inches) tall, and may be branched (U.S. Fish & Wildlife Service 2002). It blooms April–May; the bright yellow to white flowers are clustered at the ends of branches and subtended by leafy, brittle bracts (Hickman 1993). It is distinguished by the closely related field owl's-clover (*C. c.* ssp. *campestris*) by its thick brittle bracts, contrasted with the thin flexible bracts of field owl's-clover (Hickman 1993).

References

California Department of Fish and Game. 2000. *Status of rare, threatened, and endangered animals and plants of California*. Sacramento, CA: Habitat Conservation Planning Branch.

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U.S. Fish and Wildlife Service. No date. Succulent owl's-clover (*Castilleja campestris* ssp. *succulenta*). Prepared by Endangered Species Division, Sacramento Fish and Wildlife Office. Available at: http://sacramento.fws.gov/es/plant_spp_accts/succulent_owls_clover.htm. Accessed June 2002.

California Jewelflower (*Caulanthus californicus*)

Conservation Considerations

Status

Federal: Endangered
State: Endangered
Other: California Native Plant Society List 1B

Distribution

California jewelflower, a California endemic, historically occurred in Fresno, Kings, Kern, Santa Barbara, San Luis Obispo, Tulare, and Ventura Counties (California Native Plant Society 2001). Today, it is only known from the western edge of its range in Santa Barbara, San Luis Obispo, and Fresno counties (California Department of Fish and Game 2000).

The California Natural Diversity Database (CNDDB) reports 58 total occurrences within the state. Of these occurrences, 24 are within the Plan Area.

Four of these occurrences are considered extant, 12 are possibly extirpated, and eight are extirpated (California Natural Diversity Database 2002).

The four extant occurrences within the Plan Area are in Kern and Fresno Counties. In Kern County there is one occurrence on Semitropic Ridge, about 11 kilometers (7 miles) east-northeast of the Lost Hills; it is managed by the Center for National Lands Management. The three extant occurrences in Fresno County are on Bureau of Land Management–Hollister Resource Area land in the Garcia Canyon area. (California Natural Diversity Database 2002.)

Population Trend

According to the 2002 CNDDB review, the population trend of California jewelflower is unknown for all occurrences within the Plan Area. Annual surveys of the three extant occurrences in Fresno County conducted in the early 1990s reported an increase of individual plants. Possible reasons for fluctuation in population sizes could be variations in precipitation, lack of heavy winter freezes, increased competition, and insect predation. The Kern county population was transplanted there in 1975; 13 plants were counted in 1986. (California Natural Diversity Database 2002.)

As is typical of annual plant species, plant and population size can vary from year to year, depending on site and weather conditions. Undiscovered populations may persist in the foothills of Fresno, Kern, and Kings Counties where potential habitat remains in rangeland. (U.S. Fish and Wildlife Service 2002.).

The species' status in 1999 was considered to be stable to declining (California Department of Fish and Game 2000).

Threats

Populations of California jewelflower are threatened by agriculture, urbanization, energy development, grazing, and nonnative plants (California Native Plant Society 2001). Grazing can promote establishment of nonnative annual grasses, which can in turn competitively exclude California jewelflower. On the Carrizo Plain, California jewelflower frequently occurs on precincts of giant kangaroo rat (*Dipodomys ingens*), a species listed as endangered under both California and federal Endangered Species Acts. Although the kangaroo rats destroy some of the jewelflowers, their feeding behavior reduces mulch and nonnative seeds within their precincts, especially during the dry season; this effect may promote California jewelflower the following year. (California Department of Fish and Game 2000.)

Conservation and Management

In the last few years, several experimental introductions of California jewelflower have been attempted in Kern, Santa Barbara, and Tulare Counties. In each attempt, the number of plants at each site has declined following initial seeding. Protection measures for California jewelflower are included in the U.S. Fish and Wildlife Service's Recovery Plan for Upland Species of the San Joaquin Valley, California, completed in 1998. (California Department of Fish and Game 2000.)

Biology

Habitat Requirements

California jewelflower grows on sandy soils in pinyon and juniper woodlands, chenopod scrub, and valley and foothill grasslands at elevations of 70–100 meters (230–328 feet) (California Department of Fish and Game 2000; California Native Plant Society 2001).

Reproduction and Demography

California jewelflower is an annual herb in the mustard family (Brassicaceae). It produces raceme inflorescence February–May with maroon buds at the tips and translucent flowers below. Fruits are elongated and flattened in cross section (U.S. Fish and Wildlife Service 2002). Seeds begin to germinate in the fall, and seedlings may continue to emerge for several months. The seedlings develop into rosettes of leaves during winter months, after which stems elongate and flower buds appear in February–March. It is thought that this species forms a persistent seed band, but seeds appear to germinate only when exposed to conditions of prolonged weathering. Seed dispersal agents are unknown, but may include gravity, seed-eating animals such as giant kangaroo rats, wind, and water. (Cypher and Sandoval 1997.)

References

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Cypher, E. A., and T. M. Sandoval. 1997. California jewelflower (*Caulanthus californicus*). San Joaquin Valley Endangered Species Recovery Program. California State University Stanislaus. Available at: http://arnica.csustan.edu/esrpp/cajwlfwr.htm. Accessed June 11, 2002.

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Hoover's Spurge (*Chamaesyce hooveri*)

Conservation Considerations

Status

Federal: Threatened
State: None
Other: California Native Plant Society List 1B

Distribution

Hoover's spurge is endemic to vernal pool complexes on remnant alluvial fans and related depositional stream terraces along a stretch of 386 kilometers (240 miles) on the eastern margin of the Central Valley (62 Federal Register [FR] 58, March 26, 1997). Its historical distribution is not well documented, but it is presumed that Hoover's spurge was once more common than it is presently (U.S. Fish and Wildlife Service 2002).

Most populations occur in Tulare County north of Visalia; one population each occurs in Stanislaus and Merced Counties. Of these populations all are on private property, with the exception of one on the California Department of Fish and Game's Stone Corral Ecological Reserve in Tulare County west of Seville; this population may represent the type locality. (California Natural Diversity Database 2002.)

The California Natural Diversity Database (2002) lists 30 occurrences of Hoover's spurge in California. The Plan Area contains eight occurrences, of which seven are recent and one which is historic (California Natural Diversity Database 2002).

Population Trend

The population trend of all occurrences that have potential to be within the Plan Area is unknown (California Natural Diversity Database 2002). Numbers of individual plants vary at each occurrence from 50 to several thousand. The largest occurrence, located on private property in Tulare County north of Visalia, is reported the population to be large and probably stable under the current grazing regime; more than 10,000 plants were reported in 1986, and several thousand were reportedin 1992. The possible type locality was reported to support 50 plants in 1981, more than 1,100 in 1986, and about 500 in 1995. (California Natural Diversity Database 2002.)

Threats

Hoover's spurge is threatened by habitat loss and degradation caused by urbanization, agricultural land conversion, livestock grazing, off-highway vehicle use, a flood control project, a highway project, altered hydrology, landfill projects, and competition from weedy nonnative plants (62 FR 58, March 26, 1997).

Conservation and Management

In order to preserve Hoover's spurge habitat, a vernal pool recovery plan is under development. Critical habitat has not been designated for Hoover's spurge (U.S. Fish and Wildlife service 2002). This species would benefit from a habitat preservation program.

Biology

Habitat Requirements

Hoover's spurge is restricted to large, deep vernal pools on old alluvial terraces and basin rims with claypan soils at the base of the Sierra Nevada foothills (62 FR 58, March 26, 1997).

Demography

Hoover's spurge, a member of the spurge family (Euphorbiaceae), is a small, prostrate annual herb with milky sap that forms mats from a few inches to a few feet across. The small flowers occur singly in the leaf axils and bloom July–August (California Native Plant Society 2001). The 5-mm (0.19 inch) leaves are glaberous, grey-green, and opposite with a coarsely toothed margin; the spheric and lobed fruits are 1.5–2 mm (0.06–0.08 inch) long (Hickman 1993). Population sizes very from year to year due to drainage patterns into vernal pools and amount of cattle grazing. Light grazing does not affect

populations; heavy grazing, however, can be damaging (California Natural Diversity Database 2002).

References

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

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U.S. Fish and Wildlife Service. No date. Hoover's spurge (*Chamaesyce hooveri*). Prepared by Endangered Species Division, Sacramento Fish and Wildlife Office. Available at: http://sacramento.fws.gov/es/plant_spp_accts/hoovers_spurge.htm. Accessed June 2002.

Slough Thistle (*Cirsium crassicaule*)

Conservation Considerations

Status

Federal: None
State: None
Other: California Native Plant Society List 1B

Distribution

Slough thistle is endemic to Kern, King, and San Joaquin Counties in the San Joaquin Valley of California. The California Natural Diversity Database (CNDDB) (2002) lists 19 occurrences.

All occurrences are in the Plan Area. Of these, 17 are presumed extant and two are possibly extirpated. Fifteen of the occurrences are located in Kern County. One extant and one possibly extirpated occurrence is located in each of San Joaquin and King Counties. (California Natural Diversity Database 2002).

Population Trend

According to the CNDDB, the population trend of slough thistle is unknown. Most populations contain fewer than 50 plants, but a few populations in Kern County contain several hundred, and the known extant population in Kings County was estimated to contain thousands of individuals in 1979 (California Natural Diversity Database 2002). Because slough thistle is an annual plant, population sizes vary from year to year depending on weather and habitat conditions (California Native Plant Society 2001).

Threats

Conversion of habitat to agricultural use, nonnative plants, grazing, and loss of water sources threaten current populations of slough thistle (California Native Plant Society 2001; California Natural Diversity Database 2002).

Conservation and Management

A recovery plan has not been prepared nor have recovery requirements been identified for this species. However, San Joaquin kit fox tracks and scat have been observed in the immediate area of two Kern County occurrences; preservation of the kit fox habitat could lead to indirect conservation of these slough thistle populations (California Natural Diversity Database 2002).

Biology

Habitat Requirements

Slough thistle grows in chenopod scrub, marshes and swamps (sloughs), and riparian scrub at elevations of 3–100 meters (10–328 feet) (California Native Plant Society 2001).

Reproduction and Demography

Slough thistle is an annual or biennial species of the sunflower family (Asteraceae) that grows 1–3 meters (3–10 feet) tall and blooms May–August (Hickman 1993; California Native Plant Society 2001).

References

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee,

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California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Hickman, J. C. 1993. *The Jepson manual*. Berkeley, CA: University of California Press.

Mariposa Clarkia (*Clarkia biloba* ssp. *australis*)

Conservation Considerations

Status

Federal: None
State: None
Other: California Native Plant Society List 1B

Distribution

Mariposa clarkia is a California endemic known from the west foothills of Mariposa County and may occur in Tuolumne County (California Natural Diversity Database 2002, California Native Plant Society 2001). Recorded occurrences of this species are along or near the South Fork Merced River and along State Routes 140 and 49. Populations are located on privately owned property, National Forest System lands in the Sierra National Forest, and property of unknown ownership (California Natural Diversity Database 2002). U. S. Bureau of Land Management manages one extensive population on the Sierra National Forest in the Merced River canyon.

The California Natural Diversity Database lists 14 occurrences. Of these, 13 occur in the Plan Area. The seven recent and six historic occurrences are presumed extant.

Population Trend

In all occurrences, the population trend of Mariposa clarkia is unknown due to lack of research (California Natural Diversity Database 2002). Population sizes vary from hundreds to thousands of individuals.

Threats

Primary threats to Mariposa clarkia include road maintenance and roadside spraying, power line maintenance, slope failure, mining, public recreation, fire control activities, and competitive nonnative plants (California Native Plant Society 2001; California Natural Diversity Database 2002).

Conservation and Management

The populations of Mariposa clarkia on federal land are protected form development; these populations appear to be stable (California Natural Diversity Database 2002). A specific conservation or management plan has not been prepared or implemented for this species.

Biology

Habitat Requirements

Mariposa clarkia grows in chaparral and woodlands. Several populations occur in transition areas between foothill woodland and riparian habitat. Populations are generally located at elevations of 300–945 meters (984–3,100 feet). Soil substrates for this species include soil derived from phyllite parent material; dry, metamorphic rock; and loose soil (California Native Plant Society 2001; California Natural Diversity Database 2001).

Demography

Mariposa clarkia is an erect, annual herb in the evening primrose family (Onagraceae) that blooms May–July (California Native Plant Society 2001). It grows to less than 1 meter (3 feet) and has showy, bright-pink to magenta flowers (Hickman 1993).

References

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Hickman, J. C. 1993. *The Jepson manual*. Berkeley, CA: University of California Press.

Merced Clarkia (*Clarkia lingulata*)

Conservation Considerations

Status

Federal: None
State: Endangered
Other: California Native Plant Society List 1B

Distribution

Merced clarkia endemic to California. It is known only from two locations in Mariposa County (California Native Plant Society 2001): one at the mouth of the South Fork Merced River, the other at the mouth of Ned Gulch about 3 kilometers (2 miles) west of the South Fork Merced River bridge. Both occurrences are located on National Forest System lands in the Sierra National Forest (California Natural Diversity Database 2002).

Both occurrences are in the Plan Area. According to the California Natural Diversity Database (2002), both are considered extant and recent.

Population Trend

The population trend for Merced clarkia in both occurrences is unknown. Both populations have been described to range from no individuals in dry years to tens of thousands in wet years (California Natural Diversity Database 2002).

Threats

Primary threats to Merced clarkia are road maintenance, herbicide spraying, slumping of slope, fire, grazing, and (as of 1998) yellow star-thistle encroachment (*Centaurea solstitialis*) (California Natural Diversity Database 2002).

Conservation and Management

In 1994, a multi-agency memorandum of understanding (MOU) for the conservation and protection of sensitive species in the Merced River Canyon was

signed by the California Department of Fish and Game, the U.S. Forest Service, the U.S. Bureau of Land Management, Caltrans, and PG&E (California Department of Fish and Game 2000). The MOU specifies guidelines for highway and power line maintenance and repair, notification requirements, species monitoring, and annual reviews. The MOU emphasizes protection measures for Merced clarkia.

Biology

Habitat Requirements

Merced clarkia grows on steep north-facing slopes in chaparral and cismontane woodland plant communities with sandy loam soils of phyllite parent material at elevations of 400–455 meters (1,312–1,493 feet) (California Native Plant Society 2001).

Demography

Merced clarkia is an annual herb in the evening primrose family (Onagraceae) that produces bright pink flowers May–June (California Native Plant Society 2001).

References

California Department of Fish and Game. 2000. *Status of rare, threatened, and endangered animals and plants of California*. Sacramento, CA: Habitat Conservation Planning Branch.

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 01, 2002, update). Sacramento, CA: California Department of Fish and Game.

Springville Clarkia (*Clarkia springvillensis*)

Conservation Considerations

Status

Federal: Threatened
State: Endangered
Other: California Native Plant Society List 1B

Distribution

Springville clarkia is endemic to California. Its known distribution is restricted to roadsides and grassy openings in blue oak woodland areas near Springville, Tulare County (California Natural Diversity Database 2002).

Fifteen extant populations occur in a small area near the North and Middle Forks of the Tule River northeast of Springville; of these, 11 are in the Plan Area (California Natural Diversity Database 2002). Populations occur on the Sequoia National Forest, on Bureau of Land Management lands, and on lands under private and unknown ownership.

Population Trend

Springville clarkia is a late-blooming annual that may not develop mature seeds before its grassland habitat is mowed annually for fire protection. According to 1993 research funded by the California Department of Fish and Game (DFG), Springville clarkia exhibits a fair amount of genetic diversity despite its small population size and annual fluctuation in population numbers. Continued research found that in 1997, many plants dried up and died before setting seeds, presumably due to the extremely dry spring that followed a major storm in early January. (California Department of Fish and Game 2000.)

As of 1999, Springville clarkia was declining (California Department of Fish and Game 2000).

Threats

Springville clarkia is threatened by nonnative plants, overgrazing, vehicles, road maintenance, logging, and residential development (California Native Plant Society 2001).

Conservation and Management

Sequoia National Forest and DFG are developing a Species Management Guide that will prescribe research and management actions to maintain this species (California Department of Fish and Game 2000).

Biology

Habitat Requirements

Springville clarkia grows in chaparral, cismontane woodland, and valley and foothill grassland plant communities with granitic soils at 335–1,220 meters (1,099–4,003 feet) (California Native Plant Society 2001).

Demography

Springville clarkia is an annual herb in the evening primrose family (Onagraceae) that blooms May–July. It has simple or branched stems, narrow leaves, and lavender-pink flowers with dark purplish basal spots (California Native Plant Society 2001).

References

California Department of Fish and Game. 2000. *Status of rare, threatened, and endangered animals and plants of California*. Sacramento, CA: Habitat Conservation Planning Branch.

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 01, 2002, update). Sacramento, CA: California Department of Fish and Game.

Vasek's Clarkia (*Clarkia tembloriensis* ssp. *calientensis*)

Conservation Considerations

Status

Federal: None
State: None
Other: California Native Plant Society List 1B

Distribution

Vasek's clarkia is endemic to California. It is known from only three locations in Kern County near Caliente Creek, east of Bakersfield (California Native Plant Society 2001). All three occurrences are on private property owned by Tejon Ranch Company (California Natural Diversity Database 2002).

All three occurrences are in the Plan Area. The California Natural Diversity Database lists all three as extant and recent.

Population Trend

The population trend of Vasek's clarkia is unknown. Two populations appear in good condition with individual numbers of 200 and 100, although one appears to be threatened by encroachment of invasive grasses. The third population was not located at last report, possibly due to a late survey date, but it may also have been extirpated. (California Natural Diversity Database 2002.)

Threats

The primary threats to Vasek's clarkia are grazing and invasive grass encroachment (California Natural Diversity Database 2002).

Conservation and Management

Conservation efforts for Vasek's clarkia have not yet been implemented. All known populations of Vask's clarkia should be secured and protected.

Biology

Habitat Requirements

Vasek's clarkia grows on north- and northwest-facing slopes in valley and foothill grassland plant communities at elevations of 275–500 meters (902–1,640 feet) (California Native Plant Society 2001).

Demography

Vasek's clarkia is an annual herb in the evening primrose family (Onagraceae) that blooms in April (California Native Plant Society 2001).

References

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Hispid Bird's-Beak (*Cordylanthus mollis* ssp. *hispidus*)

Conservation Considerations

Status

Federal: None
State: None
Other: California Native Plant Society List 1B

Distribution

Hispid bird's-beak historically occurred in California's central and southern Central Valley, including Alameda, Merced, Placer, Kern, and Solano Counties (Hickman 1993; California Native Plant Society 2001). Although the taxon has been extirpated from most of the San Joaquin Valley, it is known from

approximately 25 occurrences within its range (California Native Plant Society 200; California Natural Diversity Database 2002). Populations can contain up to 4,000 plants; they are located on private property as well as property owned by the California Department of Fish and Game (DFG), the U.S. Fish and Wildlife Service (USFWS), The Nature Conservancy, the Federal Communications Commission, and the Cities of Livermore and Los Banos (California Natural Diversity Database 2002).

Of the 25 total occurrences listed in the California Natural Diversity Database, 24 occurrences are located within the Plan Area. These occurrences are all recent; 23 are presumed extant and one is listed as extirpated. Twenty-two of the extant occurrences are in Merced County; one is Kern County. (California Natural Diversity Database 2002.)

Population Trend

The population trend of hispid bird's-beak is unknown for all populations except two, in which the populations are reported as decreasing. Populations can range from 50 to 4,000 plants; these numbers fluctuate from year to year in response to site and weather conditions (California Natural Diversity Database 2002).

Threats

Current populations of hispid bird's-beak are threatened by conversion of habitat to agricultural use, residential development, hydraulic modifications, off-highway vehicle use, erosion, and grazing (California Native Plant Society 2001; California Natural Diversity Database 2002).

Conservation and Management

A recovery plan has not been prepared and recovery requirements have not been identified for this species. Securing and protecting populations to conserve hispid bird's-beak should be a high priority.

Biology

Habitat Requirements

Hispid bird's-beak is a hemiparasitic annual herb in the figwort family (*Scrophulariaceae*). It grows 10–40 centimeters (4–16 inches) tall (Hickman 1993) in playas, alkaline meadows, saline marshes, and flats. Hispid bird's-beak blooms June–September (California Native Plant Society 2001).

References

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Hickman, J. C. 1993. *The Jepson manual*. Berkeley, CA: University of California Press.

Palmate-Bracted Bird's-Beak (*Cordylanthus palmatus*)

Conservation Considerations

Status

Federal: Endangered
State: Endangered
Other: California Native Plant Society List 1B

Distribution

Palmate-bracted bird's-beak is endemic to California and is known from only 28 occurrences. Historic populations were scattered throughout the San Joaquin Valley in Fresno and Madera Counties, the Livermore Valley in Alameda County, and the Sacramento Valley in Colusa and Yolo Counties (California Department of Fish and Game 2000).

The California Natural Diversity Database (2002) lists 11 occurrences in the Plan Area; of these, eight are extant, one is possibly extirpated, and two are extirpated. The six occurrences in Fresno County are on land of unknown ownership and at the California Department of Fish and Game's Alkali Sink Ecological Reserve and Mendota Wildlife Management Area. The five occurrences in Madera County are on private property and lands of unknown ownership. (California Natural Diversity Database 2002.)

Population Trend

Fluctuations in palmate-bracted bird's-beak populations are common from year to year. These changes may be a result of changes in pollination success, rainfall patterns, freshwater influence, and marsh pollution (U.S. Fish and Wildlife Service undated). The U.S. Fish and Wildlife Service (USFWS) suggests that researchers should take into account the unreliability of single-season surveys.

Threats

Palmate-bracted bird's-beak is threatened by agriculture, urbanization, vehicles, altered hydrology, grazing, bicycle use, and industrial development (California Native Plant Society 2001).

Conservation and Management

Protection measures for palmate-bracted bird's-beak are included in USFWS's *Recovery Plan for Upland Species of the San Joaquin Valley, California*. The plan was completed in 1998 (California Department of Fish and Game 2000).

Biology

Habitat Requirements

Palmate-bracted bird's-beak grows on seasonally-flooded, saline-alkali soils in lowland plains and basins in chenopod scrub and valley and foothill grasslands at elevations of less than 152 meters (500 feet) (California Native Plant Society 2001; U.S. Fish and Wildlife Service undated).

According to the California Department of Fish and Game, a recent study of the alkali sink hydrology found that palmate-bracted bird's-beak occupies a narrow zone of favorable conditions. Stability of pH, salinity, and moisture content maintain the specialized habitat and enable individuals to complete their life cycle (California Department of Fish and Game 2000).

Demography

Palmate-bracted bird's-beak is an annual herb in the figwort family (Scrophulariaceae) that blooms May–October (California Native Plant Society 2001). Like other bird's-beaks, palmate-bracted bird's-beak is partially parasitic on the roots of other plants (California Native Plant Society 2001). Its host may be salt grass (*Distichlis spicata*) (U.S. Fish and Wildlife Service undated).

References

California Department of Fish and Game. 2000. *Status of rare, threatened, and endangered animals and plants of California*. Sacramento, CA: Habitat Conservation Planning Branch.

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

U.S. Fish and Wildlife Service. No date. Palmate-bracted bird's-beak (*Cordylanthus palmatus*). Prepared by Endangered Species Division, Sacramento Fish and Wildlife Office. Available at: http://sacramento.fws.gov/es/plant_spp_accts/palmate_bracted_birds_beak.htm. Accessed June 2002.

Kern Mallow (*Eremalche kernensis*)

Conservation Considerations

Status

Federal: Endangered
State: None
Other: California Native Plant Society List 1B

Distribution

Kern mallow is endemic to California. Its known distribution is restricted to a single metapopulation consisting of intermittent occurrences within an area of approximately 104 square kilometers (40 square miles) at the eastern base of the Temblor Range in the Lokern area of western Kern County (U.S. Fish and Wildlife Service undated). The occurrences are distributed from the vicinity of McKittrick to near Buttonwillow (California Natural Diversity Database 2002; U.S. Fish and Wildlife Service undated).

Kern mallow is known from only 15 occurrences, all of which are in the Plan Area. Thirteen off these occurrences are extant and recent; two are historic and extirpated. Eighty-five percent of the occurrences are located on private land; the

remainder are on Bureau of Land Management lands and land of unknown ownership. (California Natural Diversity Database 2002.)

Population Trend

Because Kern mallow is an annual species, population and plant size can vary dramatically depending on site and weather conditions. According to the U.S. Fish and Wildlife Service, several botanists familiar with Kern mallow were unable to find it at known locations during below-average rainfall years.

According to the California Natural Diversity Database (2002), the population trend is unknown due to inconsistent data.

Threats

Kern mallow is seriously threatened by agriculture, sheep grazing, a transmission line corridor, and oil and gas development (California Native Plant Society 2001).

Conservation and Management

Kern mallow is included in the *Recovery Plan for the Upland Species of the San Joaquin Valley* (U.S. Fish and Wildlife Service 1998).

Biology

Habitat Requirements

Kern mallow grows on alkaline sandy loam or clay soils in chenopod scrub and in valley and foothill grassland at elevations of 70–1,000 meters (230–3,281 feet) in areas where shrub cover is less than 25% (California Native Plant Society 2001, U.S. Fish and Wildlife Service undated).

Demography

Kern mallow is a small annual herb in the mallow family (Malvaceae). It has predominantly white to sometimes pale lavender, hollyhock-like flowers that bloom March–May (California Native Plant Society 2001). The seed dispersal agents and the duration of seed viability in the soil are unknown. It is thought that at least some seeds remain ungerminated in the following growing season, and that seeds may be dispersed by animals and wind (U.S. Fish and Wildlife Service undated).

References

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

U.S. Fish and Wildlife Service. 1998. *Recovery plan for upland species of the San Joaquin Valley, California.* Region 1, Portland, OR.

U.S. Fish and Wildlife Service. Undated. Kern mallow (*Eremalche kernensis*). Prepared by Endangered Species Division, Sacramento Fish and Wildlife Office. Available at: http://sacramento.fws.gov/es/plant_spp_accts/kern_mallow.htm. Accessed June 2002.

Congdon's Woolly Sunflower (*Eriophyllum congdonii*)

Conservation Considerations

Status

Federal: None
State: Rare
Other: California Native Plant Society List 1B

Distribution

Congdon's woolly sunflower is endemic to California. It is restricted to the Merced River Canyon in Mariposa County (California Department of Fish and Game 2000). The California Natural Diversity Database (2002) lists 14 occurrences, all on the Sierra or Stanislaus National Forests or near the western boundary of Yosemite National Park.

Of the 14 occurrences, five are in the Plan Area. Two are recent, three are historic, and all are presumed extant (California Natural Diversity Database 2002).

Population Trend

The population trend of Congdon's woolly sunflower occurrences in the Plan Area is unknown with one exception; this population is reported to exhibit an increasing trend (California Natural Diversity Database 2002). All occurrences are reported to exceed 600 individual plants.

In 1999 the California Department of Fish and Game described the population trend of Congdon's woolly sunflower as stable .

Threats

The primary threats to Congdon's woolly sunflower are competition from weedy nonnative plants, trail restoration, mining, timber harvest, and road maintenance (California Native Plant Society 2001; California Natural Diversity Database 2002).

Conservation and Management

Conservation efforts for Congdon's woolly sunflower have not yet been implemented. Securing and protecting populations should be a primary conservation objective for this species.

Biology

Habitat Requirements

Congdon's woolly sunflower occurs in chaparral, cismontane woodland, and lower montane conifer Forest on dry ridges of metamorphic rock, scree, and talus at elevations of 500–1900 meters (1,640–6,234 feet) (California Native Plant Society 2001).

Demography

Congdon's woolly sunflower is a yellow-flowered annual herb in the sunflower family (Asteraceae) that blooms May–June (California Native Plant Society 2001).

References

California Department of Fish and Game. 2000. *Status of rare, threatened, and endangered animals and plants of California*. Sacramento, CA: Habitat Conservation Planning Branch.

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Delta Button-Celery (*Eryngium racemosum*)

Conservation Considerations

Status

Federal: Endangered
State: None
Other: California Native Plant Society List 1B

Distribution

Delta button-celery is endemic to California and is known from only 26 occurrences. The historical distribution includes Calaveras, Merced, Stanislaus, and San Joaquin Counties. Of the 26 known occurrences, six may have been extirpated, including all the occurrences in San Joaquin County and most of those in Stanislaus County. Most extant occurrences are found in Merced County along the San Joaquin River. (California Natural Diversity Database 2002.)

The California Natural Diversity Database (2002) lists 25 occurrences for the Plan Area; of these, 19 are extant and six are possibly extirpated. Of the 19 extant occurrences, 17 are in Merced County on private land, U.S. Fish and Wildlife Service National Wildlife Refuges, and the Department of Fish and Game's (DFG's) North Grasslands and Los Baños Wildlife Areas (California Department of Fish and Game 2000). One occurrence in Stanislaus County, located on the eastern shore of Turlock Lake, is of unknown ownership. Additionally, one occurrence on the Merced–Stanislaus County boundary west of the San Joaquin River is in DFG's North Grasslands Wildlife Area.

Population Trend

Delta button-celery has been determined to be dependent on flooding for survival. During the 1986–94 drought, Delta button-celery populations in the San Joaquin River floodplain were greatly reduced. During the wet years of 1995–1997, populations increased in numbers and areal extent, particularly after the major flooding in January 1997. (California Department of Fish and Game 2000.)

Population locations and characteristics differ in dry and wet years. In dry years, many populations exist only as annual plants. A strong population of plants that were perennial during the drought disappeared during wet years (California Department of Fish and Game 2000).

In 1999, DFG described Delta button-celery as stable to declining.

Threats

Flood control activities and conversion of lowlands to agricultural uses have affected many populations of Delta button-celery. Friant Dam on the San Joaquin River and an extensive levee system have greatly reduced the frequency and flooding of floodplain habitat. Riparian restoration or waterfowl enhancement projects could also threaten the species if habitat areas are artificially flooded during critical stages in the Delta button-celery's life cycle. (California Department of Fish and Game 2000; California Native Plant Society 2001.)

Conservation and Management

Conservation and management efforts began in the early 1990s when DFG funded studies of Delta button-celery at the North Grasslands Wildlife Area in Merced County (California Department of Fish and Game 2000). The DFG surveys and population monitoring have been ongoing. Successful conservation of the species will require protection and maintenance of habitat with a variety of hydrological regimes. A DFG project to enhance and restore historical wetland habitat at the North Grasslands Wildlife Area may affect Delta button-celery populations there, although DFG is making an effort to minimize adverse effects and maximize benefits on Delta button-celery (California Department of Fish and Game 2000).

Biology

Habitat Requirements

General habitat of Delta button-celery is riparian scrub (vernally mesic clay depressions) and subalkaline swales at elevations of 3–30 meters (10–98 feet) (California Native Plant Society 2001). Periodic flooding maintains the species' habitat through sustenance of seasonal wetlands; scouring leads to a reduction of competition (California Department of Fish and Game 2000).

Demography

Delta button-celery is an annual/perennial herb in the carrot family (Apiaceae) that blooms June–August (California Native Plant Society 2001).

References

California Department of Fish and Game. 2000. *Status of rare, threatened, and endangered animals and plants of California*. Sacramento, CA: Habitat Conservation Planning Branch.

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Striped Adobe Lily (*Fritillaria striata*)

Conservation Considerations

Status

Federal: None
State: Threatened
Other: California Native Plant Society List 1B

Distribution

Striped adobe lily is endemic to California. Its known distribution is in the southern Sierra Nevada foothills of eastern Tulare and Kern Counties (California Native Plant Society 2001). At least 18 extant populations are scattered throughout the species' known range. All populations occur on private land and land of unknown ownership (California Department of Fish and Game 2000; California Natural Diversity Database 2002).

The California Natural Diversity Database (CNDDB) (2002) lists 20 occurrences. In the Plan Area there are 17 occurrences that are recent and extant and two that are extirpated (California Natural Diversity Database 2002).

Population Trend

According to the CNDDB, the population trend of striped adobe lily is unknown. CNDDB records reflect populations ranging from a few to thousands of plants.

According to the California Department of Fish and Game, the status in 1999 of striped adobe lily was unknown.

Threats

Striped adobe lily is threatened by agriculture, competition from nonnative plants, and urbanization (California Native Plant Society 2001). Although heavy grazing has adversely affected some populations, light grazing and avoidance during the flowering period appears to benefit the species by reducing competition from nonnative plants (California Department of Fish and Game 2000).

Conservation and Management

A conservation plan has not been prepared and management efforts have not been implemented for this species. Efforts to conserve this species have been hampered by landowner efforts to prevent its federal listing, which was proposed in 1994 (California Department of Fish and Game 2000). In 1997, the U.S. Fish and Wildlife Service convened a mediated group of landowners; ranchers; and federal, state, and local officials; so far, the issue has not been resolved (California Department of Fish and Game 2000). Measures to conserve this species should include securing and protecting known populations and studying the effects of grazing on population dynamics.

Biology

Habitat Requirements

Striped adobe lily grows on clay soils at elevations of 135–1455 meters (443–4,774 feet) in cismontane woodland and valley and foothill grassland plant communities (California Native Plant Society 2001).

Demography

Striped adobe lily is a perennial herb in the lily family (Liliaceae) that blooms February–April. It grows from a bulb and produces white to pink bell-shaped flowers with burgundy stripes (California Native Plant Society 2001).

References

California Department of Fish and Game. 2000. *Status of rare, threatened, and endangered animals and plants of California*. Sacramento, CA: Habitat Conservation Planning Branch.

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Boggs Lake Hedge-Hyssop (*Gratiola heterosepala*)

Conservation Considerations

Status

Federal: None
State: Endangered
Other: California Native Plant Society List 1B

Distribution

Boggs Lake hedge-hyssop is endemic to northern California and southern Oregon. The distribution of Boggs Lake hedge-hyssop populations is patchy throughout its range, even within areas of suitable habitat. In California, occurrences are documented from Lassen County south to Madera County. The California Natural Diversity Database (CNDDB) lists 86 occurrences, concentrated on the Modoc Plateau and in the southeastern and northeastern Sacramento Valley (California Natural Diversity Database 2002).

Although vernal pools are abundant in some parts of the Plan Area, few occurrences of Boggs Lake hedge-hyssop are known from this area. Ten recent occurrences and one historic occurrence are documented: six in the vicinity of Big Table Mountain in northern Fresno County, three in the Goose Creek watershed in northern San Joaquin County, and one near Haystack Mountain in Merced County. One historic occurrence documented near Millerton Lake in Madera County has not been seen since 1961. (California Natural Diversity Database 2002.)

Population Trend

Like many vernal pool species, populations of Boggs Lake hedge-hyssop fluctuate in abundance from year to year, depending on the amount of rainfall. In a dry season, a vernal pool may not fill sufficiently for Boggs Lake hedge-hyssop seeds to germinate. Populations have fluctuated from no plants observed in a dry year to thousands in a wet year; for example, at the type locality at Boggs Lake, the number of plants has varied from 1,000 plants in 1981, to none from 1989 through 1997, to five in 1997 (California Natural Diversity Database 2002). Although many new populations of Boggs Lake hedge-hyssop have been discovered in the past 20 years, both the quality and quantity of available habitat have declined during the same time period.

Threats

Much vernal pool habitat in the San Joaquin Valley has been altered or removed for agricultural and urban development and damaged by overgrazing and off-highway vehicle traffic (California Department of Fish and Game 1998; California Native Plant Society 2001; California Natural Diversity Database 2002). Hydrologic alteration and disturbance by disking and grading have also disturbed or extirpated populations of Boggs Lake hedge-hyssop (Kaye et al. 1990; California Natural Diversity Database 2002). Several occurrences in the Plan Area occur on ranchland and are threatened by grazing and trampling by cattle (California Natural Diversity Database 2002).

Conservation and Management

Most occurrences of Boggs Lake hedge-hyssop in the Plan Area are on private land. Because of the brief survey window for finding Boggs Lake hedge-hyssop and because the plants are small and inconspicuous, it is likely that the species has been overlooked and that undiscovered populations may exist in the Plan Area. Grazing appears to be detrimental if livestock use is concentrated in a small area or if it occurs before seed set. Grazing may be a compatible land use if it occurs after seed set (Mason and Bacigalupi 1954; California Department of Fish and Game 1987). Additional studies are needed to establish compatible grazing levels.

Biology

Habitat Requirements

Boggs Lake hedge-hyssop is a semiaquatic annual plant that typically grows on the margins of shallow lakes and large vernal pools (Hickman 1993). Less frequently, this species has been found on loam and loamy sand soils. In smaller vernal pools, it inhabits barren, muddy areas on extremely shallow soils (California Department of Fish and Game 1998). Elevations of known occurrences range from 8 meters (26 feet) in Solano County to more than 1,576 meters (5,171 feet) in Modoc County (California Natural Diversity Database 2002).

Demography

Boggs Lake hedge-hyssop is an annual plant that flowers April–August (California Native Plant Society 2001). It completes a rapid life cycle during the period when vernal pools have begun to dry but still contain shallow water up to 5 centimeters (2 inches) deep (Kaye et al. 1990; Corbin et al. 1994). Boggs Lake hedge-hyssop germinates and begins growth underwater. It generally flowers between April and June in the Central Valley when shallow water is still present. Flowering at higher elevations occurs as late as August (Corbin et al. 1994). Boggs Lake hedge-hyssop is apparently self-pollinated (Kaye et al. 1990). Seed longevity in nature has not been studied, although an interval of 3 years between observations of growing plants on the Lassen National Forest indicates that dormancy can persist for at least that long (Corbin et al. 1994). Studies of this species in Oregon found that seed production was unchanged when insects were excluded during flowering. Insects were not observed visiting flowers under natural conditions (Kaye et al. 1990). Fruits mature within 1–2 weeks after flowering begins; the seeds disperse and the plants disappear soon after seed set (Corbin et al. 1994). Seed dispersal agents have not been studied, although the CNDDB records for two Tehama County occurrences note that seeds may have been carried to the site (by birds or humans) from nearby occurrences (California Natural Diversity Database 2002).

References

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Hickman, J. C. (ed.). 1993. *The Jepson manual*. Berkeley, CA: University of California Press.

California Department of Fish and Game. 1987. *California native plant status report:* Gratiola heterosepala. Sacramento, CA: California Department of Fish and Game Endangered Plant Project, California Natural Diversity Database, and California Native Plant Society.

_____. 1998. Draft sections from 1997 annual report on the status of California state-listed threatened and endangered animals and plants. Sacramento, CA.

Corbin, B., G. Schoolcraft, A. Sanger, and J. Molter. 1994. *Gratiola heterosepala* conservation strategy. Unpublished report to Lassen National Forest, Modoc National Forest, Alturas Resource Area BLM, and Redding Resource Area BLM.

Kaye, T., W. Messinger, S. Massey, and R. Meinke. 1990. *Gratiola heterosepal*a: inventory and breeding system evaluation. Unpublished report to the U.S. Bureau of Land Management, Lakeview, OR.

Mason, H. L., and R. Bacigalupi. 1954. A new *Gratiola* from Boggs Lake, Lake County, California. *Madroño* 12:150–152.

Pale-Yellow Layia (*Layia heterotricha*)

Conservation Considerations

Status

Federal: None
State: None
Other: California Native Plant Society List 1B

Distribution

Pale-yellow layia is endemic to California, having a historical distribution throughout the southern Tehachapi Mountains, western San Joaquin Valley, southern Coast Ranges, and northern Western Transverse Ranges (Hickman 1993). The historical range includes portions of Fresno, Kings, Kern, Monterey, Santa Barbara, San Benito, San Luis Obispo, and Ventura Counties (California Native Plant Society 2001).

Pale-yellow layia is known from more than 30 recorded populations, most of which have not been revisited recently (California Natural Diversity Database 2002). Of the nine populations recently surveyed, population size ranged from five to more than 1,000 plants. These occurrences are located in Fresno, Kern, Santa Barbara, and Ventura Counties on privately owned land, land managed by the U.S. Bureau of Land Management (BLM), the U.S. Forest Service, and the California Department of Parks and Recreation.

Five extant occurrences are within the Plan Area; two are recent and three are historic (California Natural Diversity Database 2002).

Population Trend

According to the California Natural Diversity Database (2002), the population trend of pale-yellow layia is unknown. Population sizes are not reported for most occurrences in the Plan Area. The single exception had 50 individuals in 1995 (California Natural Diversity Database 2002).

Threats

The primary threats to pale-yellow layia are agricultural conversion, previous construction on San Antonio Reservoir, and overgrazing (California Native Plant Society 2001; California Natural Diversity Database 2002).

Conservation and Management

No conservation efforts for pale-yellow layia have been implemented. Conservation measures for this species should include securing and protecting populations and managing grazing at levels that are not detrimental to the populations.

Biology

Habitat Requirements

Pale-yellow layia occurs in cismontane woodland, pinyon and juniper woodland, and valley and foothill grassland communities on alkaline or clay soils at elevations of 300–1,600 meters (984–5,249 feet) (California Native Plant Society 2001).

Demography

Pale-yellow layia is an annual herb in the sunflower family (Asteraceae) that grows 13–900 centimeters (5–354 inches) tall and blooms March–June (Hickman 1993; California Native Plant Society 2001).

References

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

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Hickman, J. C. (ed.). 1993. *The Jepson manual*. Berkeley, CA: University of California Press.

Comanche Point Layia (*Layia leucopappa*)

Conservation Considerations

Status

Federal: None
State: None
Other: California Native Plant Society List 1B

Distribution

Comanche point layia is endemic to California. It is restricted to the Comanche Point area in the Tehachapi Mountains of Kern County (Hickman 1993).

Comanche Point layia is known from only eight recorded populations, most of which have not been revisited recently (California Natural Diversity Database 2002). Five of the eight populations are located on Tejon Ranch Company property; the other three are on property of unknown and private ownership (California Natural Diversity Database 2002).

All eight occurrences are within the Plan Area and are presumed extant. Two are recent occurrences and 5 are historic (California Natural Diversity Database 2002).

Population Trend

According to the California Natural Diversity Database (2002), the population trend of Comanche Point layia is unknown in all occurrences except one, in which it is reported as decreasing.

Threats

The primary factors causing the decline of Comanche Point layia are agricultural conversion, development, and overgrazing (California Native Plant Society 2001; California Natural Diversity Database 2002).

Conservation and Management

No conservation efforts for Comanche Point layia have been implemented. Conservation measures for this species should include securing and protecting populations and managing grazing at levels that are not detrimental to the populations.

Biology

Habitat Requirements

Comanche Point layia occurs in chenopod scrub and valley and foothill grassland communities on open slopes with heavy clay soils at elevations of 100–350 meters (328–1,148 feet) (Hickman 1993; California Native Plant Society 2001,).

Demography

Comanche Point layia is a straw-colored annual herb in the sunflower family (Asteraceae). It grows 8–60 centimeters (3–24 inches) tall and blooms March–April, producing white to cream-colored flowers (Hickman 1993; California Native Plant Society 2001).

References

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Hickman, J. C. (ed.). 1993. *The Jepson manual*. Berkeley, CA: University of California Press.

Legenere (Legenere limosa)

Conservation Considerations

Status

Federal: None
State: None
Other: California Native Plant Society List 1B

Distribution

Legenere is endemic to California. It is found in wet areas and vernal pools in Lake, Napa, Placer, Sacramento, Shasta, San Mateo, Solano, and Tehama Counties and is known historically from Sonoma and Stanislaus Counties (Hickman 1993; California Native Plant Society 2001).

Legenere is known from more than 50 recorded populations; of these, only two occur within in the Plan Area (California Natural Diversity Database 2002). These two occurrences are both on privately owned land in San Joaquin County. One of these occurrences is extant and is on Buckeye Ranch, north of the Mokelumne River in Galt. The other occurrence was located on the San

Joaquin–Stanislaus County border; it was extirpated by agricultural development (California Natural Diversity Database 2002).

Population Trend

According to the California Natural Diversity Database (2002), the population trend of legenere in the plan area is unknown. The report for the one extant occurrence in the Plan Area states that many plants were seen in 1993 (California Natural Diversity Database 2002).

Threats

The primary factors leading to the decline of legenere are agricultural conversion and overgrazing; these factors have caused the extirpation of many historical occurrences (California Native Plant Society 2001; California Natural Diversity Database 2002).

Conservation and Management

No conservation efforts for legenere have been implemented. Conservation measures for this species should include securing and protecting populations and managing grazing at levels that are not detrimental to the populations.

Biology

Habitat Requirements

Legenere occurs in vernal pools and wet areas at elevations of 1–880 meters (3–2,887 feet) (California Native Plant Society 2001).

Demography

Legenere is a small annual herb in the bellflower family (Campanulaceae) that blooms April–June (Hickman 1993; California Native Plant Society 2001).

References

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Hickman, J. C. (ed.). 1993. *The Jepson manual*. Berkeley, CA: University of California Press.

Panoche Peppergrass (*Lepidium jaredii* ssp. *album*)

Conservation Considerations

Status

Federal: None
State: None
Other: California Native Plant Society List 1B

Distribution

Panoche peppergrass is endemic to California. It occurs in Fresno, San Benito, and San Luis Obispo Counties (California Native Plant Society 2001). In the Plan Area, a few occurrences are recorded in the Panoche Hills (in the foothills of western Fresno County). Populations are located on private property and on property of unknown ownership. (California Natural Diversity Database 2002.)

The California Natural Diversity Database (2002) lists 13 occurrences. Of these, eight—four recent and four historic— are in the Plan Area; only three are extant.

Population Trend

In all occurrences, the population trend of Panoche peppergrass is unknown due to lack of research. Reported population sizes vary from hundreds to thousands of individuals. (California Natural Diversity Database 2002.)

Threats

Threats to Panoche pepper grass include gravel mining and grazing (California Native Plant Society 2001).

Conservation and Management

A specific conservation or management plan has not been prepared or implemented for this species.

Biology

Habitat Requirements

Panoche peppergrass grows on alkali bottoms, slopes, washes, and alluvial fans with clay and gypsum-rich soils in valley and foothill grasslands at elevations of 185–275 meters (607–902 feet) (California Native Plant Society 2001; California Natural Diversity Database 2001).

Demography

Panoche peppergrass is a tall annual herb in the mustard family (Brassicaceae) that blooms February–June (California Native Plant Society 2001).

References

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Congdon's Lewisia (*Lewisia congdonii*)

Conservation Considerations

Status

Federal: None
State: Rare
Other: California Native Plant Society List 1B

Distribution

Congdon's lewisia is endemic to California, known only from the Merced River Canyon in Mariposa County and along the Kings River Canyon in Fresno County (California Natural Diversity Database 2002).

The California Natural Diversity Database (2002) lists eight occurrences for Congdon's lewisia. Of these, three are within the Plan Area. Two are recent and one is historic; all three are presumed extant. Most of the Plan Area occurrences are on National Forest System lands. (California Natural Diversity Database 2002.)

Population Trend

According to the California Department Fish and Game, the status of Congdon's lewisia populations are stable (California Department of Fish and Game 2000).

Threats

The threats to Congdon's lewisia are herbicide spraying, road widening, collecting, and landslides (California Natural Diversity Database 2002).

Conservation and Management

In 1994, a multi-agency memorandum of understanding (MOU) for the conservation and protection of sensitive species in the Merced River Canyon was signed by the California Department of Fish and Game, the U.S. Forest Service, the Bureau of Land Management, Caltrans, and PG&E. The MOU specifies guidelines for highway and power line maintenance and repair, notification requirements, species monitoring, and annual reviews. The MOU emphasizes protection measures for Merced clarkia (*Clarkia lingulata*) (state-listed as endangered), but it also improves protection for Congdon's lewisia and other species. (California Department of Fish and Game 2000.)

Biology

Habitat Requirements

Congdon's lewisia grows in chaparral, cismontane woodland, lower montane coniferous forest, and upper montane coniferous forest communities on dry talus slopes and in rock crevices at elevations of 500–2,800 meters (1,640–9,186 feet) (California Department of Fish and Game 2000; California Native Plant Society 2001).

Demography

Congdon's lewisia is a perennial herb in the purslane family (Portulaceae) that has a basal rosette of semi-succulent leaves and produces rose-colored flowers April–June (California Department of Fish and Game 2000; California Native Plant Society 2001).

References

California Department of Fish and Game. 2000. *California native plant status report:* Lewisia congdonii. Sacramento, CA: California Department of Fish and Game Endangered Plant Project, California Natural Diversity Database, and California Native Plant Society.

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Mason's Lilaeopsis (*Lilaeopsis masonii*)

Conservation Considerations

Status

Federal: None
State: Endangered
Other: California Native Plant Society List 1B

Distribution

Mason's lilaeopsis is endemic to California. The known distribution extends from the margins of the Napa River in Napa County east to the channels and sloughs of the Sacramento–San Joaquin Delta from Contra Costa County to Solano, Sacramento, Yolo, and San Joaquin Counties (California Natural Diversity Database 2002). Much of the habitat is privately owned. Several state and federal agencies have jurisdiction over the Delta waterways where the species occurs. One site is protected in Solano County on a California Department of Fish and Game (DFG) Ecological Reserve (California Department of Fish and Game 2000).

The California Natural Diversity Database (CNDDB) lists 148 total occurrences. In the Plan Area, there are 37 occurrences that are recent and extant (California Natural Diversity Database 2002).

Population Trend

According to the CNDDB, the population trend is unknown in most cases and decreasing in a few. Some of the largest and healthiest populations have been reported from uninhabited islands in Suisun Bay, where there is no riprap and little human disturbance (Fielder and Golden 1990).

According to DFG, the status of Mason's lilaeopsis is stable to declining (California Department of Fish and Game 2000).

Threats

Mason's lilaeopsis is threatened by erosion, channel stabilization, development, flood control projects, recreation, agriculture, shading resulting from marsh succession, and competition with nonnative water hyacinth (*Eichhornia crassipes*) (California Native Plant Society 2001). In addition, saltwater intrusion and changes in water quality resulting from decreased flows in the Delta reduce habitat suitability (California Department of Fish and Game 2000).

Conservation and Management

A conservation plan has not been prepared and management efforts have not been implemented for this species.

Biology

Habitat Requirements

Mason's lilaeopsis is a semiaquatic herb that grows in marshes, swamps (brackish or freshwater), and riparian scrub at elevations of 0–10 meters (0–33 feet) (California Native Plant Society 2001). Its substrate is saturated clay soils that are regularly inundated by waves and tidal action (California Department of Fish and Game 2000).

Demography

Mason's lilaeopsis is a small (1.5–7.5 centimeters [0.6–3 inches]), turf-forming, perennial herb in the carrot family (Apiaceae) that spreads by rhizomes, produces

narrow jointed leaves, and flowers April–November (California Native Plant Society 2001).

Entire plants have been observed floating in the sloughs, suggesting that vegetative reproduction may be an important factor in colonization. It is likely that some populations are comprised mostly of clones from individuals that initially colonized the habitat (California Department of Fish and Game 2000).

References

California Department of Fish and Game. 2000. *Status of rare, threatened, and endangered animals and plants of California*. Sacramento, CA: Habitat Conservation Planning Branch.

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Feidler, P. L., and M. L. Golden. 1990. *Interim report: characterization of the habitat for* Lilaeopsis masonii *(Unbelliferae): a California state-listed rare plant species*. Submitted by Ann Howald, California Department of Fish and Game. Sacramento, CA.

Mariposa Lupine (*Lupinus citrinus* var. *deflexus*)

Conservation Considerations

Status

Federal: None
State: Threatened
Other: California Native Plant Society List 1B

Distribution

Mariposa lupine is endemic to California. It is known from only six occurrences on the western slope of the Sierra Nevada in southwestern Mariposa County, south of the town of Mariposa. The total area occupied by this species is less than 125 acres (California Natural Diversity Database 2002). There are no

historical records of Mariposa lupine outside this area, indicating that the species has always been rare (California Department of Fish and Game 2000).

The California Natural Diversity Database (CNDDB) lists six occurrences of Mariposa lupine. All occur in the Plan Area and are recent and extant. All known populations occur on private land. (California Natural Diversity Database 2002.)

Population Trend

According to the CNDDB, the population trend of Mariposa lupine is unknown. All surveys reported to the CNDDB except one counted thousands of individual plants in populations in the early 1990s; the exception was described has having hundreds of individuals (California Natural Diversity Database 2002).

Threats

The primary threats to Mariposa lupine are grazing and factors associated with development, such as irrigation runoff and herbicides (California Native Plant Society 2001; California Natural Diversity Database 2002).

Conservation and Management

The only conservation efforts for Mariposa lupine are voluntary registration of the landowners with The Nature Conservancy. This agreement involved four of the known occurrences, although one was on property that in 1992 was reported to be for sale (California Natural Diversity Database 2002).

Biology

Habitat Requirements

Mariposa lupine grows in chaparral and cismontane woodland communities on granitic domes with sandy soil at elevations of 400–610 meters (1,312–2,001 feet) (California Native Plant Society 2001).

Demography

Mariposa lupine is an annual herb in the pea family (Fabaceae) that blooms April–May, producing long spikes of white to pinkish flowers (California Department of Fish and Game 2000; California Native Plant Society 2001).

References

California Department of Fish and Game. 2000. *Status of rare, threatened, and endangered animals and plants of California*. Sacramento, CA: Habitat Conservation Planning Branch.

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

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Showy Madia (*Madia radiata*)

Conservation Considerations

Status

Federal: None
State: None
Other: California Native Plant Society List 1B

Distribution

Showy madia is endemic to California. It occurs in the western San Joaquin Valley, the eastern San Francisco Bay, and the South Coast Ranges (Hickman 1993). In the Plan Area, the species occurs in the foothills along the west side of the Central Valley in San Joaquin, Stanislaus, Fresno, Kings, and Kern Counties. Populations are located on private property, Department of Water Resources property, and property of unknown ownership. (California Natural Diversity Database 2002.)

The California Natural Diversity Database (2002) lists 32 occurrences. Of these, 12 extant occurrences are in the Plan Area; three are recent and nine are historic.

Population Trend

In all occurrences within the plan area, the population trend of showy madia is unknown due to lack of research. One population size was reported to have10 individuals; other populations require fieldwork. (California Natural Diversity Database 2002.)

Threats

Showy madia is threatened by grazing and competition with invasive nonnative plants (California Native Plant Society 2001). The species could be threatened by road maintenance activities and conversion of habitat to off-highway vehicle use (California Natural Diversity Database 2002).

Conservation and Management

A specific conservation or management plan has not been prepared or implemented for this species.

Biology

Habitat Requirements

Showy madia grows on grassy slopes of cismontane woodlands and grasslands with mostly adobe clay soils at elevations of 25–1,125 meters (82–3,691 feet) (California Native Plant Society 2001; California Natural Diversity Database 2001).

Demography

Showy madia is an annual herb in the sunflower family (Asteraceae) (Hickman 1993). The species is glandular and grows from 10 to 90 centimeters (4–35 inches) tall. The blooming period is March–May (California Native Plant Society 2001).

References

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Hickman, J. C. 1993. *The Jepson manual*. Berkeley, CA: University of California Press.

Hall's Bush Mallow (*Malacothamnus hallii*)

Conservation Considerations

Status

Federal: None
State: None
Other: California Native Plant Society List 1B

Distribution

Hall's bush mallow is endemic to California and is distributed throughout Contra Costa, Merced, Santa Clara, and Stanislaus Counties. In the Plan Area, the species occurs in the foothills of western Merced and Stanislaus Counties. There are two populations in Merced County on land of unknown ownership. All the Stanislaus County populations are on privately owned land; they range from 30 to 100,000 plants. (California Natural Diversity Database 2002.)

The California Natural Diversity Database (2002) lists 17 occurrences. Four extant occurrences are in the Plan Area; three are recent and one is historic.

Hall's bush mallow is recognized only by the California Native Plant Society (2001). *The Jepson Manual* includes this taxon in the treatment of *Malacothamnus fasciculatus* (Hickman 1993).

Population Trend

The population trend of Hall's bush mallow in the Plan Area is unknown due to lack of research. Population sizes range from 2 to 100,000 individuals. (California Natural Diversity Database 2002.)

Threats

Hall's bush mallow is threatened by grazing, rooting by feral pigs, and a proposed reservoir at Los Banos Creek in Merced County (California Natural Diversity Database 2002).

Conservation and Management

A specific conservation or management plan has not been prepared or implemented for this species.

Biology

Habitat Requirements

Hall's bush mallow is found in chaparral plant communities at elevations of 10–550 meters (33–1,804 feet). Some populations grow on serpentine soils. (California Natural Diversity Database 2001.)

Demography

Hall's bush mallow is an evergreen shrub in the mallow family (Malvaceae) that grows 100–500 centimeters (39–197 inches) tall (California Native Plant Society 2001). It blooms May–September (California Native Plant Society 2001).

References

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

San Joaquin Woollythreads (*Monolopia [Lembertia] congdonii*)

Conservation Considerations

Status

Federal: Endangered
State: None
Other: California Native Plant Society List 1B

Distribution

San Joaquin woollythreads is endemic to the southern San Joaquin Valley and surrounding hills. Its historic range extended from southern Fresno and Tulare Counties (excluding the Tulare Lake bed) to Bakersfield and Cuyama Valley.

Today, San Joaquin woollythreads occurs primarily near Carrizo Plain, Kettleman Hills, and Kettleman Plain. (California Natural Diversity Database 2002.)

The California Natural Diversity Database lists 87 occurrences. Sixty-eight of these occur in the Plan Area; 46 are extant, and 22 are possibly extirpated. Populations occur on land owned by Chevron USA, the Bureau of Land Management, the California Department of Fish and Game, the Center for Lands Management, as well as on private land and land of unknown ownership. (California Natural Diversity Database 2002.)

Population Trend

In most occurrences, the population trend of San Joaquin woollythreads is unknown due to lack of research. Reported population sizes range from fewer than 10 individuals to a few thousand. (California Natural Diversity Database 2002.)

Threats

More than 60% of historically known populations of San Joaquin woollythreads have been eliminated by conversion of habitat to agricultural uses. Threats to remaining unprotected populations include heavy grazing (especially by sheep), oil field development, energy development and, possibly, air pollution. (California Native Plant Society 2001.)

Conservation and Management

A recovery plan for the species has been prepared by the U.S. Fish and Wildlife Service (1998). To ensure the survival of San Joaquin woollythreads, existing habitat should be protected and populations should be monitored to determine density and stability. The recovery strategy includes acquisition of land with a plant density of 1,000 plants per acre and up to 450-foot buffer zones.

Biology

Habitat Requirements

San Joaquin woolythreads grows in chenopod scrub, valley and foothill grasslands, and alluvial fans with a sparse cover of saltbush. It often grows in sandy soils at elevations of 60–800 meters (197–2,625 feet) (California Native Plant Society 2001).

Demography

San Joaquin woollythreads is an annual herb in the sunflower family (Asteraceae) that produces several white, woolly, many-branched trailing stems up to 25 centimeters (10 inches) long (Hickman 1993). The blooming period is March–May (California Native Plant Society 2001).

References

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Hickman, J. C. (ed.). 1993. *The Jepson manual*. Berkeley, CA: University of California Press.

U.S. Fish and Wildlife Service. 1998. *Recovery plan for upland species of the San Joaquin Valley, California.* Region 1, Portland, OR.

Pincushion Navarretia (*Navarretia myersii* ssp. *myersii*)

Conservation Considerations

Status

Federal: None
State: None
Other: California Native Plant Society List 1B

Distribution

Pincushion navarretia is endemic to California where it is found in vernal pools in the central Sierra Nevada foothills and central Great Valley. It is known from only 12 occurrences in Amador, Lake, Merced, and Sacramento Counties. (Hickman 1993; California Native Plant Society 2001.)

Pincushion navarretia is known from three extant occurrences in the Plan Area (California Natural Diversity Database 2002). These three occurrences are on the privately owned Flying M Ranch in Merced County (California Natural Diversity Database 2002).

Population Trend

According to the California Natural Diversity Database, the population trend of pincushion navarretia in the Plan Area is unknown. There are no recent population counts for these sites. (California Natural Diversity Database 2002.)

Threats

The primary threat to pincushion navarretia is potential loss of habitat due to development (California Native Plant Society 2001).

Conservation and Management

No conservation efforts for pincushion navarretia have been implemented. Conservation measures for this species should include securing and protecting populations.

Biology

Habitat Requirements

Pincushion navarretia occurs in vernal pools at elevations of 20–330 meters (66–1,083 feet) (California Native Plant Society 2001).

Demography

Pincushion navarretia is a small white-flowered annual herb in the phlox family (Polemoniaceae) that blooms in May (Hickman 1993; California Native Plant Society 2001).

References

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

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Hickman, J. C. (ed.). 1993. *The Jepson manual*. Berkeley, CA: University of California Press.

Colusa Grass (*Neostapfia colusana*)

Conservation Considerations

Status

Federal: Threatened
State: Endangered
Other: California Native Plant Society List 1B

Distribution

Colusa grass is endemic to the Sacramento and San Joaquin Valleys, where it grows in the mud of large or deep vernal pools (California Department of Fish and Game 2000). The species' historical distribution included Merced, Stanislaus, Solano, and Colusa Counties. Populations are currently known from Merced, Stanislaus, and Solano Counties; none remain in Colusa County (California Natural Diversity Database 2002).

The California Natural Diversity Database lists 59 occurrences. Of the 51 that occur in the Plan Area, 41 are extant, four are possibly extirpated, and six are extirpated. Most populations occur on privately owned land; two occurrences are part of a conservation easement held by The Nature Conservancy, and a single pool in one occurrence is on Stanislaus County property (California Natural Diversity Database 2002).

Population Trend

The California Department of Fish and Game (2000) described the population trend of Colusa grass as declining.

Threats

The primary reasons for the decline of Colusa grass include the conversion of vernal pools to agricultural and developed lands, heavy grazing by cattle, and

competition from introduced weedy species that displace it (California Department of Fish and Game 2000).

Conservation and Management

One population of Colusa grass is protected by the Solano County Farmlands and Open Space Foundation at its Jepson Prairie Preserve in Solano County. Protection measures for this species are expected to be included in the U.S. Fish and Wildlife Service's *Draft California Vernal Pool Ecosystem Recovery Plan* (California Department of Fish and Game 2000).

Biology

Habitat Requirements

Colusa grass occurs in large or deep vernal pools on clay substrates at elevations ranging of 5–200 meters (16–656 feet) (California Native Plant Society 2001; California Natural Diversity Database 2002).

Demography

Colusa grass is an annual in the grass family (Poaceae) that grows 10–30 centimeters (4–12 inches) tall and flowers May–July (Hickman 1993; California Native Plant Society 2001).

References

California Department of Fish and Game. 2000. *Status of rare, threatened, and endangered animals and plants of California*. Sacramento, CA: Habitat Conservation Planning Branch.

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

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Hickman, J. C. (ed.). 1993. *The Jepson manual*. Berkeley, CA: University of California Press.

Bakersfield Cactus (*Opuntia basilaris* var. *treleasei*)

Conservation Considerations

Status

Federal: Endangered
State: Endangered
Other: California Native Plant Society List 1B

Distribution

Bakersfield cactus is endemic to the southern San Joaquin Valley. It once formed extensive colonies around Bakersfield, extending up the Kern River Canyon to the northeast, through the Caliente Creek drainage to the southeast, and to the Tejon Hills about 32 kilometers (20 miles) to the south (California Department of Fish and Game 2000). Today Bakersfield cactus is restricted to a limited area of central Kern County near Bakersfield.

The California Natural Diversity Database lists 44 occurrences, all of which are within the Plan Area. Thirty-three are extant, one is possibly extirpated, and 10 are extirpated. (California Natural Diversity Database 2002.)

Population Trend

The extent of historic populations of Bakersfield cactus was not recorded, but it is thought that densely-spaced clumps of the cactus once covered an estimated area of 5 square kilometers (2 square miles) from the Caliente Creek floodplain onto Sand Ridge. At last inventory, fewer than 20,000 clumps of Bakersfield cactus were estimated to remain, with only four areas containing populations of 1,000 clumps or more: Comanche Point, Kern Bluff, Sand Ridge, and the area north of Wheeler Ridge. (U.S. Fish and Wildlife Service undated.)

The California Department of Fish and Game reported Bakersfield cactus to be declining (California Department of Fish and Game 2000).

Threats

Bakersfield cactus is threatened by energy development, agricultural conversion, grazing, sand mining, and vehicles (California Natural Diversity Database 2002). Habitat loss results primarily from urban development in the Bakersfield area (California Native Plant Society 2001).

Conservation and Management

Conservation efforts for Bakersfield cactus include acquisition in 1997 of three areas of Bakersfield cactus habitat specified in the Metropolitan Bakersfield Habitat Conservation Plan and the U.S. Fish and Wildlife Service's *Draft Recovery Plan for Upland Species of the San Joaquin Valley, California* (California Department of Fish and Game 2000).

Biology

Habitat Requirements

Bakersfield cactus grows in chenopod scrub, cismontane woodland, and valley or foothill grassland communities on sandy or gravelly soils at elevations of 120–530 meters (394–1,739 feet) (California Native Plant Society 2001).

Demography

Bakersfield cactus is a spiny-stem succulent shrub in the cactus family (Cactaceae). The large, showy magenta flowers are produced in May.

Seed dispersal agents are unknown, but Bakersfield cactus seeds do require warm, wet conditions to germinate, a combination that is rare in the Bakersfield area. More commonly, the cactus reproduces vegetatively by pads (fleshy stems) falling from the plant and rooting. This makes individual populations difficult to distinguish because pads from adjacent plants may overlap; accordingly, populations are referred to as clusters. (Brown and Cypher 1997.)

References

Brown, N. L., E. A. Cypher. 1997. Bakersfield cactus (*Opuntia basilaris* var. *treleasei*). San Joaquin Valley Endangered Species Recovery Program. California State University Stanislaus. Available at: http://arnica.csustan.edu/esrpp/bcp.htm. Accessed June 11, 2002.

California Department of Fish and Game. 2000. *Status of rare, threatened, and endangered animals and plants of California*. Sacramento, CA: Habitat Conservation Planning Branch.

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_____. No date. Bakersfield cactus (*Opuntia basilaris* var. *treleasei*). Prepared by Endangered Species Division, Sacramento Fish and Wildlife Office. Available at: http://sacramento.fws.gov/es/plant_spp_accts/bakersfield_cactus.htm. Accessed June 2002.

San Joaquin Valley Orcutt Grass (*Orcuttia inaequalis*)

Conservation Considerations

Status

Federal: Threatened
State: Endangered
Other: California Native Plant Society List 1B

Distribution

San Joaquin Valley Orcutt grass is the only Orcutt grass restricted to the San Joaquin Valley. This grass was once common along the eastern margin of the Valley in Stanislaus, Merced, Fresno, Madera, and Tulare Counties. Most of the remaining occurrences of San Joaquin Valley Orcutt grass are concentrated in two small areas in eastern Merced County. Populations occur in two vernal pools that are partially on land owned by the U.S. Bureau of Land Management (BLM) and partially on private land on Big Table Mountain near Friant in Fresno County. San Joaquin Valley Orcutt grass also occurs in a vernal pool complex in Madera County that was acquired by the California Department of Transportation (Caltrans) in 1995 for mitigation purposes. Just before acquisition by Caltrans, the pools were disked, which resulted in an invasion by upland plants. Nonetheless, the pools still support rare species. In 1997, a small population of San Joaquin Valley Orcutt grass was discovered in one vernal pool on the California Department of Fish and Game's (DFG's) Stone Corral Ecological

Reserve in Tulare County. Three occurrences on the Flying M Ranch in Merced County are protected through conservation easement agreements with The Nature Conservancy (TNC). (California Department of Fish and Game 2000.)

The California Natural Diversity Database lists 48 occurrences of San Joaquin Valley Orcutt grass, all of which are in the Plan Area. Twenty-eight occurrences are extant, three are possibly extirpated, and 17 are extirpated. (California Natural Diversity Database 2002.)

Population Trend

According to the California Department of Fish and Game (2000), populations of San Joaquin Valley Orcutt grass are declining.

Threats

Nearly half of the historical occurrences of San Joaquin Valley Orcutt grass have been destroyed by habitat conversion of grassland to agricultural uses. Disking, hydrological modification, urbanization, late spring grazing, and competition from nonnative weeds have also degraded and destroyed the species' habitat. Because San Joaquin Valley Orcutt grass matures in early summer and occupies large vernal pools that retain water through that period, it is vulnerable to trampling when cattle are attracted to vernal pools as annual grasses in the surrounding upland dry out. Vernal pools that have been disturbed are vulnerable to invasion by nonnative upland grasses and forbs that compete with San Joaquin Valley Orcutt grass. (California Department of Fish and Game 2000.)

Conservation and Management

DFG and the U.S. Fish and Wildlife Service (USFWS) funded a study, completed in 1995, to characterize the vernal pools of San Joaquin Valley, including those in which San Joaquin Valley Orcutt grass occurs. Protection measures for this species are expected to be included in USFWS's *Draft California Vernal Pool Ecosystem Recovery Plan*.

Biology

Habitat Requirements

San Joaquin Valley Orcutt grass grows in vernal pool ecosystems in the San Joaquin Valley at elevations of 30–755 meters (98–2,477 feet) (California Native Plant Society 2001).

Demography

San Joaquin Valley Orcutt grass is a small, grayish-green, sticky, aromatic, tufted annual in the grass family (Poaceae) that occurs in vernal pools (California Department of Fish and Game 2000). It blooms April–September (California Native Plant Society 2001).

References

California Department of Fish and Game. 2000. *Status of rare, threatened, and endangered animals and plants of California*. Sacramento, CA: Habitat Conservation Planning Branch.

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Hairy Orcutt Grass (*Orcuttia pilosa*)

Conservation Considerations

Status

Federal: Endangered
State: Endangered
Other: California Native Plant Society List 1B

Distribution

Hairy Orcutt grass is endemic to the eastern margins of the Central Valley. Historically, it occurred from Tehama County south to Merced and Madera Counties (California Native Plant Society 2001). Currently, one-third of known populations are found in Tehama County, with other occurrences in Butte and Glenn Counties (California Natural Diversity Database 2002). In the Plan Area, occurrences are known in Madera and Stanislaus Counties, but none remain in Merced County (U.S. Fish and Wildlife Service 2002).

Population Trend

Of 34 historically known populations, 24 remain; of these, only half are considered to be stable (U.S. Fish and Wildlife Service 2002).

Threats

The main reason for the decline of hairy Orcutt grass has been the loss of vernal pool habitat to agriculture conversion and urbanization. Hairy Orcutt grass is currently threatened by urbanization, agricultural activities and land conversion, off-highway vehicle use, highway expansion projects, and competition from nonnative plants (California Native Plant Society 2001; California Natural Diversity Database 2002; U.S. Fish and Wildlife Service 2002). Grazing and trampling by livestock may be an adverse impact, depending on the stocking level and the timing and duration of grazing (U.S. Fish and Wildlife Service 2002).

Conservation and Management

A vernal pool recovery plan for the Central Valley that includes hairy Orcutt grass is under development (U.S. Fish and Wildlife Service 2002).

Biology

Habitat Requirements

Hairy Orcutt grass grows in vernal pools in rolling grasslands that developed on the remnant alluvial fans and stream terraces of the eastern edge of the Central Valley (Hickman 1993; California Native Plant Society 2001).

Demography

Hairy Orcutt grass is a small tufted annual in the grass family (Poaceae) that flowers May–September (California Native Plant Society 2001). Plants typically produce several short stems, each with a dense inflorescence.

References

California Department of Fish and Game. 2000. *Status of rare, threatened, and endangered animals and plants of California*. Sacramento, CA: Habitat Conservation Planning Branch.

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Hickman, J. C. (ed.). 1993. *The Jepson manual*. Berkeley, CA: University of California Press.

U.S. Fish and Wildlife Service. No date. Hairy Orcutt grass (*Orcuttia pilosa*). Prepared by Endangered Species Division, Sacramento Fish and Wildlife Office. Available at: http://sacramento.fws.gov/es/plant_spp_accts/hairy_orcutt_grass.htm. Accessed June 2002.

Hartweg's Golden Sunburst (*Pseudobahia bahiifolia*)

Conservation Considerations

Status

Federal: Endangered
State: Endangered
Other: California Native Plant Society List 1B

Distribution

Hartweg's golden sunburst is endemic to the Central Valley of California. Historically, the species' range may have extended from Yuba County approximately 322 kilometers (200 miles) south to Fresno County. It was apparently locally abundant but never common. The distribution is now concentrated in the Friant region of Fresno and Madera Counties and the La Grange region of Stanislaus County (California Department of Fish and Game 2000; California Natural Diversity Database2002). The California Natural Diversity Database lists 20 occurrences of Hartweg's golden sunburst, 19 of which are within the Plan Area; of these, 15 are presumed to be extant, and four are historic. Most of the extant occurrences of Hartweg's golden sunburst are very small, containing fewer than 200 plants. (California Natural Diversity Database 2002.)

Almost all populations are on privately owned land; part of one Fresno County population is on land owned by the U.S. Bureau of Reclamation; another part of the same population is protected by a conservation easement held by The Nature Conservancy.

Population Trend

The overall trend for the species is one of decline (California Department of Fish and Game 2000).

Threats

Hartweg's golden sunburst has declined because of habitat loss caused by agricultural and urban development, levee construction, pumice mining, overgrazing by cattle, competition with nonnative invasive plants, road construction, and off-highway vehicle use (California Department of Fish and Game 2000; California Native Plant Society 2001; California Natural Diversity Database 2002).

Conservation and Management

Plants such as Hartweg's golden sunburst (i.e., with very small scattered populations) are vulnerable to decline and extinction from genetic problems and random catastrophic events such as floods, attack by insects, disease, or extended droughts (California Department of Fish and Game 2000). A recovery plan has not yet been prepared and recovery requirements have not been identified for Hartweg's golden sunburst.

Biology

Habitat Requirements

Hartweg's golden sunburst grows on grassy slopes in valley and foothill grasslands and at the edges of blue-oak woodland, usually on clay or shallow, well-drained, fine-textured, and gravelly soils (Hickman 1993; California Department of Fish and Game 2000). Hartweg's golden sunburst typically occurs on the north- or northeast-facing slopes of mima mounds, which are often associated with vernal pool complexes; the highest densities of Hartweg's golden sunburst are usually on the upper slopes where grass cover is lowest (California Department of Fish and Game 2000).

Demography

Hartweg's golden sunburst is a small annual plant that flowers in March and April (California Native Plant Society 2001). There is no information on aspects of life history such as pollination biology or germination requirements.

References

California Department of Fish and Game. 2000. *Status of rare, threatened, and endangered animals and plants of California*. Sacramento, CA: Habitat Conservation Planning Branch.

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Hickman, J. C. (ed.). 1993. *The Jepson manual*. Berkeley, CA: University of California Press.

San Joaquin Adobe Sunburst (*Pseudobahia peirsonii*)

Conservation Considerations

Status

Federal: Threatened
State: Endangered
Other: California Native Plant Society List 1B

Distribution

San Joaquin adobe sunburst is endemic to the eastern San Joaquin Valley. Historical occurrences were scattered from northern Kern County to Tulare and Fresno Counties (California Department of Fish and Game 2000). Today, the species is concentrated in three major locations: east of Fresno in Fresno County, west of Lake Success in Tulare County, and northeast of Bakersfield in Kern County. One population occurs on land owned and managed by the Fresno Flood

Control District, and two populations occur on land owned by the U.S. Army Corps of Engineers. All other populations occur on privately owned land (California Department of Fish and Game 2000).

The California Natural Diversity Database lists 39 occurrences, all of which are in the Plan Area. Of these occurrences, 32 are extant, two are possibly extirpated, and five are extirpated. Part of one population in Fresno County occurs on land owned by the U.S. Bureau of Reclamation; another part of the same population is protected by a conservation easement held by The Nature Conservancy (TNC). All other populations are on privately owned land. (California Natural Diversity Database 2002.)

Population Trend

Seventeen of the known occurrences of San Joaquin adobe sunburst each contained fewer than 250 plants in 1991; approximately 80% of all plants are contained in four populations (California Department of Fish and Game 2000).

According to the California Department of Fish and Game (2000), San Joaquin adobe sunburst is declining.

Threats

The primary reasons for the decline of San Joaquin adobe sunburst are agriculture, grazing, development, road construction and maintenance, and flood control activities (California Native Plant Society 2001).

Conservation and Management

Conservation efforts have not yet been implemented for this species. Because conversion of natural habitat is the primary threat to San Joaquin adobe sunburst, a habitat preservation plan would help to reduce this species' decline.

Biology

Habitat Requirements

San Joaquin adobe sunburst grows on heavy adobe clay soils in cismontane woodland and valley and foothill grassland communities at elevations of 90–800 meters (295–2,625 feet) (California Native Plant Society 2001).

Demography

San Joaquin adobe sunburst is a slender, woolly annual in the sunflower family (Asteraceae). It has branching stems 10–61 centimeters (4–24 inches) tall and blooms March–April (California Native Plant Society 2001).

Heavy adobe clay soils may be conducive to the plant's growth because of the soil's ability to hold moisture longer into the summer dry season than other soils (California Department of Fish and Game 2000).

References

California Department of Fish and Game. 2000. *Status of rare, threatened, and endangered animals and plants of California*. Sacramento, CA: Habitat Conservation Planning Branch.

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Hickman, J. C. (ed.). 1993. *The Jepson manual*. Berkeley, CA: University of California Press.

Keck's Checkerbloom (*Sidalcea keckii*)

Conservation Considerations

Status

Federal: Endangered
State: None
Other: California Native Plant Society List 1B

Distribution

Keck's checkerbloom is endemic to Tulare and Fresno Counties (California Natural Diversity Database 2002).

The California Natural Diversity Database lists three occurrences, all in the Plan Area; of these, one is recent and two are historic. All known populations occur on private land. The one recent occurrence is located approximately 2 kilometers (1.5 miles) south of highway 190, 3 kilometers (2 miles) southwest of Success Dam, and 0.3 kilometer (0.2 mile) west of powerlines. (California Natural Diversity Database 2002.)

Population Trend

The population trend for Keck's checkerbloom is unknown. In one occurrence in Tulare County, 60 plants were seen in 1992. This was the first time in 55 years it had been observed; previously it had been considered possibly extinct (California Natural Diversity Database 2002).

Threats

The primary factors threatening Keck's checkerbloom are agricultural conversion, proposed development, and, possibly, grazing (California Native Plant Society 2001; California Natural Diversity Database 2002).

Conservation and Management

No conservation efforts for Keck's checkerbloom have been implemented.

Biology

Habitat Requirements

Keck's checkerbloom grows in cismontane woodland and valley and foothill grassland communities with clay soils and serpentinite parent material at elevations of 120–425 meters (394–1,395 feet) (California Native Plant Society 2001).

Demography

Keck's checkerbloom is an annual herb in the mallow family (Malvaceae) that blooms April–May, producing deep pink flowers (California Native Plant Society 2001).

References

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Oil Neststraw (*Stylocline citroleum*)

Conservation Considerations

Status

Federal: None
State: None
Other: California Native Plant Society List 1B

Distribution

Oil neststraw is endemic to California. Its historical distribution was limited to Kern and San Diego Counties (Hickman 1993). Today, the species is known only from flats at Taft, the Kern River Canyon, and Elk Hills in Kern County (California Natural Diversity Database 2002).

The California Natural Diversity Database lists nine occurrences. Eight extant occurrences are in the Plan Area; four are recent and four are historic (California Natural Diversity Database 2002).

Population Trend

The population trend of this species is unknown (California Natural Diversity Database 2002).

Threats

Oil neststraw is threatened by urbanization and possibly by energy development, flooding, and fire (California Native Plant Society 2001; California Natural Diversity Database 2002).

Conservation and Management

A conservation plan has not been prepared and management efforts have not been implemented for this species.

Biology

Habitat Requirements

Oil neststraw is found in chenopod scrub, valley and foothill grasslands, and possibly coastal scrub. It grows on clay soils at elevations of 50–400 meters (164–1,312 feet). (California Native Plant Society 2001.)

Demography

Oil neststraw is an annual herb in the sunflower family (Asteraceae) that blooms March–April (Hickman 1993; California Native Plant Society 2001). The inflorescence is a small spherical woolly head.

References

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Hickman, J. C. (ed.). 1993. *The Jepson manual*. Berkeley, CA: University of California Press.

Greene's Tuctoria (*Tuctoria greenei*)

Conservation Considerations

Status

Federal: Endangered
State: Endangered
Other: California Native Plant Society List 1B

Distribution

Greene's tuctoria is endemic to vernal pools of the Central Valley. Its historical range included parts of Shasta, Tehama, and Butte Counties in the northern and eastern Central Valley and extended south through Fresno, Madera, San Joaquin, Stanislaus, and Tulare Counties in the San Joaquin Valley. The known extant populations are in Shasta, southern Tehama, Butte, Glenn, and eastern Merced Counties (U.S. Fish and Wildlife Service 2002).

The California Natural Diversity Database lists 40 occurrences, 23 of which occur in the Plan Area. Seven of these are recent and extant, seven are possibly extirpated, and nine are extirpated. All known populations occur on private land or land of unknown ownership.

Population Trend

In most occurrences, the population trend of Greene's tuctoria is unknown due to lack of research. In two occurrences in Merced County, the population trend is reported as decreasing. One population in Merced County is reported to be stable. (California Natural Diversity Database 2002.)

Threats

The primary threats to Greene's tuctoria are conversion of habitat by agriculture, competition from weedy nonnative plants, overgrazing by cattle, and residential development (California Native Plant Society 2001; California Natural Diversity Database 2002.)

Conservation and Management

No conservation efforts for Greene's tuctoria have been implemented.

Biology

Habitat Requirements

Greene's tuctoria grows in vernal pools at elevations of 30–1,070 meters (98–3,510 feet) (California Native Plant Society 2001).

Demography

Greene's tuctoria is a small tufted annual in the grass family (Poaceae) that blooms May–September (California Native Plant Society 2001). Seedlings are particularly sensitive to livestock trampling because they germinate as pool water is receding; many other vernal pool plants are already established at this phase (U.S. Fish and Wildlife Service 2002).

References

California Native Plant Society. 2001. *Inventory of rare and endangered plants of California* (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

U.S. Fish and Wildlife Service. No date. Greene's tuctoria (*Tuctoria greenei*). Prepared by Endangered Species Division, Sacramento Fish and Wildlife Office. Available at: http://sacramento.fws.gov/es/plant_spp_accts/greenes_tuctoria.htm. Accessed June 2002.

Kings Gold (*Twisselmannia californica*)

Conservation Considerations

Status

Federal: None
State: None
Other: California Native Plant Society List 1B

Distribution

Kings gold is known from only one occurrence near Kettleman City in Kings County (California Native Plant Society 2001; California Natural Diversity Database 2002).

The single occurrence of Kings gold occurs within the Plan Area; the location information has been suppressed (California Natural Diversity Database 2002).

Kings Gold was first described in 1999; it is not included in The Jepson Manual (Al-Shehbaz 1999).

Population Trend

According to the California Natural Diversity Database, the population trend of Kings gold is unknown (California Natural Diversity Database 2002). The occurrence site was last reported (in 1999) to have fewer than 50 individual plants present (California Native Plant Society 2001).

Threats

Kings gold is threatened by development (California Native Plant Society 2001).

Conservation and Management

A conservation plan has not been prepared and management efforts have not been implemented for this species.

Biology

Habitat Requirements

Kings gold grows in a chenopod scrub plant community at an elevation of 65 meters (213 feet) (California Native Plant Society 2001).

Demography

Kings gold is an annual herb in the mustard family (Brassicaceae) that blooms in March (California Native Plant Society 2001).

References

Al-Shehbaz, I. A. 1999. *Twisselmannia* (Brassicaceae), a remarkable new genus from California. *Novon* 9:132–135.

California Native Plant Society. 2001. Inventory of rare and endangered plants of California (sixth edition). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. Sacramento, CA: California Native Plant Society.

California Natural Diversity Database. 2002. RareFind 2, Version 2.1.2 (March 1, 2002, update). Sacramento, CA: California Department of Fish and Game.

Appendix D

VELB Conservation Program and Biological Opinion

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

IN REPLY REFER TO:
1-1-01-F-0114

June 27, 2003

Jack Blackwell
Pacific Southwest Regional Forester
Forest Service
1323 Club Drive
Vallejo, California 94592

Mike Poole
California State Director
Bureau of Land Management
2800 Cottage Way, Room W-1834
Sacramento, California 95825

Subject: Formal Endangered Species Consultation on the Pacific Gas and Electric Company Transmission Separation Project, located in the Plumas, Sequoia, and Sierra National Forests within Butte, Plumas, Madera and Fresno Counties; in the Redding, Folsom, and Bakersfield Districts within Madera, Fresno, Amador, Calaveras, Tuolumne, Nevada, Placer, Butte, Yuba, Shasta and Tehama Counties; and Various Other Jurisdictions, California.

Dear Messrs. Blackwell and Poole:

This is in response to the Forest Service's (FS) March 20, 2001, and Bureau of Land Management's (BLM) July 1, 2002, request for formal consultation with the U.S. Fish and Wildlife Service (Service) on the Pacific Gas and Electric Company Transmission Separation Project (Project) in the FS's Plumas, Sequoia, and Sierra National Forests, Butte, Plumas, Madera and Fresno Counties and in the BLM's Bakersfield, Folsom and Redding Bureau of Land Management Districts, Madera, Fresno, Amador, Calaveras, Tuolumne, Nevada, Placer, Butte, Yuba, Shasta and Tehama Counties, California.

The Service concurred with the FS's determination that the Project is not likely to adversely affect the bald eagle (*Haliaeetus leucocephalus*), California red-legged frog (*Rana aurora draytonii*) (frog), and Springville clarkia (*Clarkia springvillensis*) on November 21, 2000 (Service file 1-1-00-3149). However, also as stated in our November 21, 2000, letter to the FS,

the Service does not concur with the FS's determination that the proposed project is not likely to adversely affect the threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (VELB). The Service concurs with the BLM's May 15, 2003, determination that the proposed action is not likely to adversely affect the bald eagle.

This document represents the Service's biological opinion on the effects of the action on the VELB, as described in our August 22, 2002, letter to the FS and memorandum to the BLM (Service files 1-1-02-I-3005 and 1-1-01-I-3006, respectively). This biological opinion has been prepared pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*)(Act) and authorizes only incidental take of the VELB on FS, BLM, and private lands.

This biological opinion is based on information provided in, among other things: (1) Pacific Gas and Electric Company's October 1999, *Results of Habitat Assessments and Protocol-Level Field Surveys for the California Red-legged Frog (*Rana aurora draytonii*) Conducted for the Transmission Line Separation Project*; (2) FS's August 2000 *Biological Assessment of Potential Effects of the Pacific Gas and Electric Company Transmission Line Separation Project on Federally Listed Endangered or Threatened Wildlife Species* (Wildlife BA); (3) FS's August 2000, *Biological Assessment of Potential Effects of the Pacific Gas and Electric Company Transmission Line Separation Project on Federally Listed Endangered or Threatened Plant Species* (Plant BA); (4) FS's March 20, 2001, *Addendum to Biological Assessment of Potential Effects of the Pacific Gas and Electric Company Transmission Line Separation Project on Federally Listed Endangered or Threatened Wildlife Species* (Addendum); (5) Pacific Gas and Electric Company's November 19, 2001, *Additional Information on Valley Elderberry Longhorn Beetle for the Pacific Gas and Electric Company Transmission Separation Project*; (6) BLM's July 1, 2002, request for formal consultation; 7) BLM's April 2003 Biological Assessment of Potential Effects of the Pacific Gas & Electric Transmission Separation Project on Threatened Valley Elderberry Longhorn Beetle and Other Listed Species; (8) Garcia and Associates' November 27, 2002 *Valley Elderberry Longhorn Beetle Surveys on Properties Associated with Pacific Gas and Electric Company's Transmission Separation Project*; (9) Garcia and Associate's March 2003 *Supplemental Biological Surveys on BLM Lands Affected by PG&E's Transmission Separation Project* and its March 2003 revision; (10) Pacific Gas and Electric Company and the Service's September 13, 2002 *VELB Conservation Program*, as amended in March 2003; and (11) other published and unpublished sources of information. A complete administrative record of this consultation is on file in our office.

Consultation History

May 6, 1998. The Service provided Pacific Gas and Electric Company with a species list during a meeting in Sacramento for the proposed action in the Eldorado, Plumas, Sequoia, Shasta-Trinity, Sierra, Stanislaus and Tahoe National Forests.

November 30, 1999. Pacific Gas and Electric Company submitted to the Service California red-legged frog habitat assessment and protocol-level surveys for the Project. Enclosed was a copy

of the Results of *Habitat Assessments and Protocol-Level Field Surveys for the California Red-legged Frog (*Rana aurora draytonii*) Conducted for the Transmission Line Separation Project.*

July 5, 2000. Pacific Gas and Electric Company gave the Service a draft biological assessment (BA) with proposed reasonable and prudent measures for the VELB at a meeting in Sacramento. Enclosed was a copy of the *Biological Assessment for Pacific Gas and Electric Company Transmission Separation Project.*

September 5, 2000. The Service received a letter dated August 31, 2000, from the FS requesting informal consultation for the Pacific Gas and Electric Company Project. The FS issued two biological assessments (wildlife and botanical) for the Project and submitted a request for the Service's concurrence on the determination that the proposed authorization of the Project is not likely to adversely affect the bald eagle, California red-legged frog, VELB, and Springville clarkia. Enclosed was a copy of the Wildlife BA and Plant BA.

October 3, 2000. The Service requested additional information during a meeting with Pacific Gas and Electric Company concerning the occurrence of VELB habitat (elderberry plants: *Sambucus* spp.) in the Project area and an annual estimate of effects on plants based on Project maintenance activities.

November 21, 2000. The Service sent FS a letter of non-concurrence for the VELB and request for formal endangered species consultation on the authorization of the Project (Service file 1-1-00-I-3149). The Service concurred with the determination that the Project is not likely to adversely affect the bald eagle, California red-legged frog or Springville clarkia.

March 23, 2001. The Service received a letter dated March 20, 2001, from the FS requesting formal consultation on the VELB in the Plumas, Sequoia, and Sierra National Forests. In response to the Service's November 21, 2000, letter (Service file 1-1-00-I-3149) of nonconcurrence for the VELB and the October 3, 2000, meeting when additional VELB information was requested, the FS submitted an addendum to the wildlife biological assessment detailing VELB habitat and estimates of Project effects. Enclosed was a copy of the *Addendum to Biological Assessment of Potential Effects of the Pacific Gas and Electric Company Transmission Line Separation Project on Federally Listed Endangered or Threatened Wildlife Species.*

October 18, 2001. The Service received a letter dated October 17, 2001, from Pacific Gas and Electric Company concerning the biological opinion (BO) preparation. Pacific Gas and Electric Company proposed Foster-Wheeler, a third party contractor, prepare the BO under the direction of the Service.

November 14, 2001. The Service received a letter dated November 14, 2001, from Pacific Gas and Electric Company that addressed an October 23, 2001, telephone conversation concerning conductor spacing and voltage on the existing lines in the Project. The Pacific Gas and Electric Company stated that they are conforming to the Avian Power Line Interaction Committee

(APLIC) bird safe guideline of 60-inch minimum conductor spacing to prevent raptor electrocution and are replacing the single 12kV line with one at least 70kV (APLIC 1996).

November 19, 2001. The Service received a letter, via electronic mail attachment, dated November 19, 2001, from Foster-Wheeler, a third party contractor, that provided additional information in the forms of observations and assumptions concerning the Service's July 9, 1999, *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (Conservation Guidelines). Attached was a copy of the document entitled *Additional Information on Valley Elderberry Longhorn Beetle for the Pacific Gas and Electric Company Transmission Separation Project.*

February 28, 2002. The Service met with Pacific Gas and Electric Company staff to begin development of a comprehensive conservation program to address the Project's potential adverse effects on the VELB. Subsequent discussions between the Pacific Gas and Electric Company and the Service, and the FS and BLM regarding the proposed program occurred through January 2003.

July 1, 2002. BLM requested formal consultation.

September 10, 2002: The Service issued a biological opinion to the Bureau of Reclamation (Service file 1-1-02-F-0298) to allow the Pacific Gas and Electric Company to prune elderberry shrubs at New Melones Lake, Tuolumne County, California, under the aegis of the impending VELB Conservation Program document.

September 13, 2002: Pacific Gas and Electric Company submitted to the Service the final draft of the VELB Conservation Program document. The Service's formal adoption of this document and its March 2003 amendments will occur upon issuance of this biological opinion.

November 19, 2002. The Service received a draft *Work Plan for Collecting Information on the Occurrence of Valley Elderberry Longhorn Beetle*, prepared by Jones and Stokes Associates for the Pacific Gas and Electric Company.

January 10, 2003. A final Memorandum of Understanding was executed between the Pacific Gas and Electric Company, Service, FS, and BLM, defining the respective roles of each party in the consultation and subsequent implementation of the proposed project. The Pacific Gas and Electric company henceforth gained status as a non-Federal applicant under the Act and its implementing regulations.

February 19, 2003: Pacific Gas and Electric Company provided the Service with initial refinements in VELB effects based on changes in BLM land acreage brought about by active Public Land exchange and disposal programs.

February 20, 2003: A near-final draft biological opinion was transmitted by the Service via electronic mail to representatives of the FS, BLM, and Pacific Gas and Electric Company and their private counsel.

February 21, 2003: The BLM provided the Service with written comments on the near-final draft biological opinion.

March 11, 2003: The Pacific Gas and Electric Company provided the Service with an electronic version of the final VELB Conservation Plan, including revised data for BLM public lands. This concluded the BLM effects revision initiated on February 19, 2003.

March 12, 2003: The Pacific Gas and Electric Company provided the Service with comments on the near-final draft biological opinion via electronic mail.

April 14 and 18, 2003: The Pacific Gas and Electric Company transmitted an electronic version of a draft Biological Assessment for public lands and accompanying data to the BLM.

May 15, 2003: The BLM transmitted an April 2003 final biological assessment (BLM BA) to the Service. The BLM BA's transmission memorandum contained additional comments on the near-final draft biological opinion. Service and BLM staff discussed the memorandum further and on May 19, 2003, the BLM transmitted final comments and clarifications.

BIOLOGICAL OPINION

Description of the Proposed Action

Background and Action Area

Pacific Gas and Electric Company has t a 70,000 square mile service area in northern and central California that includes approximately 113,000 miles of transmission and distribution lines and associated facilities to distribute electricity across the service area and over 42,700 miles of pipeline and associated facilities are used to transmit and distribute natural gas. Portions of these facilities cross various national forests administered by the FS, and certain public lands administered by the BLM, Federal lands surrounding Bureau of Reclamation facilities, and privately-owned lands. These public and private lands constitute the action area for the proposed project.

On December 22, 1998, the Federal Energy Regulatory Commission (FERC) granted license amendments to remove certain non-primary transmission lines and associated facilities located on National Forest System and BLM-administered lands from Pacific Gas and Electric Company's hydroelectric licensed projects (85 FERC §61, 411). FERC also issued two subsequent orders on May 16, 2000, incorporating two existing transmission only facilities located on Forest System lands into the Transmission Separation Project (93 FERC § 62,113 and ¶ 62,114) effective when Pacific Gas and Electric Company receives land use authorization from the FS and the BLM, as appropriate. This "Transmission Separation Project" involves continued occupancy, use and maintenance of existing transmission facilities in ten right-of-way (ROW) corridors occupying approximately 861 acres of National Forest System lands in the Shasta-Trinity, Plumas, Tahoe, Eldorado, Stanislaus, Sierra, and Sequoia national forests as well as

approximately 142 acres of public land within the BLM administered Bakersfield, Folsom and Redding Districts. The term of the respective land entitlements is up to 30 years.

On July 28, 1998, and November 5, 1998, Pacific Gas and Electric Company applied to the FS and the BLM, respectively, for a 30-year authorization to continue to use and maintain these existing transmission facilities. The corridors on Forest Service lands contain existing transmission towers or poles, conductors and associated electrical equipment, which range in voltage from 12kV to 230kV (Table 1). The corridors on BLM lands include existing transmission towers or poles, conductors and associated electrical equipment which range in voltage from 60kV to 230kV (Table 2). Elderberry (*Sambucus* spp.) are only known to occur sporadically on existing right-of-way corridors covering 646 acres within the Plumas, Sierra and Sequoia National Forests and approximately 142 acres of land administered by the BLM.

Table 1. List of National Forests and associated transmission corridors for Pacific Gas and Electric Company Transmission Separation Project.

FERC No.	Hydro Project Name	Transmission Line	Total Acres of FS Lands within Trans. Corridors
#137	Mokelumne	Salt Springs – Tiger Creek 115 kV	72.88
#184	Eldorado	Eldorado – Missouri Flat 1 and 2 115 kV	43.89
#233	Pit 3, 4 and 5	Pit 3 230 kV	23.12
#619	Bucks Creek	Bucks Creek – Rock Creek Junction 230 kV	31.9
#1333	Tule River	Tule – Springville 70 kV	39.78
#1354	Crane Valley	San Joaquin No 3 – Crane Valley 1101 Circuit 12 kV, Wishon to San Joaquin No 3 70 kV, Wishon to Coppermine 70 kV	59.25
#1962	Rock Creek Cresta	Rock Creek PH Tap 230 kV Cresta PH Tap 230 kV	21.74
#1988	Haas - Kings River	Haas – Woodchuck 70 kV Haas – McCall 230 kV Balch – McCall 230 kV	145.97
#2105	UNF Feather River	Caribou – Big Bend Sub 115 kV	328.24
#2118	Donnells – Curtis T/L	Donnells – Curtis 115 kV	69.18
#2130	Spring Gap - Stanislaus	Stanislaus – Manteca No. 1 115kV; Stanislaus – Newark No. 1 and 2 115kV	2.74
#2310	Drum - Spalding	Drum to Halsey Jct. 1 and 2 115kV;	6.61
#2281	Woodleaf – Palermo T/L	Woodleaf – Palermo 115 kV	18.81

Table 2. List of BLM lands and associated transmission corridors for Pacific Gas and Electric Company Transmission Separation Project.

FERC No.	Hydro Project Name	Transmission Line	Total Acres of BLM Lands within Trans. Corridors
#96	Kerckhoff 1 and 2	Kerckhoff - Le Grand 115 kV; Kerckhoff 1- Kerckhoff 2 115kV; Kerckhoff - Clovis No. 1 and 2 115kV	15.87
#137	Mokelumne	Tiger Creek – Newark No. 1 and 2 230 kV; WestPoint – Stockton 60kV	59.74
#803	De Sabla - Centerville	De Sabla to Oroville 60kV	17.95
#1121	Battle Creek	Coleman – Coleman Junction 60kV; Inskip – Coleman 60kV; Volta – Deshutes 60kV; South – Inskip 60kV	44.62
#1354	Crane Valley	Wishon to Coppermine 70kV	5.02
#2130	Spring Gap - Stanislaus	Stanislaus – Manteca No. 1 115kV; Stanislaus – Newark No. 1 and 2 115kV	21.77
#2310	Drum - Spalding*	Drum to Halsey Jct. 1 and 2 115kV; Drum to Alta to Colfax Jct. 69kV; Dutch Flat to Halsey Jct. 115kV; Chicago Park to Halsey Jct. (NID) 115kV	42.20**
#1962	Rock Creek - Cresta	Rock Creek – Rio Oso 1 and 2 230kV	11.14**
#1988	Haas - Kings River	Balch No.2 – McCall 230kV	ca. 1.5

*Existing BLM Right of Way Grants
** Approximately 11.6 to 14.5 acres of this corridor are situated at ca. 3,400 feet, above the nominal elevation range of VELB.

During the course of the consultation, it became apparent that a greater scope of actions should be analyzed in the biological opinion due to, among other things, the unique nature of certain line separation project actions (specifically the effects of routine operations and maintenance on the VELB), which will occur throughout Pacific Gas and Electric Company's transmission and distribution system, regardless of land ownership, and the impracticability of addressing these effects through existing Service Guidelines. Thus, a comprehensive region-wide conservation strategy appeared to be the most sound approach to addressing potential adverse effects on the VELB. This overall conservation strategy is beyond the scope of the FS or BLM-administered lands, but it cannot be readily separated into sub-plans for each jurisdiction. The conservation strategy is an inseparable element of the Project description.

As a result, this consultation has been expanded to include the Pacific Gas and Electric Company's gas and electric service area that overlaps with the potential range of the VELB. This range covers 33,633 square miles and encompasses California's Central Valley, the 3,000-foot contour to the valley's east (Service 1999), and the Central Valley watershed divide to the west (the western valley watershed boundary often exists at altitudes of less than 3,000 feet). The Pacific Gas and Electric Company's linear facilities (those associated with transmission and distribution of gas and electricity, including those located on National Forest System lands and BLM-administered lands) within the potential range of the VELB are summarized in Table 3. These facilities include approximately 55,500 circuit miles of electric transmission and distribution line, the supporting poles and towers, and approximately 648 electrical substations of various size and capacity. There are more than 4,180 miles of gas transmission line within the

project area, linked to 1,470 related facilities of various size and function. These gas facilities include testing stations, metering stations, valve lots, compressor stations, pressure limiting stations, and storage facilities. Additionally, there are more than 10,000 linear miles of existing gas distribution lines. A large portion of the gas distribution system, however, is situated in urban areas.

The project area includes the transmission lines associated with FERC-licensed projects owned and operated by the Pacific Gas and Electric Company, as well as various linear facilities associated with hydroelectric generation projects (e.g., canals, penstocks, dams, weirs, flumes, culverts, powerhouses, and recreational facilities). Within the potential range of the VELB, linear features (e.g., canals, ditches, penstocks, etc.) associated with FERC hydroelectric generation projects amount to less than 200 miles. The Project area encompasses a broad range of habitat types, from annual grassland-oak habitat in the lower elevations to pine-oak woodlands and mixed conifer forest in higher elevations.

Table 3. Length and classification of linear gas and electric facilities and proportion of those facilities within potential range of the VELB

Electric Transmission			
Voltage	**Total Circuit Miles**	**Circuit Miles Within VELB Range**	**Percent Circuit Miles Within VELB Range**
115 kV	6,086.2	3,558.9	58.5
230 kV	5,329.3	3,471.0	65.1
60 kV	3,956.0	1,974.0	49.9
70 kV	1,548.7	1,349.0	87.1
500 kV	1,329.0	1,005.5	75.7
idle (unidentified)	250.0	115.0	46.0
unknown	12.8	11.8	92.6
Total	18,512.0	11,485.2	62.0
Electric Distribution			
Voltage	**Total Circuit Miles**	**Circuit Miles Within VELB Range**	**Percent Circuit Miles Within VELB Range**
12.0 kV	64,744.8	36,623.2	56.6
21.0 kV	11,835.9	4,955.4	41.9
17.2 kV	2,569.6	2,150.6	83.7
4.16 kV	1,529.2	161.4	10.6
2.4 kV	358.2	10.7	3.0
7.2 kV	260.5	66.7	25.6
4.8 kV	61.1	58.1	95.1
44.0 kV	24.8	0.1	0.4
22.0 kV	21.8	5.1	23.2
480 volts	0.1	0.1	100.0
Total	81,405.8	44,031.3	54.1
Gas Transmission			

Pipeline Type	Total Line Miles	Line Miles Within VELB Range	Percent Line Miles Within VELB Range
Local transmission	2,582.6	1,413.9	54.7
Backbone transmission	2,007.1	1,053.6	52.5
Distribution feeder main	1,472.3	846.5	57.5
Gas Gathering	522.8	498.3	95.3
Distribution	232.1	210.0	90.5
Service line	183.8	99.7	54.3
Standard Pacific (joint w/ Chevron)	54.5	20.8	38.1
Underground storage	37.0	35.1	95.0
Blow-down	4.6	2.2	47.1
Total	7,096.9	4,180.0	58.9

Pacific Gas and Electric Company system activities include routine operation and maintenance activity associated with Company transmission facilities on National Forest lands, as described in Transmission Separation Project documents previously submitted to the Service (Foster Wheeler Environmental Corporation 2000a, 2000b, and 2001). In addition to the aforementioned Transmission Separation Project related activities on FS lands, system activities include routine operation and maintenance activity associated with Pacific Gas and Electric Company's facilities within rights-of-way on BLM land, and within rights-of-way, franchises, and easements on other land classifications, including private land not owned by the Pacific Gas and Electric Company. These activities include routine vegetation and non-vegetation management activities (including the use and maintenance of the roads necessary to access the transmission facilities), and to conduct emergency maintenance activities, if needed, as summarized below. These activities are also identified in Table 4 and discussed in more detail in the VELB Conservation Program, Appendix A. Pacific Gas and Electric Company has conducted similar activities with the transmission facilities for the past 30 years. The Company does not intend to undertake any major projects or construction activities such as new electric pole/tower construction, substation expansion, new pipeline installation, or pressure limiting station construction as part of this program. These activities will be subject to separate authorizations.

Operation and maintenance of the Pacific Gas and Electric Company's electrical and natural gas facilities are performed according to standard industry procedures and in accordance with the requirements of State of California law for public health and safety, including California Public Utilities Commission General Order 95, Rule 35, Public Resources Code 4293 (Tree Trimming and Removal), Public Resources Code 4292, and California Public Utilities Commission (CPUC) General Order 112-E, to keep facilities clear of trees and other fire hazards and to inspect and prevent damage to natural gas systems. Their legal requirements are discussed in more detail in the VELB Conservation Program and are incorporated herein by reference. Other government requirements specify maintenance practices to prioritize, inspect, and maintain overhead electrical transmission lines placed under the control of the California Independent System Operator. These state requirements were also developed to protect public health and safety.

Electric System Vegetation Management Activity. Vegetation management activity includes routine inspections of linear facilities and identification of potential hazards/trees that may violate conductor clearance laws and requirements. The degree of needed vegetation management often depends upon type (voltage) of facility involved and the height of the conductor lines. Management of such vegetation may include cutting, trimming, pruning, or clearing vegetation by manual or mechanical means as well as directed herbicide applications or stump treatments (except on FS lands covered by the Transmission Separation Project or as otherwise authorized) to comply with state laws and requirements, protect the integrity of Pacific Gas and Electric Company facilities, and/or maintain safe and reliable access to Company facilities for purposes of inspection and operation. Routine electric system-related activity to manage vegetation also includes clearing of brush, shrubs, and saplings around certain water conveyance/storage facilities (e.g., penstocks, dams, weirs, flumes, culverts, *etc.*) to protect their structural integrity and/or maintain safe access for routine inspection, operation, and maintenance purposes.

Gas System Vegetation Management Activity. Gas line rights-of-way are generally cleared of all vegetation and brush during initial construction of the gas pipelines. Although existing Rights of Way (ROWs) are maintained in a state of reduced vegetative cover, trees and brush that grow into these areas and interfere with these patrols may require periodic trimming and/or removal to prevent damage to the natural gas system and facilitate inspections. Areas within the right-of-way requiring vegetation management are identified during routine patrols, typically at least once or twice per year. Vegetation management is usually accomplished by mechanically or manually removing large-diameter woody stems or other vegetation to achieve a maximum height of 1 foot or less. The vegetation management program is also designed to eliminate weeds, brush, and trees around gas-related facilities to reduce fire hazard, improve safety, and maintain access, including aerial inspection of the right-of-way.

Non-Vegetation Management Activities. Additional routine maintenance activities for gas and electric systems have the potential to affect elderberry plants. These additional activities are also listed in Table 4 and discussed in more detail in Appendix A of the VELB Conservation Program. Additional routine maintenance activities for the electric system include aerial inspections, ground inspections, wood pole test and treat, insulator replacement, cross arm replacement, anchor/guy replacement, incidental pole replacement, and road maintenance (occasional blading of existing roads). Routine maintenance activities for the gas system include aerial and ground inspections of pipelines and related facilities, remedial maintenance, compressor station maintenance, electric test system installation, valve recoating, valve replacement, installation of cathodic protection, coating replacement, telecommunications site maintenance, and access road maintenance.

Emergency Activities. Emergency activities may be required in the event of disaster or acts of God (50 C.F.R. § 402.05). Events such as fire, landslides and intense storms may disable electric and/or gas transmission. Emergency activities would include any of the activities described above undertaken in response to a sudden unusual occurrence such as, but not limited to, fire, wind, flood, earthquake or other soil movement, riot, accident, or damage to a subsurface installation requiring immediate action to prevent or mitigate loss of, or damage to, life, health,

property or essential public services. In these events, Pacific Gas and Electric Company would notify the Service and the FS and/or the BLM, as appropriate, as soon as possible after the activities taken to restore electric power and/or gas service.

Table 4. Proposed routine operation, maintenance and emergency activities.

Electric O&M Activities	
E1	Patrols; aerial, ground
E2	Inspections; tower, pole, and equipment; outage; substation
E3	Electric Insulator Washing
E4	Electric Substation Maintenance
E5	Electric System Outage Repair
E6	Electric System Tower/Pole Replacement or Repair
E7	Facility Installations (Shoo-Fly)
E8	Electric System Pole and Equipment Replacement or Repair
E9	Electric Line Reconductoring
E10	Vegetation Management
E11	Wood Pole Test and Treat
E12	Access Road Maintenance
Gas O&M Activities	
G1	Patrols; aerial, ground, leak detection
G2	Inspections; valves, telecom sites, anode beds
G3	Remedial Maintenance
G4	Compressor Station Maintenance
G5	Pipeline Electric Test System Installation
G6	Pipeline Valve Recoating
G7	Pipeline Valve Replacement
G8	Pipeline Cathodic Protection
G9	Pipeline Lowering
G10	Pipeline Coating Replacement
G11	Pipeline Replacement
G12	Pipeline Telecommunications Site Maintenance
G13	Vegetation Management
G14	Access Road Maintenance
Emergency Activities include the above activities performed under emergency circumstances.	

Description of the Proposed Avoidance, Minimization, and Conservation Measures

The Pacific Gas and Electric Company, with Service input, has developed a comprehensive program to address potential VELB effect issues on lands included in the Transmission Separation Project and on other lands that are affected by similar routine operation and maintenance activities throughout the Pacific Gas and Electric Company service area, and provide funds for VELB recovery plan efforts in California.

Because habitat modification is thought to be one of the leading causes of the VELB's rarity, the intent of the VELB conservation program is to increase or improve VELB habitat through acquisition, development, and/or protection of lands in those areas expected to be the most productive and most at risk, such as along major drainages within the range of the VELB. In order to achieve the desired conservation benefits associated with this conservation program, and consistent with the VELB Recovery Plan (Service, 1984), Pacific Gas and Electric Company will provide incremental funding over eight years, in an escrow or other appropriate account, for acquisition and/or long-term management of up to 1,000 acres of high quality habitat near or adjacent to existing VELB populations of the Sacramento and San Joaquin Valleys. Thus, the acquisition and/or long-term management of 125± acres/year, on an average annual basis, is anticipated, subject to acquisition and management opportunities. These conservation areas will be selected in consultation with the Service, FS, and BLM. Property acquisition and/or long-term management activities will begin within 18 months of issuance of the Biological Opinion and after appropriate habitat identification (discussed below). The properties will be selected based upon the presence of elderberry plants and associated habitat and, if appropriate, the potential for the addition of elderberry plants.

In order to determine the most beneficial habitat areas, the Pacific Gas and Electric Company and the Service, in coordination with FS and BLM, will identify available properties in high quality, priority conservation areas, where VELB protection and restoration activities will improve the long-term viability of the species, near or adjacent to existing VELB habitat. Once prime VELB areas are identified, the tools used in this conservation effort may include, but are not limited to, fee purchase, conservation easement, and dedication of Pacific Gas and Electric Company's fee properties, as well as efforts to preserve, protect, manage, enhance or otherwise take advantage of other available opportunities to consolidate and connect corridors of riparian habitat along California's rivers to ensure VELB survival and recovery, in cooperation with other public and private conservation organizations.

The conservation program also includes required environmental training and education for Pacific Gas and Electric Company personnel and contractors, as well as various requirements to protect, avoid and/or minimize effects on VELB, including flagging areas to avoid VELB habitat, certain limitations on the use of pesticides (where use of pesticides are permitted) near VELB habitat, directional felling of hazard trees, and erosion control, as well as monitoring and reporting of Pacific Gas and Electric Company activities that may affect VELB to the Service. Additionally, the Company has committed to an integrated vegetation management program on its rights-of-way and employs best management practices that are designed to protect wildlife, groundwater, surface water, soils and the general public.

Status of the Species/Critical Habitat

Species/Critical Habitat Description

The VELB, a woodborer, is dependent on its host plant, elderberry, which is a common component of the remaining riparian forests and adjacent grasslands of the Central Valley, and of the elderberry savanna which borders riparian forests in some areas. The VELB appears to be

only locally common, found in population clusters that are not evenly distributed across available habitat. The VELB was listed as a threatened species by the Service on August 8, 1980 (45 **Federal Register** (**FR**) 52803-52807), pursuant to provisions of the Act, as amended, because the habitat of the species had largely disappeared throughout much of its former range due to, among other things, agricultural conversion, levee construction, and stream channelization. At the time of listing, the beetle was only known from the valley areas of California in Sacramento, Solano, Yolo, and Merced counties (Service 1980). Beetle habitat was described as elderberry thickets in moist valley oak woodland along the margins of the Sacramento and San Joaquin Rivers in California's Central Valley. Two Critical Habitat areas were designated along portions of the American River in Sacramento County (Service 1980). Important VELB habitat was also identified along Putah Creek in Solano County. Elderberry of various species occur throughout California, up to elevations of 10,000 feet. The current range of the VELB, however, encompasses California's Central Valley, the Central Valley watershed to the west, and the 3,000-foot contour to the east (Service 1999). The *Valley Elderberry Longhorn Beetle Recovery Plan* (Recovery Plan) was issued in 1984 (Service 1984).

Life History

Adult VELB lay their eggs in the bark of living elderberry plants and larvae bore into the pith of stems (Lindsley and Chemsak 1972). A variety of branch sizes are utilized for larval development and pupation although most of those measured in Barr's study (1991) were 2 – 4 inches in diameter at the exit hole. Infrequently, smaller branches (less than 1.5 inches in diameter) that contained exit holes were encountered. Lang *et al.* (1989) found no current-year exit holes on stems less than 2.5 cm (1 inch). Thus, larvae appear to be distributed mostly in large, mature plants with stems greater than 1.0 inch in diameter near ground level. Larvae feed within the stems and emerge from pupation as adults after at least 14 months (Halstead 1990) through a 7-10mm exit hole (Barr 1991) in spring at about the same time the elderberry plants are blooming. The entire life cycle from egg to adult was previously thought to take two years (Service 1984; Eng 1984), though the duration of each stage in the cycle is unknown. Barr (1991) observed beetles feeding on elderberry leaves under laboratory conditions. However, data on feeding preferences, reproductive behavior, or mechanisms of host-plant location under natural conditions are unavailable.

Though use of the plants by the VELB is rarely apparent, plants used by the VELB usually show evidence of repeated use over a period of several years, but sometimes only one or two exit holes are present (Jones and Stokes 1987). Exit holes are often the only evidence of beetle presence or, at least, historic occupation of a plant. A review of exit hole data shows the tendency for VELB to utilize lower portions of elderberry plant stems. Barr (1991), from a survey of 122 exit holes, found mean exit hole height to be 38.8 inches. Almost 71 percent of all holes were 48 inches or less in height. These results compare to Eya (1976), Jones & Stokes (1987), and Andrews *et al.* (1987). Jones and Stokes estimated stem heights at 627 exit holes and found that nearly 70 percent were at or below 4 feet, and only about 10 percent were higher than 6 feet. Andrews *et al.* found *D. californicus* holes from ground level up to 7 feet high – of 133 measurements, approximately 65 percent were less than 3 feet high, and approximately 35 percent were between 1 and 2 feet. Eya (1976) reported holes from 0.3 to 10 feet from the ground. Halstead (1990)

reported finding at least one exit hole as high as 25 feet above the ground, but also reported that exit hole occurrences are most common between ground level and four feet. A more recent study by Collinge *et al.* (2001) found exit holes from ground level to approximately six feet above ground.

Field work along the Cosumnes River and in the Folsom Lake area indicates that larval galleries can be found in elderberry stems with no evidence of exit holes; the larvae either die prior to construction of an exit hole or are not far enough along in the developmental process to construct an exit hole. The VELB Recovery Plan (Service 1984) and Barr (1991) contain further details on the VELB's life history.

Status, Distribution and Population Dynamics

When the VELB was federally listed as threatened on August 8, 1980 (45 **FR** 52803: Service 1980), the species was known to occur at less than 10 localities along the American River, the Merced River, and Putah Creek. By the time the VELB Recovery Plan was prepared in 1984, additional species localities had been found along the American River and Putah Creek. As of 1998, the California Natural Diversity Database included 181 occurrences for this species in 44 drainages throughout the Central Valley, from a location along the Sacramento River in Shasta County, southward to an area along Caliente Creek in Kern County (CNDDB 1998). In the foothills of the western Sierra Nevada, adults have been found up to 2,220 feet in elevation, and exit holes up to 2,940 feet in elevation. Although the VELB has been discovered in many localities where it had not been known to occur when the species was federally listed, recent studies indicate that the VELB continues to be threatened by habitat loss and fragmentation, including loss or degradation of the riparian forest ecosystem as a result of agricultural and urban development (Barbour et al 1993; Eng 1984; Kucera and Barrett 1995; Katibah 1984).

Colonization by the Argentine ant (*Linepithema humile*) may also pose a biological threat to VELB through egg predation (Huxel 2000). Other factors such as pesticide drift, exotic plant invasion, and grazing may possibly affect VELB or its habitat. The VELB is a rare habitat specialist that inhabits a highly fragmented landscape. Based on historical evidence regarding riparian habitat in the Central Valley prior to colonization, the VELB probably evolved as a species in the context of continuous wide stretches of riparian habitat. The substantial loss of riparian habitat in the Central Valley since the large human population influx in the mid 19th century may have driven VELB populations to low numbers long before the species was listed in 1980. This habitat loss resulted not only in a decline in VELB numbers, but also in increased habitat fragmentation. Recent studies have indicated that the VELB is highly vulnerable to habitat fragmentation, largely due to the species' limited dispersal abilities (Collinge *et al.* 2001).

Environmental Baseline

Status of the Species Within the Action Area

Continued human population growth in the Central Valley is expected to drive further development of agriculture, cities, industry, transportation, and water resources in the foreseeable

future. This future development, and the associated infrastructure, will further contribute to the continued loss and fragmentation of natural areas, including areas harboring the VELB. With the historic and ongoing loss and fragmentation of this species' habitat, and the likely ongoing effects of anthropogenic factors such as pesticides, invasion of exotic plant species, and spread of the Argentine ant, VELB perseverance will be difficult without well designed and successfully implemented conservation efforts. Moreover, VELB persistence over the next 100 years is unlikely without reversing habitat loss through habitat restoration (Collinge, *et al.* 2001, Huxel and Collinge, in prep.). VELB conservation efforts to date have probably resulted in a net increase in habitat, considering authorized loss only (unauthorized loss cannot be quantified), but the degree of increase is unknown because conservation efforts have not been closely monitored for success. To provide for the long-term persistence of this species, loss of occupied habitat must be limited, and any loss must be addressed by providing additional habitat that is likely to have long-term conservation value for the species. However, habitat restoration may not enhance long-term persistence unless conservation areas (transplant/planting sites) are placed in close proximity to sites where the VELB occurs naturally (Collinge *et al.* 1991; Huxel and Collinge, in prep.). Collinge *et al.* (2001) showed that dispersal among drainages was relatively rare, thus the placement of conservation planting sites within the dispersal range of the VELB is crucial. Prudent choice of conservation areas coupled with limited loss of occupied and potential VELB habitat will ensure the long-term viability of this species.

Factors Affecting Species Environment Within the Action Area

The following discussion analyzes the effects of past and ongoing factors leading to the current status of the species, its habitat and ecosystem, throughout the species' range. It includes an analysis of effects from projects that have received incidental take authorization for the VELB since the species was listed and, based on the best available information, an evaluation of conservation efforts aimed at minimizing these effects. The purpose of this analysis is to provide a baseline with which to compare in determining whether implementation of the proposed project would jeopardize the continued existence of the species, and whether the proposed project would provide for the species' conservation and long-term survivability.

Habitat Loss

Habitat loss has been ranked as the single greatest threat to biodiversity in the United States (Wilcove *et al.* 1998). In the 1980 final rule to list the VELB as threatened, habitat destruction was cited as the primary factor contributing to the need to federally list the species. As stated in the final rule, by the time the species was listed, its habitat had largely disappeared throughout much of its former range due to agricultural conversion, levee construction, and stream channelization. The 1984 Recovery Plan reiterated that the primary threat to the VELB was loss and alteration of habitat by agricultural conversion, grazing, levee construction, stream and river channelization, removal of riparian vegetation, riprapping of shoreline, plus recreational, industrial and urban development (Service 1984). Riparian forests, the primary VELB habitat, have been severely depleted throughout the Central Valley over the last two centuries as a result of expansive agricultural and urban development (Katibah 1984, Thompson 1961, Roberts *et al.* 1977). Since colonization, these forests have been "modified with a rapidity and completeness

matched in few parts of the United States" (Thompson 1961). As of 1849, the rivers and larger streams of the Central Valley were largely undisturbed. They supported continuous bands of riparian woodland 4 to 5 miles in width along some major drainages such as the lower Sacramento River, and generally about 2 miles wide along the lesser streams (Thompson 1961). Most of the riverine floodplains supported riparian vegetation to about the 100-year flood line (Katibah 1984).

Some accounts state that the Sacramento Valley, as of approximately 1848, supported approximately 775,000 to 800,000 acres of riparian forest (Smith 1977, Katibah 1984). No comparable estimates are available for the San Joaquin Valley. Based on early soil maps, however, more than 921,000 acres of riparian habitat are believed to have been present throughout the Central Valley under pre-settlement conditions (Katibah 1984). Another source estimates that out of approximately five million acres of wetlands in the Central Valley in the 1850's, approximately 1,600,000 acres were riparian wetlands (Frayer *et al.* 1989). A large human population influx occurred after 1849, however, and much of the Central Valley riparian habitat was rapidly converted to agriculture and used as a source of wood for fuel and construction to serve a wide area (Thompson 1961). By as early as 1868, riparian woodland had been severely affected in the Central Valley, as evidenced by the following excerpt:

> This fine growth of timber which once graced our river [Sacramento], tempered the atmosphere, and gave protection to the adjoining plains from the sweeping winds, has entirely disappeared-the woodchopper's axe has stripped the river farms of nearly all the hard wood timber, and the owners are now obliged to rely upon the growth of willows for firewood (Cronise 1868, in Thompson 1961).

The clearing of riparian forests for fuel and construction made this land available for agriculture (Thompson 1977). Natural levees bordering the rivers, once supporting vast tracts of riparian habitat, became prime agricultural land (Thompson 1961, 1977). As agriculture expanded in the Central Valley, needs for increased water supply and flood protection spurred water development and reclamation projects. Artificial levees, river channelization, dam building, water diversion, and heavy groundwater pumping further reduced riparian habitat to small, isolated fragments (Katibah 1984). In recent decades, these riparian areas have continued to decline as a result of ongoing agricultural conversion, development, and stream channelization. As of 1989, there were over 100 dams within the Central Valley drainage basin, as well as thousands of miles of water delivery canals and streambank flood control projects for irrigation, municipal and industrial water supplies, hydroelectric power, flood control, navigation, and recreation (Frayer *et al.* 1989). Riparian forests in the Central Valley have dwindled to discontinuous strips of widths currently measurable in yards rather than miles. Based on a California Department of Fish & Game (CDFG) riparian vegetation distribution map, by 1979 there were approximately 102,000 acres of riparian vegetation remaining in the Central Valley. This represents a decline in acreage of approximately 89 percent as of 1979 (Katibah 1984). More extreme figures were given by Frayer *et al.* (1989), who reported that woody riparian forests in the Central Valley had declined to 34,600 acres by the mid-1980s (from 65,400 acres in 1939). Although these studies have differing findings in terms of the number of acres lost (most likely explained by differing methodologies), they attest to a dramatic historic loss of riparian habitat in the Central Valley.

As there is no reason to believe that riparian habitat suitable to the VELB (occupied by elderberry shrubs) would be destroyed at a different rate than other riparian habitat, it can be assumed that the rate of loss for VELB habitat in riparian areas has been equally dramatic. A number of studies have focused on riparian loss along the Sacramento River, which supports some of the densest known VELB populations. Approximately 98 percent of the middle Sacramento River's historic riparian vegetation was believed to have been extirpated by 1977 (CDWR 1979). The California Department of Water Resources estimated that native riparian habitat along the Sacramento River from Redding to Colusa decreased from 27,720 acres to 18,360 acres (34 percent) between 1952 and 1972 (Conrad *et al.* 1977). The average rate of riparian loss on the middle Sacramento River was 430 acres per year from 1952 to 1972, and 410 acres per year from 1972 to 1977. In 1987, riparian areas as large as 180 acres were observed converted to orchards along this river (McCarten and Patterson 1987). Barr (1991) examined 79 sites in the Central Valley supporting VELB habitat. When 65 of these sites were re-examined in 1997 (Collinge *et al.* 2001), seven no longer supported VELB habitat. This represents a decrease in the number of sites with VELB habitat by approximately nine percent in six years.

There is no comparable information on the historic loss of non-riparian VELB habitat such as elderberry savanna and other vegetation communities where elderberry occurs (oak or mixed chaparral-woodland, or grasslands adjacent to riparian habitat). However, all natural habitats throughout the Central Valley have been heavily affected within the last 200 years (Thompson 1961), and it can be assumed that non-riparian VELB habitat also has suffered a widespread decline. This analysis focuses on loss of riparian habitat because the VELB is primarily dependent upon riparian habitat. Adjacent upland areas are also likely to be important for the species, but this upland habitat typically consists of oak woodland or elderberry savanna bordering willow riparian habitat (Barr 1991). The riparian acreage figures provided by Frayer *et al.* (1989) and Katibah (1984) included the oak woodlands concentrated along major drainages in the Central Valley, and most likely included lands we would classify as upland VELB habitat adjacent to riparian drainages. Between 1980 and 1995, the human population in the Central Valley grew by 50 percent, while the rest of California grew by 37 percent. The Central Valley's population was 4.7 million by 1999, and it is expected to more than double by 2040. The American Farmland Trust estimates that by 2040 more than 1 million cultivated acres will be lost due to development and 2.5 million more put at risk (Ritter 2000). This increasing population in the Central Valley and resultant development pressure is likely to result in continuing loss of riparian habitat.

While habitat loss is clearly a large factor leading to the species' decline, other factors are likely to pose significant threats to the long-term survival of the VELB. Approximately 20 percent of riparian sites with elderberry observed by Barr (1991) supported VELB populations, based on observance of exit holes. Collinge *et al.* (2001) observed both historic and recent exit hole data and found 24.3% occupancy rates. Jones and Stokes (1988) found evidence of VELB populations on 65 percent of 4,800 riparian acres along the Sacramento River. The fact that a large percentage of apparently suitable habitat is unoccupied suggests that the populations are limited by factors other than habitat availability, such as habitat quality or limited dispersal ability.

Habitat Fragmentation

Destruction of riparian habitat in central California has resulted not only in loss of acreage, but also in habitat fragmentation. Riparian habitat in the Central Valley, which has experienced greater than 90 percent loss by most estimates, would meet this criterion as habitat vulnerable to effects of fragmentation. Existing data suggests that VELB populations are affected by habitat fragmentation. Barr (1991) found that small, isolated habitat remnants were less likely to be occupied by the VELB than larger patches, indicating that VELB subpopulations are extirpated from small habitat fragments. Barr (1991) and Collinge *et al.* (2001) consistently found VELB exit holes occurring in clumps of elderberry bushes rather than isolated bushes, suggesting that isolated shrubs do not typically provide long-term viable habitat for this species.

Local populations of organisms often undergo periodic colonization and extinction, while the metapopulation (set of spatially separated groups of a species) may persist (Collinge 1996). Habitat fragmentation can be an important factor contributing to species declines because: (1) it may divide a large population into two or more small populations that become more vulnerable to inbreeding depression, genetic drift, and other problems associated with small populations; (2) it may limit a species' potential for dispersal and colonization; and (3) it makes habitat more vulnerable to outside influences by increasing the edge : interior ratio (Primack 1998). These factors, as they relate to the VELB, are discussed below.

Small Populations

Small, isolated subpopulations are susceptible to extirpation from random demographic, environmental, and/or genetic events (Shaffer 1981, Lande 1988, Primack 1998). While a large area may support a single large population, the smaller subpopulations that result from habitat fragmentation may not be large enough to persist over a long time period. As a population becomes smaller, it tends to lose genetic variability through genetic drift, leading to inbreeding depression and a lack of adaptive flexibility. Smaller populations also become more vulnerable to random fluctuations in reproductive and mortality rates, and are more likely to be extirpated by random environmental factors.

Species that characteristically have small population sizes, such as large predators or habitat specialists, are more likely to become extinct than species that typically have large populations (Primack 1998). Also, a species with low population density (few individuals per unit area) tends to have only small populations remaining if its habitat is fragmented. Populations of species that naturally occur at lower densities become extinct more rapidly than populations of species with higher densities (Bolger *et al.* 1991). The species may be unable to persist within each fragment, and gradually die out across the landscape.

The VELB, a specialist on elderberry plants, tends to have small population sizes, and occurs in low densities (Barr 1991, Collinge *et al.* 2001). Collinge *et al.* (2001) compared resource use and density of exit holes between the VELB and a related subspecies, the California elderberry longhorn beetle (CELB). The VELB tended to occur in areas with higher elderberry densities and lower exit hole densities than CELB. With extensive riparian habitat loss and fragmentation,

these naturally small populations are broken into even smaller, isolated populations. Once a small population has been extirpated from an isolated habitat patch, the species may be unable to re-colonize this patch if it is unable to disperse from nearby occupied habitat.

Limited dispersal and colonization

Insects with poor dispersal abilities may persist better in large habitat patches than small patches because small fragments may be insufficient to maintain viable populations when insects are unable to disperse to more suitable habitat (Collinge 1996).

Studies suggest that the VELB may be unable to re-colonize drainages where the species has been extirpated, due to its limited dispersal ability (Huxel 2000, Barr 1991; Collinge *et al.* 2001). Huxel and Collinge (in prep.) used computer simulations of colonization and extinction patterns for the VELB based on differing dispersal distances, and found that the short dispersal simulations best matched the 1997 census data in terms of site occupancy. This suggests that in the natural system, dispersal and thus colonization is limited to nearby sites. At spatial scales greater than 10 kilometers (km), such as across drainages, VELB occupancy appears to be strongly influenced by regional extinction and colonization processes, and colonization is constrained by limited dispersal (Collinge *et al.* 2001). Except for one occasion, drainages examined by Barr occupied in 1991 remained occupied in 1997 (Collinge *et al.* 2001). The one exception was Stony Creek, which was occupied in 1991 but not in 1997. All drainages Barr (1991) found to be unoccupied in 1991 were also unoccupied in 1997. These data suggest that unoccupied drainages are not easily recolonized by the VELB.

Edge Effects

Habitat fragmentation not only isolates small populations, but also increases the interface between habitat and urban or agricultural land, increasing negative edge effects such as the invasion of non-native species (Huxel 2000, Soule 1990) and pesticide contamination (Barr 1991).

Argentine Ants

Recent evidence indicates that the Argentine ant may pose a risk to the long-term survival of the VELB (Huxel 2000). The Argentine ant has negatively affected populations of other native arthropod species (Ward 1987). Predation on eggs is most likely the effect these ants have on the VELB. In Portugal, Argentine ants have been found to be significant egg predators on the eucalyptus borer (*Phoracantha semipunctata*)(Way *et al.* 1992). Egg predation on the VELB could lead to local extirpations, as indicated by a population viability study, suggesting that egg and juvenile mortality are significant factors affecting probability of extinction for the VELB (Huxel and Collinge, in prep.). The Argentine ant has been expanding its range throughout California since its introduction around 1907, especially in riparian woodlands associated with perennial streams (Ward 1987). Huxel (2000) states that, given the potential for Argentine ants to spread with the aid of human activities such as movement of plant nursery stock and

agricultural products, this species may eventually infest most drainages in the Central Valley along the valley floor, where the VELB is found.

Pesticides

Direct spraying or drift of herbicide or insecticide in or near riparian areas (which may be done to control mosquitoes, crop diseases, or other pests) is likely to adversely affect the VELB and its habitat. Elderberries commonly grow along drainage and irrigation ditches and, therefore, are subject to over-spray and pesticide drift, which could effect the beetle. Malathion effects have been found to depress coleopteran populations by as much as 87.9 percent for up to one year after spraying (Quinn *et al.* 1990). As of 1980, the prevalent land use adjacent to riparian habitat in the Sacramento Valley was agriculture, even in regions where agriculture was not generally the most common land use (Katibah *et al.* 1984). Therefore, the species is likely susceptible to pesticide contamination from adjacent agricultural practices. Recent studies of major rivers and streams documented that 96 percent of all fish, 100 percent of all surface water samples and 33 percent of major aquifers contained one or more pesticides at detectable levels (Gilliom 1999). Pesticides were identified as one of the 15 leading causes of impairment for streams included on the Clean Water Act section 303(d) lists of impaired waters. As the VELB occurs primarily in riparian habitat, the contamination of rivers and streams may affect this species and its habitat. Pesticides have been identified as one of a number of potential causes of the decline of pollinator species and other insects beneficial to agriculture (Ingram *et al.* 1996), therefore it is possible that the VELB, typically occurring adjacent to agricultural lands, has suffered a decline due to pesticides.

Other Factors

Competition from invasive exotic plants such as giant reed (*Arundo donax*) may adversely affect riparian habitat supporting the VELB. Giant reed, a native of Asia, has become a serious problem in California riparian habitats, forming dense, homogenous stands essentially devoid of wildlife and native plants. This species, growing up to 2.5 inches per day and yielding 8.3 tons of oven-dry cane per acre, tolerates drought, floods, and extreme temperatures, and is not significantly affected by insects, disease, herbivory, fire, or mechanical disturbance. It has an extensive root system allowing it to resprout rapidly after disturbance and out-compete native riparian vegetation. Giant reed also introduces a frequent fire cycle into the riparian ecosystem, disrupting natural riparian dynamics and eventually forming homogenous climax communities. The extent to which giant reed has affected elderberry specifically, however, has not been studied. Effects of other non-native, invasive plants such as black locust (*Robinia pseudoacacia*), tamarisk (*Tamarix* spp.), and Himalayan blackberry (*Rubus discolor*), on habitat of the VELB are also little studied.

Grazing by livestock may damage or destroy elderberry plants and inhibit regeneration of seedlings. Cattle readily forage on new growth of elderberry, which may explain the apparent absence of VELB at manicured elderberry stands (Service 1984). Habitat fragmentation exacerbates problems related to exotic species invasion and cattle grazing by increasing the edge-to-interior ratio of habitat patches, facilitating the penetration of these influences.

Illegal damage to elderberries is also believed to have a sizeable, but unknown, effect upon the VELB. Various public and private entities are known to periodically trim elderberry shrubs for road maintenance, pole line repair, road construction and brush clearing purposes. Additional losses occur through the removal of shrubs during residential construction or alterations. Since few of these activities are reported or permitted, quantification of such effects is not possible.

Projects Authorized for Incidental Take, and Associated Conservation Efforts

As of July, 2000, the date of the last comprehensive investigation of consultations on projects affecting VELB and its habitat, the Service had processed at least 172 section 7 consultations authorizing take of the VELB since the species was federally listed in 1980. Projects typically affected under ten shrubs (59 of 81 projects sampled, or 73 percent), and sometimes affected over 50 shrubs (8 of 81 projects sampled, or 10 percent). The greatest number of shrubs affected by a single project was 282. These 172 projects affected an estimated 3,784 elderberry shrubs, and 17,372 elderberry stems greater than 1 inch in diameter. Based on an estimated 1,800 square feet for every five shrubs (consistent with the 1996 and 1999 Guidelines), roughly 31 acres of an ecosystem supporting VELB habitat were lost with the removal of 3,784 elderberry shrubs.

As of July 2000, the Service had processed 6 section 10 (A)(1)(a) permits authorizing take of the VELB since the species was federally listed in 1980. No projects affected more than 15 shrubs. These six projects affected an estimated 50 elderberry shrubs. Based on an estimated 1,800 square feet for every five shrubs (consistent with the 1996 and 1999 Guidelines), roughly 0.4 acre of riparian habitat were lost with the removal of 50 elderberry shrubs.

Based on the Service's VELB Conservation Guidelines that were in effect from 1996 to 2000 (when 95 percent of the consultations occurred), roughly 36,000 seedlings with associated native plants were to be planted to address the losses of elderberry shrubs that were authorized for take under these consultations. Based on a minimum 60 percent survival rate, as required under Service Guidelines, 21,847 of the elderberry seedlings would have survived. With 0.57 acre of riparian habitat per five seedlings planted, as required under the Service Guidelines, roughly 4,104 acres of riparian habitat were to have been planted to compensate for losses authorized under the Service's consultations to date. Because of a shortage of staff and funding, however, the Service has been unable to monitor the success of VELB conservation measures implemented through these projects. It is also not known what proportion of these sites are within the 12.4 mile (20 kilometer) VELB dispersal distance from known occupied sites that was noted by Collinge *et al.* (2001), though it is expected that conservation sites adjacent to relatively densely-occupied regions (*i.e.* the lower reaches of the Sacramento and American rivers) would have a higher likelihood of success as VELB habitat than would remote sites not adjacent to vegetated stream courses.

In the nearly 3 years that have passed since the detailed baseline data were compiled, the Service has issued approximately 30 biological opinions allowing limited amounts of take. These biological opinions utilized the 1999 Conservation Guidelines, either as appendages to September 19, 1996, and March 11, 1997, programmatic biological opinions (Service files 1-1-96-F-0066 and 1-1-96-F-0156, respectively) or as stand-alone biological opinions authorizing

larger amounts of take, such as the January 9, 2001, and March 29, 2001, biological opinion on and amendment of the Quarry Ridge project in Sacramento County, California (Service files 1-1-00-F-0075 and 1-1-01-F-0078, respectively). The latter biological opinion and its amendment authorized the incidental take of all VELB inhabiting three guideline-driven stem size classes with 32 elderberry shrubs.

The Service has also increasingly relied upon alternate, non-1999 Conservation Guideline-driven conservation strategies where those strategies are believed to be adequate to protect the VELB. For example, on July 23, 2002, the Service issued to the Federal Highway Administration (Administration) an amended biological opinion (Service file 1-1-02-F-0222 amending 1-1-01-F-0077) on the effects of a comprehensive bike-trail improvement and maintenance program on the lower American River in Sacramento County which involved a large-scale, non-native weed renovation program. In the bike trail biological opinion, the incidental take of 30 shrubs (10 shrubs per year for each of three years) and up to 300 stems greater than 1" in diameter at ground level for initial project implementation was authorized. To offset this take, the County of Sacramento (on behalf of the Administration) would implement a two acre elderberry conservation site and begin renovation of approximately 650 acres of invasive, non-native plants, followed by restoration with native species.

Other projects seek to preserve on or near the project site occupied elderberries, to help address dispersal concerns raised by Collinge *et al.* (2001). The Service is currently engaged in formal consultation with the Administration regarding preservation and/or transplantation of elderberries on sites known to be occupied, rather than relying solely on off-site conservation at a bank.

Huxel and Collinge (in prep.) recently used a modeling approach to examine the effects of various demographic parameters and management strategies on long-term survivability of the VELB. They found that habitat restoration may not enhance long-term survivability of the species unless mitigation sites are placed in close proximity to sites where the VELB occurs naturally. Since dispersal among drainages is relatively rare, VELB compensation sites must be placed within the dispersal range of the species if they are to provide long-term conservation benefits. The spatial dependence of site colonization also suggests caution in allowing further destruction of occupied VELB sites. Collinge *et al.* (2001) stress that placement of compensation sites should consider the proportion of occupied sites within a 12.4 mile (20 kilometer) distance.

As stated by Collinge *et al.* (2001), restoration projects for the VELB have usually not considered the important demographic contributions of other restoration sites and nearby native habitats. Future compensation plans need to consider not only what constitutes usable habitat for a species, but also the details of metapopulation viability and patch occupancy. Based on existing information regarding the projects that have been authorized under the Act for take of the VELB, and the conservation measures implemented to minimize effects on the species, there has likely been a net increase in riparian habitat acreage and numbers of elderberry shrubs as a result of these projects. The degree to which this increase has benefitted the species, however, is uncertain. Furthermore, it is likely that unauthorized destruction of VELB habitat has occurred, although the Service has not been able to quantify such destruction.

Baseline and Baseline Assumptions at the Project Site

The construction of the Pacific Gas and Electric Company transmission facilities included an initial period of relatively intense disturbance, which included major ground disturbance for clearing of corridors, construction of towers, and clearing and construction of access roads. These activities removed habitat and fragmented the remaining habitat to varying degrees. It is difficult to determine to what degree any of the known populations of VELB were affected by the original construction or past maintenance activities.

Information on the location of elderberry plants on National Forest System lands was gathered in 1998 from field surveys prepared by Pacific Gas and Electric Company (1998a, 1998b, and 1998c) in response to two separate FERC Additional Information Requests (AIR's) for the Rock Creek-Cresta, Mokelumne River and Haas-Kings River hydroelectric relicensing project. Additional data on VELB habitat occurrence on Forest Service lands was collected during road surveys (identifying project roads) when incidental observations of occurrence of elderberry plants were recorded and reported to the Service in the wildlife BA. A database search [FS, Pacific Gas and Electric Company and California Natural Diversity Data Base (CNDDB)] for elderberry sites on Forest Service lands revealed 18 known sites within the Plumas National Forest, 42 known sites within the Sierra National Forest and 8 known sites within the Sequoia National Forest. The two surveys completed in 1998 on National Forest System lands resulted in 10 elderberry plants or clumps greater than one inch diameter, four with exit holes, located in Plumas National Forest, 24 plants or clumps greater than one inch diameter, three with exit holes, located in the Sierra National Forest and five plants or clumps greater than one inch diameter, one with an exit hole, located in the Sequoia National Forest. No elderberries were located in Shasta-Trinity, Tahoe, Eldorado or Stanislaus National Forests. In response to an October 3, 2000, request for additional information from the Service, additional elderberry plant surveys were completed during fall of 2000 and the data were presented in an Addendum to the biological assessment. The 2000 VELB surveys on Forest Service lands were conducted as part of special status plant surveys, but no detailed measurements of the plants, observations of VELB exit holes, nor associated habitats were made. Only number of plants and anticipated effects were recorded from each location. The number of elderberry plants reported in the Addendum after the 1998 data gathering and 2000 surveys were 21 elderberry plants in the Plumas National Forest, 86 plants in the Sierra National Forest and ten plants in the Sequoia National Forest for a total of 117 plants. All plants are reportedly within 100 feet of the transmission line corridors. The general locations are along the Caribou-Big Bend transmission corridor in Plumas National Forest, the Wishon-San Joaquin and Haas-McCall transmission corridors in Sierra National Forest and the Haas-McCall and Tule-Springville transmission corridors in the Sequoia National Forest. Pacific Gas and Electric Company did not provide the Service with the exact locations of these plants. Evidence of past beetle occupancy was reported at <4 percent (1 out of 23 plants where exit hole determinations were made). Occupancy was not determined for the remaining 88 plants. (Pacific Gas and Electric Company 1998b, 1998c, Garcia and Associates 2000, Pacific Gas and Electric Company 1999).

Surveys were conducted on BLM administered lands (Garcia and Associates 2003a and 2003b) in 2002 and 2003 that identified 37 elderberry shrubs within the Transmission Separation Project

in three separate areas – Kerckhoff (FERC #96), Spring Gap-Stanislaus (FERC #2130), and Mokelumne River (FERC #137). Based on exit hole observations, historic VELB occupancy of the shrubs surveyed was reported to average73 percent (Table 3).

In Fall 2000, the Pacific Gas and Electric Company began to survey for and identify the locations of elderberry plants that occur within its electric transmission and distribution rights-of-way, licenses and franchises and began developing a comprehensive database of known elderberry plant locations. Elderberry within 20 feet of other vegetation requiring trimming has been documented by address, while elderberry that requires trimming has been surveyed in greater detail (e.g., VELB habitat quality, presence of exit holes, and plant community characteristics). Data have been collected from the following Pacific Gas and Electric Company divisions responsible for vegetation management: North Valley, Sacramento, Sierra, Stockton, Diablo, Yosemite, and Fresno. A limited sampling (10 percent) of known elderberry was surveyed for global position, beetle occupancy, height, canopy width, and general habitat quality.

The number of elderberry plants identified in surveys conducted for the aforementioned projects is shown in Table 5. The average VELB occupancy rate (per shrub, as evidenced by presence of exit holes) in a 2001 O&M systemwide vegetation management study was approximately 22 percent. For all surveys where elderberry shrubs and VELB exit holes were recorded, occupancy averages 28.7 percent. Although surveys were directed toward Pacific Gas and Electric Company land and/or facilities, this value is comparable to the 27.8 percent occupancy (64 out of 230 sites surveyed) reported by Barr (1991). The Pacific Gas and Electric Company is using data from these various projects and activities to develop a database of known elderberry locations along its facilities.

Table 5. Elderberry/VELB Surveys along Pacific Gas and Electric Company Facilities.

Project Type/Name/Description	Survey Period	Survey Area	Plant Nos.	Occupancy	No. Plants Potentially Affected
Transmission Separation Project - FS					
Plumas National Forest	1998-2000	31 miles T/L; 401 acres	21	indeterminable	2
Sierra National Forest	1998-2000	23 miles T/L; 193 acres	86	4% (23 plant sample)	12
Sequoia National Forest	1998-2000	4.6 miles T/L; 52 acres	10	indeterminable	4
Shasta-Trinity National Forest	2000	23.1 acres	0	n/a	0
Tahoe National Forest	2000	No lands below 3,000 feet	0	n/a	0
Eldorado National Forest	2000	11.7 acres	0	n/a	0
Stanislaus National Forest	2000	No lands below 3,000 feet	0	n/a	0
Transmission Separation Project - BLM (FERC non-jurisdictional)					
Kerckhoff 1 and 2 (FERC No. 96)	2002	2.6 miles T/L; 15.9 acres	10	40%	8
Mokelumne (FERC No. 137)	2002	4.5 miles T/L; 59.7 acres	6	83%	3
De Sabla-Centerville (FERC No. 1121)	2002	0.9 miles T/L; 17.9 acres	0	n/a	0

Battle Creek (FERC No. 1121)	2002	11.3 miles T/L; 40.7 acres	11	73%	11
Crane Valley (FERC No. 1354)	2002	0.1 mile T/L; 5.0 acres	0	n/a	0
Spring Gap-Stanislaus (FERC No. 2130)	2002	1.7 miles T/L; 21.8 acres	10	100%	5
Drum-Spaulding (FERC No. 2310)	2002	9.5 miles T/L; 42.2 acres	0	n/a	0
Rock Creek-Cresta (FERC No. 1962)	2002	1.2 miles T/L; 11.1 acres	0	n/a	0
Haas-Kings River (FERC No. 1988)	2002	0.5 mile T/L; 2.3 acres	0	n/a	0
Various Hydro Projects with VELB (Within FERC Boundaries, non-FS, non-BLM)					
Rock Creek-Cresta	1998	73 miles T/L ROW, roads, 775 acres	85	27%	9
Haas-Kings River	1998	40 miles T/L ROW, roads, 1,000 acres	81	20%	7
Mokelumne River Project	1997	45 miles T/L ROW, roads, 1,200 acres	78	40%	6
Ongoing Operation and Maintenance					
Electric Distribution and Transmission Vegetation Management	2001	~55,000 miles transmission and distribution	1,110-6,500 (Est.)	22%*	151
Electric Distribution and Transmission Vegetation Management	2002	~55,000 miles transmission and distribution	1,110-6,500 (Est.)	n/a	172
Previously-Permitted Major Construction Projects					
Gasline 401 Expansion Project	1992	840 miles	1,203	n/a	427
Oakhurst 115kV Pole Replacement	1997	12 miles T/L ROW, 75-foot corridor	56	20%	10

*Systemwide, VELB occupancy was estimated by sampling 10% of documented elderberry shrubs throughout the species' range.

Effects of the Proposed Action

While the localized effects of the proposed action to continue occupancy, use and maintenance of existing transmission facilities will contribute to the local and range-wide trend of habitat loss, fragmentation, and degradation through trimming and potential removal of elderberry bushes, the effects of the proposed action taken together with the protective conservation measures described in the proposed action (see project description), is intended to minimize and compensate for these localized adverse effects.

Additionally, implementation of the proposed action, including the VELB conservation program, is intended to make appreciable contributions to the protection and recovery of the beetle.

Factors to Be Considered

The proposed action extends throughout the range of the VELB where Pacific Gas and Electric Company facilities may be located. Although the proposed action has the potential to affect elderberry over a wide geographic range, the large majority of potential effects are considered .

short-term and variable depending upon site-specific needs. Additionally, with the limited exception of small numbers of elderberry that would need to be removed, it is likely that significant portions of Pacific Gas and Electric Company activity will be focused on those portions of elderberry shrubs that may be higher than typically observed exit holes. Likewise, Service staff have observed survival and regrowth of previously-trimmed elderberry bushes.

Analyses for Effects of the Action

The proposed action will have both direct and indirect effects on the VELB. Removing or trimming elderberry shrubs may be a direct effect on the VELB and constitutes take of the VELB via the harassment and mortality of adults, eggs, and larvae, and harm via modification and degradation of habitat. Direct effects include disturbance of habitat (elderberry) associated with operation and maintenance activity of electric transmission lines, electric distribution lines, access roads, gas lines, and linear generation facilities. Although the Pacific Gas and Electric Company operates approximately 5,000 circuit miles of underground distribution lines within potential range of the VELB, most effects on elderberry plants will occur through vegetation management activity around overhead electric transmission and distribution lines. Beetles could be killed during trimming/pruning of elderberry stems during routine vegetation management activity (as adults, post-emergence, or as larvae if stems being removed are >1" at or near the level of the cut).

Additionally, the potential effects on the VELB include the removal of habitat during, among other things, regular vegetation management, anchor/guy or incidental pole replacement, road maintenance, or emergency activities. The proposed project also includes the use of herbicides (but not on Forest Service lands), which may affect VELB and its habitat.

System wide vegetation management activity in 2001 and 2002 occurred across approximately 55,500 miles of electric transmission and distribution lines within the potential habitat range of the VELB. Although no removals occurred, elderberry plants were trimmed or pruned to maintain the regulatory conductor clearance requirements. No VELB, dead or alive, were reported or identified during these activities, though searches were likely not thorough and could not assess latent mortality. From a limited survey (a sub-sample of all sites reported in 2001), evidence of previous beetle occupation occurred in 22 percent of the elderberry shrubs.

The biological assessment for the Forest Service lands addresses effects on the VELB and its habitat within the transmission line corridors and along roads and shoulders of roads on Forest Service lands where 117 elderberry shrubs are reported to occur within 100 feet of potential routine operation and maintenance work on Pacific Gas and Electric Company facilities. The number of elderberry plants with the potential to be directly affected (trimmed, cut or removed) by the Project on FS Forest Service lands associated with the Transmission Separation Project are two in the Plumas National Forest, twelve in the Sierra National Forest and four in the Sequoia National Forest for a total of eighteen plants (Table 5). The biological assessment addendum prepared for FS lands (Foster Wheeler 2000a; 2001) indicates that the number of elderberry plants on FS lands associated with the Transmission Separation Project that may be indirectly affected from potential disturbance near the plant due to routine maintenance and

operation activities was conservatively estimated to be 58. However, implementation of reasonable and prudent measures contained in this biological opinion and incidental take statement will significantly minimize the potential for effect on these elderberry plants. The remaining 29 (of the 117) elderberry plants will be subject to routine maintenance activities within 100 feet of the plants, but are also not anticipated to be affected.

Surveys on BLM land identified a total of 37elderberry shrubs in four of the nine projects surveyed. Approximately 27shrubs on BLM lands could potentially be affected, either directly or indirectly, by the Pacific Gas and Electric Company's routine maintenance and operations activity (Table 5). The effect would be counted at the time of the activity and would be defined as the first time of trimming or, if absolutely necessary, when the plant is removed. These effects would be related to or result from the routine operation and maintenance activities described for that project.

Based on previous information provided to the Service (e.g., electronic mail notifications), routine vegetation management activity within electric transmission and distribution rights-of-way directly affected as many as 151 elderberry plants in 2001 (the first full year of program-level tracking). According to internal Pacific Gas and Electric Company records, as many as 172 plants were trimmed in 2002 as a part of routine electric system maintenance and regulatory compliance. Effects are also anticipated for 22 plants associated with the Mokelumne River, Haas-Kings River, and Rock Creek-Cresta (FERC) projects, although these portions of the facilities are not located within FS or BLM administered lands.

Additionally, elderberry counts are expected to increase where mature plants are located, due to seed dispersal/natural propagation from those mature shrubs. Thus, it is anticipated that trimming of new or previously untrimmed elderberry plants will be required over time, particularly beneath electric lines. A limited ground survey of reported elderberry locations in 2001 showed that approximately 35 percent of plants had been trimmed previously, and potentially repeatedly, during Pacific Gas and Electric Company and non-Company activities (by other agencies or individuals). Based upon the numbers of elderberry located adjacent to Company facilities, including those that are part of hydroelectric projects, and routine maintenance needs, as well as potential increases in elderberry beneath PG&E facilities, it is anticipated that up to 250 plants per year may need to be trimmed or otherwise affected. Additionally, it is anticipated that a relatively small number of plants (20 per year) would need to be removed in their entirety (versus trimming/pruning) due, for example, to their locations within facility access roads.

Finally, potential indirect effects on the VELB resulting from activities associated with the proposed project may also result in the form of fragmentation of habitat where elderberry shrubs and associated vegetation is removed. Removal of associated vegetation (trees/shrubs) can alter the habitat structure and microclimate of the surrounding environment. Changes in habitat structure (vertical and horizontal distribution of plant life) and microclimate (such as solar radiation, temperature, relative humidity, soil moisture) could negatively affect the behavior of VELB in response to these changes in unforeseen ways. Other direct and indirect effects involve damage to the shrub from vehicle use and road and transmission line maintenance. Although

difficult to measure, indirect effects on larvae or beetles may result from effects on (pruning of) individual elderberry plants. Researchers at University of California, Davis are currently conducting a multi-year elderberry management study to help determine the influence of trimming/cutting plants on beetle biology/ecology.

Beneficial Effects

As discussed previously in the Description of the Proposed Avoidance, Minimization, and Conservation Measures, the Proposed Action includes a significant region-wide conservation program for the VELB, which is discussed in more detail below.

Species Response to the Proposed Action

The Service has determined that the anticipated level of effect on VELB resulting of Pacific Gas and Electric Company routine operation and maintenance activities is expected to be offset by implementation of the Company's VELB conservation program, particularly the acquisition of 1,000 acres of elderberry habitat. VELB habitat acquired under the conservation plan is anticipated to be established adjacent to occupied beetle habitat, which Collinge *et al.* (2001) has identified as a key factor in increasing the likelihood a conservation site will be colonized by VELB. The avoidance and protection measures are designed to minimize effects on elderberry shrubs, thus reducing the likelihood of indirect effects on and take of the VELB.

The actual acreage and magnitude of benefits, however, are not presently known; sites have not yet been identified, acquired, or restored. Also, the actual number of elderberries that will be planted on the acreage is unknown at this time.

Cumulative Effects

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

The entire Project Area is within the right-of-way, easements or franchises of the transmission lines and associated access roads. However, Pacific Gas and Electric Company does not have exclusive easement rights on private lands nor is the Company always the sole occupant of franchise areas. Other state or private activities affecting the VELB are expected to occur within these rights-of-way, easements or franchises. Any major project maintenance or reconstruction activities planned by Pacific Gas and Electric Company will have advance and separate authorization from appropriate agencies.

There are numerous concurrent, ongoing resource management activities within the project area that contribute to potential adverse cumulative effects. The major management activities that have the potential of influencing the VELB include cattle grazing, extensive agricultural development, timber harvesting, fuel wood cutting, fire suppression, road building, levee

maintenance, and herbicide use. Continued human population growth in the Central and San Joaquin Valley's and foothills, in general, is expected to drive further development of agriculture, cities, industry, transportation, and water resources in the foreseeable future. These future activities may not be subject to Section 7 consultation (and thus are considered to enter into cumulative effects), and are likely to result in loss of riparian and other habitats where elderberry shrubs and the VELB occur. These activities are not associated with the proposed project.

Some of the aforementioned activities affecting the VELB involve effects on elderberry shrubs located within riparian ecosystems adjoining or within jurisdictional wetlands. These projects will be evaluated via formal section 7 consultation between the Service and the: (1) Army Corps of Engineers via section 404 of the Clean Water Act; (2) the BLM via issuance of rights-of-way or other BLM activities; and (3) the FS via issuance of special use authorizations or other Forest Service activities. There are, however, a number of projects for which there is no Federal permitting, authorization, or funding involved and for which no assistance, coordination, consultation or incidental take permitting is sought. These projects include unauthorized riprapping, levee maintenance, small-scale development and natural events such as fire and flood. These unauthorized projects and/or natural events, taken together, pose a significant threat to the recovery of the VELB, particularly when they result in the removal of elderberry savannah ecosystems. These foothill/upland landscapes often consist of mixed stands of elderberry shrubs and oak (*Quercus* spp.) trees interspersed with open grasslands. Elderberry shrubs in these savannah systems often achieve great size, due perhaps to the lack of light competition from broadleaf trees and/or entanglement with California wild grape (*Vitus californica*) vines, as often occur in riparian communities. Elderberry savannah communities are important in that they represent a large portion of the diverse habitat in which elderberry shrubs occur and because urban sprawl threatens a significant acreage of these systems. The loss of this habitat negatively affects the environmental baseline of the subspecies and is difficult to quantify.

Conclusion

After reviewing the current status of the valley elderberry longhorn beetle, the environmental baseline for the action area, the effects of the proposed project, and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of the valley elderberry longhorn beetle. Critical habitat has been designated for the valley elderberry longhorn beetle, however, this action does not affect these areas.

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened wildlife species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not

limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by the FS and BLM so that they become binding conditions of any grant, permit, or license issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The FS and BLM have a continuing duty to regulate the activity covered by this incidental take statement on lands administered by those agencies and consistent with the Memorandum of Understanding ("MOU") signed by the Service, the FS, the BLM and the Pacific Gas and Electric Company on January 10, 2003. If the FS and/or BLM (on their respective jurisdictional lands, as appropriate and within the scope of the MOU) (1) fail to adhere to the terms and conditions of the incidental take statement and/or (2) fail to retain oversight to ensure compliance with these terms and conditions consistent with said MOU, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take

The Service expects that incidental take of the valley elderberry longhorn beetle will be difficult to detect or quantify. The cryptic nature of the species and their relatively small body size make the finding of a dead specimen unlikely. The species occurs in habitat that makes them difficult to detect. Due to the difficulty in quantifying the number of beetles that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as based upon the numbers of elderberry located adjacent to Pacific Gas and Electric Company facilities, including those that are part of hydroelectric projects, as well as those expected due to future growth in and around Company facilities, and which are affected by Company activities for the 30-year term of the respective FS and BLM permits.

It is thus anticipated that all beetles inhabiting up to 250 plants per year for 30 years (a total of 7,500 elderberry shrubs) may need to be trimmed or otherwise directly affected as a result of this proposed action. It is also anticipated that a relatively small number of plants (20 per year, for 30 years; a total of 600 elderberry shrubs) would need to be removed in their entirety (versus trimming or pruning) as a result of this proposed action, due, for example, to their locations within facility access roads.

If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring review of the reasonable and prudent measures provided. The Pacific Gas and Electric Company, through the FS and/or BLM, must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

Upon implementation of the reasonable and prudent measures, below, incidental take of the beetle associated with the Project in the form of harm, harassment, or mortality from habitat loss or direct mortality, will become exempt from the prohibitions described under section 9 and regulations pursuant to section 4(d) of the Act; in addition, incidental take in the form of harm, harassment, injury, or mortality associated with indirect effects of the Project will be exempted.

Note that the overall incidental take identified above is relevant to system-wide effects on Federal and non-Federal lands. The following subsections describe the estimated incidental take that would occur by Federal land jurisdiction covered in the transmission separation projects that are the subject of this consultation (i.e. certain National Forest System Lands and Public Lands administered by the BLM) and in the remainder of the project area (including private lands, State, County, and City lands, Federal lands administered by the Bureau of Reclamation, National Wildlife Refuges, non-transmission separation project lands administered by the FS and BLM, etc.).

National Forest System Land Incidental Take Associated with Transmission Separation Project

The Pacific Gas and Electric Company previously estimated that up to 30 elderberry shrubs would be directly affected (pruned or removed) by vegetation management activities on 646 acres of NFS Lands within the Plumas, Sierra and Sequoia National Forests over the 30-year project life (900 plants). Some potential indirect affects close to project activities also were estimated in the BA, although specific indirect take assumptions and allowances are not required in the context of this incidental take statement, which relies upon the implementation of the VELB Conservation Program and reasonable and prudent measure identified herein.

It is thus anticipated that the Pacific Gas and Electric Company will incidentally take all valley elderberry longhorn beetles inhabiting up to 900 plants on 646 acres of NFS lands in the Plumas, Sierra and Sequoia National Forests will be incidentally taken (killed or injured).

Public Land Incidental Take Associated with Transmission Separation Project

The Pacific Gas and Electric Company previously estimated that up to 27 elderberry shrubs would be directly affected (pruned, removed, or indirectly affected) by vegetation management activities on 200 acres of Public Lands administered by the BLM acres over the 30-year project life (810 plants).

It is thus anticipated that the Pacific Gas and Electric Company will incidentally take all valley elderberry longhorn beetles inhabiting up to 810 elderberry shrubs on 200 acres of Public Lands administered by the BLM acres over the 30-year project life.

Project-Wide Incidental Take Other Lands

The net difference between the total effects identified in the second of the introductory paragraphs in the Amount or Extent of Take section, above, represents the estimated in incidental take on lands not administered by the FS or BLM as part of the Transmission Separation Project. It is thus anticipated that the Pacific Gas and Electric Company will incidentally take (kill or injure) all valley elderberry longhorn beetles inhabiting up to 213 elderberry shrubs per year directly affected by the proposed action on other-than NFS or BLM lands that are part of the Transmission Separation Project (270 elderberry shrubs per year, minus 30 elderberry shrubs on NFS Transmission Separation Project Lands and 27 per year for BLM Transmission Separation Project Public Lands). In the event there is less than the permitted quantity of incidental take on NFS or BLM Transmission Separation Project lands (30 and 27 elderberry shrubs, respectively), additional take on non-NFS or BLM Transmission Separation Project lands shall be allowed, but only insofar as the total take for public or private lands herein does not exceed 270 shrubs per year.

Effect of the Take

The Service has determined that this level of anticipated take is not likely to result in jeopardy to the valley elderberry longhorn beetle or result in destruction or adverse modification of its critical habitat.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize the effects of incidental take of the beetle from the Project:

Minimize the effects of project effects on the beetle and its habitat (elderberry shrubs).

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the FS, BLM and Pacific Gas and Electric Company as an applicant must comply with the following non-discretionary terms and conditions[1], which implement the reasonable and prudent measure described above.

The BLM indicated to the Service in a February 21, 2003, letter (BLM file number 6840(P), CA-930) that the agency will include in its right-of-way grants, either by reference or as an enclosure,

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[1]The Terms and Conditions herein, including the specific Reporting Requirements, serve to incorporate the measures already proposed under the Pacific Gas and Electric Company VELB Conservation Plan into this biological opinion. The Service has noted that FS and BLM jurisdictions associated with the Transmission Separation Project are limited to 646 and 200 acres of NFS and Public Lands, respectively.

the Terms and Conditions contained herein as they apply to the 200 acres of Public lands subject to the proposed action. Similarly, the Service is limiting the FS's nondiscretionary adherence to these terms and conditions to Pacific Gas and Electric Company actions on the 646 acres of NFS lands containing beetle habitat and subject to the proposed action. The activities conducted by the Pacific Gas and Electric Company as an applicant on other-than-NFS and Public Lands are subject to the Terms and Conditions below, as was established in the MOU.

The following terms and conditions implement the reasonable and prudent measure:

1. The Pacific Gas and Electric Company, in accordance with the VELB Conservation Program and MOU executed between the Company, the Service, FS and the BLM on all project-related activities, shall provide incremental funding over eight years, in an escrow or other appropriate account, for acquisition and/or long-term management of 1,000 acres of high quality habitat near or adjacent to existing VELB populations of the Sacramento and San Joaquin Valleys (125± acres/year, on an average annual basis). This provision of funding shall begin within 18 calendar months of the date of issuance of this Biological Opinion and after appropriate habitat identification.

2. The Pacific Gas and Electric Company, the FS, and the BLM shall minimize the effect of direct effects (trimming, removing) and indirect effects by implementing the avoidance and minimization measures contained in the Conservation Program as follows:

   A. When the Pacific Gas and Electric Company is undertaking routine maintenance activities in an area of potential VELB habitat, a qualified individual will survey for the presence of elderberry plants within a minimum of 20 feet from the work site within the utility easement, right-of-way, franchise or license and flag those areas needed to avoid or minimize potential effect on elderberry plants. Potential VELB habitat is defined as elderberry plants with one or more stems measuring one inch or greater in diameter at ground level at sites throughout California's Central Valley and associated foothills from about 3,000 feet in elevation on the east to the watershed divide of the Central Valley on the west (the western valley watershed divide is often at altitudes of less than 3,000 feet). If no elderberry plants meeting these criteria are present, no additional minimization, avoidance and protective measures are required.

   B. Routine Vegetation Management-Related Operations and Management Activities associated with Gas and Electric Transmission/Distribution Facilities Operation and Maintenance covered in the VELB Conservation Program.

      i. When elderberry occurs within the work area (e.g. actual work on an elderberry or other vegetation management work within 20' of an elderberry), a qualified individual (Pacific Gas and Electric Company employee or contractor) shall survey and "flag" at least twenty feet from

the drip line of each elderberry plant with pin-flagging, or other appropriate means, prior to commencing maintenance activities. Work crews shall be briefed on the location of habitat and shall review the avoidance, protection and minimization measures set forth herein. Briefings shall be each morning prior to commencing planned work and shall be tailored to the specific work area to be covered during the day. Pacific Gas and Electric Company shall be responsible for ensuring that personnel minimize any ground disturbance within 20 feet of elderberry.

ii. Pacific Gas and Electric Company shall not use herbicides (where use of herbicides is permitted) within approximately 20 feet of elderberry, except for cut stump treatment of removed trees and to help ensure compliance with California Public Resources Code Section 4292 (i.e., subject pole clearing at base of certain power poles or towers).

iii. Trees in the vicinity of an elderberry plant shall be directionally felled away from the plant so as to avoid the 20-foot zone around the elderberry plant, where possible. If there is potential to inadvertently fell a tree into the 20-foot zone, the tree shall be removed in sections. When a fallen tree is lopped and scattered, resulting material shall not be placed within the 20-foot zone around the elderberry plant.

iv. When trimming non-elderberry plants or trees in the vicinity of an elderberry plant, only trim shrubs or trees when necessary to comply with Public Resources Code Sections 4292 and 4293, or other applicable State laws. The Pacific Gas and Electric Company shall ensure that trimmed materials do not fall into the elderberry plant and that, to the extent practicable, no other disturbance occurs to the elderberry plant.

v. If the ground is disturbed during a vegetation management activity, appropriate erosion control measures shall be implemented to prevent movement of soil or other material into the 20-foot zone around elderberry plants.

vi. Vehicles required to perform vegetation management activities shall avoid the 20-foot zone around an elderberry plant to the extent practicable.

vii. Trimming, rather than removal of elderberry plants, shall be preferentially used where feasible and except where otherwise authorized by the Service consistent with the biological opinion.

C. Routine Non-Vegetation Management-Related Management and Maintenance Activities associated with Gas and Electric Transmission/Distribution Facilities and other Pacific Gas and Electric Company Facilities Covered by the VELB Conservation Program.

i. When Pacific Gas and Electric Company is undertaking routine maintenance activities in an area of potential VELB habitat, a qualified individual (Company employee or contractor) shall survey for the presence of elderberry plants within a minimum of 20 feet from the work site (defined as the area of actual work and potential ground disturbance including access and material and equipment staging and lay down area). The qualified individual shall "flag" at least twenty feet from the drip line of each elderberry plant with standard construction tape, or other appropriate means, prior to commencing maintenance activities.

ii. When elderberry occurs within the work area or within 20' of the work area, the qualified individual shall brief field workers on the location of the plant(s) and shall review the avoidance, protection and minimization measures set forth herein. Pacific Gas and Electric Company qualified individuals shall be responsible for insuring that maintenance personnel minimize any ground disturbance within 20 feet of elderberry.

iii. If ground-disturbing activities are planned, the qualified individual shall incorporate erosion control measures into the work plan to prevent movement of soil or other materials into the 20-foot zone around each elderberry plant. The work plan shall also consider maintaining the site's hydrological condition so as not to increase or decrease the flow of water to an elderberry plant.

iv. The qualified individual shall survey all project access roads prior to performing routine road maintenance or road grading associated with a routine transmission/distribution facility maintenance activity. The qualified individual shall "flag" at least twenty feet from the drip line of each elderberry plant with pin flagging, or other appropriate means, prior to commencing maintenance activities. In certain situations, elderberry plants are located on or immediately adjacent to project access roads. If at all possible, road maintenance activities shall avoid removing the elderberry plant. In addition, the qualified individual shall develop a work plan to prevent movement of soil within the 20-foot zone of an elderberry plant.

v. Any vehicles that travel near elderberry plants shall avoid the 20-foot zone around the elderberry plants unless the plants are immediately on or adjacent to an existing project access road.

D. Emergency Activities.

If Pacific Gas and Electric Company must undertake emergency activities in areas of potential VELB habitat, Pacific Gas and Electric Company shall not remove or otherwise disturb any elderberry plant or any vegetation within twenty feet of the drip line of elderberry unless required to do so to restore utility service or to meet public safety or fire prevention regulations. Following restoration of utility service Pacific Gas and Electric Company shall inspect the emergency work site area for damage to elderberry and restore the disturbed surface area to natural conditions as much as practical.

3. Transmission System Corridor Management

Pacific Gas and Electric Company shall manage its utility corridors for public safety and reliable electric and gas service by converting right-of-way plant communities from predominately tall-growing plant species to communities dominated by low-growing plant species, utilize an integrated vegetation management program on its right-of-ways, and employ best management practices that are designed to protect wildlife, groundwater, surface water, soils and the general public, all within the limits of state law requirements and landowner restrictions. In addition, Pacific Gas and Electric Company shall promote the Wire Zone/Border Zone, or successor approach, to vegetation management along electric transmission right-of-ways.

4. Argentine Ants.

The VELB Conservation Program calls for the acquisition of habitat, and not for replanting of elderberry shrubs. In the event, however, that elderberries and associated native vegetation are planted in the conservation areas, such plants shall be visually inspected for Argentine ants to make best efforts to ensure no Argentine ants will be introduced from seedling sources (nurseries, cuttings, etc.).

5. Reporting Requirements.

Ensure compliance with the Reporting Requirements below.

Conclusion

The reasonable and prudent measure, with its implementing terms and conditions, are designed to minimize the effect of incidental take on the beetle that might otherwise result from the

proposed action. With implementation of these measures, the Service believes that (1) all beetles associated with the 250 elderberry plants per year for 30 years anticipated to be affected by the proposed project shall be minimized; (2) no more than 20 elderberry plants per year for 30 years shall be removed; and (3) no more than the number of beetles inhabiting these elderberry plants will be incidentally taken as a result of Company routine operation and maintenance activities. If, during the course of the action, this level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. The FS and/or BLM, as appropriate, and Pacific Gas and Electric Company, as the applicant, must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the incidental take statement and its reasonable and prudent measures. This incidental take statement authorizes take at the above-referenced levels for a term of 30 years.

Reporting Requirements and Monitoring Plan

The Pacific Gas and Electric Company will identify VELB habitat locations during routine operation and maintenance of its facilities (where VELB could be affected) and will continue to develop and maintain, a database of this information. The Company will track effects (pruning, removal, or other acute disturbances) to individual elderberry plants on an annual basis. The Company will provide the Service with a biennial monitoring report, for the first six years of the program (three reports), and every five years thereafter. This monitoring report will summarize VELB habitat locations associated with annual effects on elderberry. The monitoring report will also describe the results of a more detailed representative survey of a limited and mutually agreed upon percentage of VELB habitat affected by Pacific Gas and Electric Company routine operation and maintenance activities. The detailed survey will be conducted by a qualified biologist on an appropriate limited sampling of VELB habitat affected during the preceding year.

The sampling will be conducted across a representative range of potential VELB habitat affected by routine Company operation and maintenance activities. The detailed survey described in the monitoring report will collect information on global position, habitat type, evidence of historic beetle occupancy, effect type and date, and the general condition of the plant. Maps of survey locations, cumulative effect tallies, and analyses of effects, beetle sign, and habitat types will be provided in the report. Any occurrence of dead or injured beetles or larvae will also be described in the report. The monitoring report will also include information on the progress of the Company's VELB Conservation Program toward the acquisition, development, and/or protection of VELB habitat or the status of areas already acquired.

Monitoring of project effects and implementation of conservation measures will provide a foundation for adaptive management and allow for modification of the plan based upon the mutual agreement of the Company and the Service. Any adaptive management evaluation will take into consideration the level of conservation provided by the program, which may exceed, by a significant margin, the potential effects associated with the activities covered.

The Sacramento Fish and Wildlife Office is to be notified immediately of the finding of any listed species or any unanticipated harm to the valley elderberry longhorn beetle. The Service contact person for this is the Division Chief for Endangered Species at (916) 414-6600. Any dead or severely injured beetles found (adults, pupae, larvae, or eggs) shall be deposited in the Entomology Department of the California Academy of Sciences. The Academy's contact is the Senior Curator of Coleoptera at (415) 750-7239. All observations of valley elderberry longhorn beetles in any life stage-live, injured, or dead-or fresh beetle exit holes shall be recorded on CNDDB field sheets and sent to California Department of Fish and Game, Wildlife Habitat Data Analysis Branch, 1416 Ninth Street, Sacramento, California 95814. Any dead or severely injured beetle shall be transferred to the Fish and Wildlife Service's Law Enforcement Office at 2800 Cottage Way, W-2605, Sacramento, California, 95825-1846.

The Pacific Gas and Electric Company shall notify the Service immediately if any listed species are found on site, and will submit a report including date(s), location(s), habitat description, and any corrective measures taken to protect the species found. A Service-approved biologist shall submit locality information to the CDFG, using completed California Native Species Field Survey Forms or their equivalent, no more than 90 calendar days after completing the last field visit of the project site. Each form shall have an accompanying scale map of the site such as a photocopy of a portion of the appropriate 7.5 minute U.S. Geological Survey map and shall provide at least the following information: township, range, and quarter section; name of the 7.5' or 15' quadrangle; dates (day, month, year) of field work; number of individuals and life stage (where appropriate) encountered; and a description of the habitat by community-vegetation type. The Service-approved biologist shall also provide a high quality copy of this information to the staff biologist, California Department of Fish and Game, 1807 13th Street, Sacramento, California 95814.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and data bases. The FS, BLM, and Pacific Gas and Electric Company should assist in the recovery of the valley elderberry longhorn beetle by funding and/or undertaking an assessment of where beetle habitat is most needed within its range (for example, where gaps in suitable habitat occur). This information should then be made available to the Service, other agencies, project applicants, and conservation organizations, in an effort to coordinate the needs of both the development and environmental conservation communities.

The FS, BLM and Pacific Gas and Electric Company should assist in recovery of the valley elderberry longhorn beetle by funding and/or undertaking a research effort to study (1) the factors that promote VELB occupancy and abundance; (2) VELB's natural enemies; and (3) the effects

of commonly used landscaping practices on elderberry and VELB, including vegetation management practices (pruning) of electric utilities.

The FS, BLM and Pacific Gas and Electric Company should assist the Service in implementing recovery actions identified in the Valley Elderberry Longhorn Beetle Recovery Plan.
In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION–CLOSING STATEMENT

This concludes formal consultation on the Pacific Gas and Electric Company Transmission Separation Project, located in the Plumas, Sequoia, and Sierra National Forests within Butte, Plumas, Madera and Fresno Counties; in the Redding, Folsom, and Bakersfield Districts within Madera, Fresno, Amador, Calaveras, Tuolumne, Nevada, Placer, Butte, Yuba, Shasta and Tehama Counties; and Various Other Jurisdictions, California. As provided in 50 C.F.R. § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals that the agency action may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect on the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the anticipated amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Please address any questions or concerns regarding this response to Jason Douglas or Justin Ly of my staff at (916) 414-6645.

Sincerely,

Wayne S. White
Field Supervisor

cc:
ARD-ES, Portland, OR
NOAA Fisheries, Sacramento, CA (Attn: Mike Aceituno)
NOAA Fisheries, Santa Rosa, CA (Attn: James Bybee)
CDFG, North Coast Region, Redding, CA (Attn: Don Koch)

CDFG, Central Sierra Region, Rancho Cordova, CA (Attn: Banky Curtis)
CDFG, Central Coast Region, Napa, CA (Attn: Rob Floerke)
CDFG, Southern Sierra Region, Fresno, CA (Attn: Bill Loudermilk)
Latham and Watkins, Washington D.C. (Attn: David Hayes, Janice Schneider)
Pacific Gas and Electric Company, San Ramon, CA (Attn: Diane Ross-Leech, Robert Knutson)

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Valley Elderberry Longhorn Beetle Conservation Program

Pacific Gas and Electric Company
and
U.S. Fish and Wildlife Service

March 2003

INTRODUCTION

This document presents information relevant to potential impacts to the valley elderberry longhorn beetle (VELB) due to ongoing routine operation and maintenance of Pacific Gas and Electric Company facilities (including facility access roads) on U. S. Forest Service lands, Bureau of Land Management administered public lands, and other lands containing gas, electric, and/or related facilities within the range of the VELB. This document also describes the system-wide VELB Conservation Program (Program) that Pacific Gas & Electric Company (the Company, or PG&E) and the U. S. Fish and Wildlife Service have developed to address potential VELB impacts on lands included in the Transmission Separation Project and on other lands that are affected by similar operation and maintenance activities that will occur on Transmission Separation Project lands. The Program will accomplish the following objectives: 1) address potential harm to VELB habitat associated with PG&E's routine operation and maintenance activity throughout the PG&E service area, and 2) provide funds for VELB Recovery Plan efforts in California. Also, the Program and supporting documentation presented in this report will satisfy requirements of the federal Endangered Species Act (Sections 7 & 9) and provide a basis to issue incidental take authorization for PG&E's maintenance and operation activities in California potentially affecting VELB and its potential habitat.

BACKGROUND

Pacific Gas & Electric Company provides gas and electric service to approximately 13 million people throughout a 70,000 square mile service area in northern and central California. Approximately 113,000 miles of transmission and distribution lines and associated facilities are used by the Company to distribute electricity across the service area and over 42,700 miles of pipeline and associated facilities are used to transmit and distribute natural gas. Portions of these facilities cross various National Forests administered by the U.S. Department of Agriculture, Forest Service (USFS), and certain public lands administered by the Bureau of Land Management (BLM), as well as other land classifications.

The Company has separately provided information regarding the potential biological effects associated with continued operation and maintenance of its existing facilities on National Forest land and on public land associated with pending land entitlement authorizations that it is seeking from the USFS (rights-of-way easements) and the BLM (rights-of-way) for the Transmission Separation Project (Foster Wheeler Environmental Corporation 2000a, 2000b, and 2001; Garcia and Associates 2003a and 2003b). The Transmission Separation Project involves continued occupancy, use and maintenance of existing transmission facilities in right-of-way (ROW) corridors occupying approximately 861 acres of National

Forest System lands in the Shasta-Trinity, Plumas, Tahoe, El Dorado, Stanislaus, Sierra, and Sequoia National Forests. Likewise, the Transmission Separation Project involves continued occupancy of approximately 207 acres of public land administered by the Bureau of Land Management[1]. The information contained in this document is intended to amend and enlarge this work to include, among other things, an evaluation of continued operation and maintenance of Company facilities located on certain other lands within the Company's service area.

Operation and maintenance of the Company's electrical and natural gas facilities are performed according to standard industry procedures and in accordance with the requirements of State of California law for public health and safety. Such laws are associated primarily with the Company's vegetation management program. These include:

- At all times, maintaining at least 18 inches of clearance between trees and primary distribution power lines ($\geq$20 inches for 115 kV, $\geq$32 inches for 230 kV, $\geq$10 feet for 500 kV), under normal conditions, and removing hazard trees (as defined by California Forest Practice Rules, hazard trees are defective trees or trees leaning toward the right-of-way that could fall into power lines) (California Public Utilities Commission General Order 95, Rule 35);
- During the Fire Season (typically April 15 - November 30) in Wild Land Areas Only, maintaining at least 4 feet of clearance between trees and primary distribution power lines and 60/70 kV transmission lines, maintaining at least 10 feet of clearance between trees and all transmission lines 115 kV and above, and removing hazard trees (Public Resources Code 4293 Tree Trimming and Removal);
- During the Fire Season in Wild Land Areas Only, clearing a cylinder (measuring 10 feet by 8 feet) around the base of subject poles and transmission structures that contain certain hardware that can cause flammable material to be present when operated correctly, and removal of dead vegetation up through the primary conductor level (Public Resources Code 4292);
- CPUC General Order 112-E requires the Company to patrol its gas lines and facilities regularly for gas leaks. Trees and brush interfering with these patrols may require periodic removal to prevent damage to the natural gas system and facilitate inspections.

[1] The Company is seeking these authorizations to comply with Federal Energy Regulatory Commission (FERC) orders removing these existing transmission lines and associated facilities from the Company's licensed hydroelectric projects and FERC jurisdiction, effective when the Company receives appropriate land use authorization from USFS and the BLM, where applicable.

Other government requirements specify maintenance practices to prioritize, patrol, inspect, and maintain overhead electrical transmission lines placed under the control of the California Independent System Operator. These state requirements were developed to protect public health and safety. The consequences of noncompliance with these state law requirements can be disastrous. There are documented accounts of increased wildfire risk due to improperly maintained electric transmission and distribution facilities. Where fire may occur in these instances, it can result in significant impacts and/or damage to human health and safety, public and private property, and wildlife in the affected areas. As a result, it is necessary for public health and safety requirements to be met, while at the same time addressing the requirements of federal law (i.e., the Endangered Species Act).

The federally threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) has been identified as the predominant species of issue for many Company activities. Potential impacts of the Company's customary operation and maintenance work are not unique to USFS or BLM lands and extend to other lands occupied by Company electric and gas facilities. For example, although there are no changes in historical operation and maintenance activities associated with the Transmission Separation Project, ongoing routine transmission line and access road maintenance activities have potential to affect the VELB and it's habitat, both within the National Forest System and BLM administered lands, and beyond those boundaries as part of the Company's contiguous system. Therefore, the VELB is a concern for the U.S. Fish and Wildlife Service (FWS) wherever the Company operates throughout the range of the beetle. A comprehensive approach for addressing potential impacts on the VELB provides a more efficient and effective means of addressing these issues.

The Company and the FWS have developed a VELB Conservation Plan that provides a unique, programmatic approach for addressing the potential impacts to VELB that are associated with Company operation and maintenance activities that are required on lands affected by the Transmission Separation Project (on both USFS and BLM lands) and on other lands occupied by Company facilities and within the range of the threatened VELB. The VELB Conservation Program discussed in this document will provide a mechanism for PG&E to provide greater benefits to VELB recovery by adopting a large-scale conservation approach that is tied to customary PG&E operation and maintenance activities system-wide. This programmatic approach will ensure that operation and maintenance activity associated with PG&E's electric and gas facilities is in compliance with the Federal Endangered Species Act of 1973 (ESA) and contributes to the VELB conservation and recovery efforts of the FWS.

SYSTEM DESCRIPTION

The area under consideration (project area) consists of the Company's gas and electric service area that overlaps with the potential range of the VELB. This range covers 33,633 square miles and encompasses California's Central Valley, the Central Valley watershed to the west, and the 3,000-foot contour to the east (FWS 1999). The Company's linear facilities (those associated with transmission and distribution of gas and electricity) within the potential range of the VELB are summarized in Table 1. These facilities include approximately 55,500 circuit miles of electric transmission and distribution line, the supporting poles and towers, and approximately 648 electrical substations of various size and capacity. There are more than 4,180 miles of gas transmission line within the project area, linked to 1,470 related facilities of various size and function. These gas facilities include testing stations, metering stations, valve lots, compressor stations, pressure limiting stations, and storage facilities. Additionally, there are more than 10,000 linear miles of existing gas distribution lines[2].

The project area includes the transmission lines associated with Federal Energy Regulatory Commission (FERC) licensed projects owned and operated by the Company, as well as various linear facilities associated with hydroelectric generation projects (e.g., canals, penstocks, dams, weirs, flumes, culverts, powerhouses, and recreational facilities). Within the potential range of the VELB, linear features (e.g., canals, ditches, penstocks, etc.) associated with hydroelectric generation projects amount to less than 200 miles.

[2] A large portion of the gas distribution system, however, is situated in urban areas.

Table 1. Length and classification of linear gas and electric facilities and proportion of those facilities within potential range of the VELB (as of July 2002).

Electric Transmission			
Voltage	**Total Circuit Miles**	**Circuit Miles Within VELB Range**	**% Circuit Miles Within VELB Range**
115 kV	6,086.2	3,558.9	58.5
230 kV	5,329.3	3,471.0	65.1
60 kV	3,956.0	1,974.0	49.9
70 kV	1,548.7	1,349.0	87.1
500 kV	1,329.0	1,005.5	75.7
idle (unidentified)	250.0	115.0	46.0
unknown	12.8	11.8	92.6
Total	18,512.0	11,485.2	62.0

Electric Distribution			
Voltage	**Total Circuit Miles**	**Circuit Miles Within VELB Range**	**% Circuit Miles Within VELB Range**
12.0 kV	64,744.8	36,623.2	56.6
21.0 kV	11,835.9	4,955.4	41.9
17.2 kV	2,569.6	2,150.6	83.7
4.16 kV	1,529.2	161.4	10.6
2.4 kV	358.2	10.7	3.0
7.2 kV	260.5	66.7	25.6
4.8 kV	61.1	58.1	95.1
44.0 kV	24.8	0.1	0.4
22.0 kV	21.8	5.1	23.2
480 volts	0.1	0.1	100.0
Total	81,405.8	44,031.3	54.1

Gas Transmission*			
Pipeline Type	**Total Line Miles**	**Line Miles Within VELB Range**	**% Line Miles Within VELB Range**
Local transmission	2,582.6	1,413.9	54.7
Backbone transmission	2,007.1	1,053.6	52.5
Distribution feeder main	1,472.3	846.5	57.5
Gas gathering	522.8	498.3	95.3
Distribution	232.1	210.0	90.5
Service line	183.8	99.7	54.3
Standard Pacific (joint w/ Chevron)	54.5	20.8	38.1
Underground storage	37.0	35.1	95.0
Blow-down	4.6	2.2	47.1
Total	7,096.9	4,180.0	58.9

*Although Gas Transmission data include some distribution lines, data are not yet available for a majority of gas distribution lines.

DESCRIPTION OF SYSTEM ACTIVITY

1. Routine Operation and Maintenance

System activities include routine operation and maintenance activity associated with Company transmission facilities on National Forest lands, as described in Transmission Separation Project documents previously submitted to the FWS (Foster Wheeler Environmental Corporation 2000a, 2000b, and 2001). In addition to the aforementioned Transmission Separation Project related activities on USFS lands, system activities include routine operations and maintenance activity of the Company's gas, electric, and hydroelectric-related facilities within rights-of-way on BLM land (BLM 2003), and within rights-of-way, franchises, and easements on private land not owned by the Company[3]. The Company does not intend to undertake any major projects or minor construction activities such as new electric pole/tower construction, substation expansion, new pipeline installation, or pressure limiting station construction as part of this program. Routine operation and maintenance activities within the project area that could potentially impact elderberry are primarily associated with routine vegetation management.

Electric System Vegetation Management Activity. Vegetation management activity includes routine inspections of linear facilities and identification of potential hazards/trees that may violate conductor clearance requirements. The degree of needed vegetation management often depends upon type (voltage) of facility involved and the height of the conductor lines. Management of such vegetation may include cutting, trimming, pruning, or clearing vegetation by manual or mechanical means as well as directed herbicide applications or stump treatments (except on USFS lands covered by the Transmission Separation Project or as otherwise authorized) to comply with state laws and requirements, protect the integrity of Company facilities, and/or maintain safe and reliable access to Company facilities for purposes of inspection and operation. Routine electric system-related activity to manage vegetation also includes clearing of brush, shrubs, and saplings around certain water conveyance/storage facilities (e.g., penstocks, dams, weirs, flumes, culverts, etc.) to protect their structural integrity and/or maintain safe access for routine inspection, operation, and maintenance purposes.

[3] Because the Company conducts this activity on lands not owned by the Company, elderberry plants within these areas would require landowner approval prior to removal, which is often not easily attainable. As a result, the ability to transplant elderberry is not within the control of the Company, and is often impossible.

Gas System Vegetation Management Activity. The CPUC General Order 112-E requires the Company to patrol periodically for gas leaks. Gas line rights-of-way are generally cleared of all vegetation and brush during initial construction of the gas pipelines. Although existing ROWs are maintained in a state of reduced vegetative cover, trees and brush that grow into these areas and interfere with these patrols may require periodic trimming and/or removal to prevent damage to the natural gas system and facilitate inspections. Areas within the right-of-way requiring vegetation management are identified during routine patrols, typically at least once or twice per year. Vegetation management is usually accomplished by mechanically or manually removing large-diameter woody stems or other vegetation to achieve a maximum height of one foot or less. The vegetation management program is also designed to eliminate weeds, brush, and trees around gas-related facilities to reduce fire hazard, improve safety, and maintain access (the Company prefers that tree canopies obscuring the ROW be pruned to facilitate aerial inspection of the ROW).

Non-Vegetation Management Activities. Additional routine maintenance activities for gas and electric systems have the potential to impact elderberry plants. These additional activities are listed in Table 2 with detailed descriptions included in Appendix A. Examples of routine maintenance activities for the electric system include inspections, wood pole test and treat, insulator replacement, cross arm replacement, anchor/guy replacement, incidental pole replacement, and road maintenance (occasional blading of existing roads). Routine maintenance activities for the gas system include aerial and ground inspections of pipelines and related facilities, remedial maintenance, compressor station maintenance, electric test system installation, valve recoating, valve replacement, installation of cathodic protection, coating replacement, telecommunications site maintenance, and access road maintenance.

2. Emergency Activities

Emergency activities would include any of the activities described above, and in Appendix A, undertaken in response to a sudden unusual occurrence such as, but not limited to, fire, flood, wind, earthquake or other soil movement, riot, accident, or damage to a subsurface installation requiring immediate action to prevent or mitigate loss of, or damage to, life, health, property or essential public services.

Table 2. Routine operation and maintenance activities for PG&E's system within the VELB habitat range.

Gas O&M Activities	
G1	Patrols; aerial, ground, leak detection
G2	Inspections; valves, telecom sites, anode beds, pls
G3	Remedial Maintenance
G4	Compressor Station Maintenance
G5	Pipeline Electric Test System Installation
G6	Pipeline Valve Recoating
G7	Pipeline Valve Replacement
G8	Pipeline Cathodic Protection
G9	Pipeline Lowering
G10	Pipeline Coating Replacement
G11	Pipeline Replacement
G12	Pipeline Telecommunications Site Maintenance
G13	Vegetation Management
G14	Access Road Maintenance
Electric O&M Activities	
E1	Patrols; aerial, ground
E2	Inspections; tower, pole, and equipment; outage; substation
E3	Electric Insulator Washing
E4	Electric Substation Maintenance
E5	Electric System Outage Repair
E6	Electric System Tower/Pole Replacement or Repair
E7	Facility Installations (Shoo-Fly)
E8	Electric System Pole and Equipment Replacement or Repair
E9	Electric Line Reconductoring
E10	Vegetation Management
E11	Wood Pole Test and Treat
E12	Access Road Maintenance
Emergency Activities	
Include the above activities performed in an emergency to restore gas or power and/or maintain public safety or welfare.	

SPECIES ACCOUNT

Status. The VELB was listed as a threatened species by the FWS on August 8, 1980 (45 Federal Register 52803-52807), pursuant to provisions of the ESA, as amended (16 U.S.C. 1531 et seq.). The beetle was only known from the valley areas of California in Sacramento, Solano, Yolo, and Merced counties (FWS 1980). Beetle habitat was described as elderberry thickets in moist valley oak woodland along the margins of the Sacramento and San Joaquin Rivers in California's Central Valley. Two Critical Habitat areas were designated along portions of the American River in Sacramento County (USFWS 1984). The Company does not own or operate any facilities within the designated Critical Habitat areas.

Distribution and Habitat Requirements. Elderberry (*Sambucus* spp.) is the sole host of VELB larvae and occurs throughout the state, up to elevations of 10,000 feet. The current range of the VELB, however, is considered to encompass California's Central Valley, the Central Valley watershed to the west, and the 3,000-foot contour to the east (USFWS 1999). Eggs are laid in the bark of living plants and larvae bore into the pith of stems (Lindsley and Chemsak 1972). Larvae feed within the stems and emerge as adults after approximately 14 months (Halstead 1990) through a 7-10mm exit hole (Barr 1991). Barr (1991) observed beetles feeding on elderberry leaves under laboratory conditions. However, data on feeding preferences, reproductive behavior, or mechanisms of host-plant location under natural conditions are unavailable.

Exit holes are often the only evidence of beetle presence or, at least, historic occupation of a plant. A review of exit hole data shows the tendency for VELB to utilize lower portions of elderberry plant stems. Barr (1991), from a survey of 122 exit holes, found mean exit hole height to be 38.8 inches. Almost 71% of all holes were 48 inches or less in height. Results compare to Eya (1976), Jones & Stokes (1987), and Andrews et al. (1987). Jones and Stokes estimated stem heights at 627 exit holes and found that nearly 70% were at or below 4 feet, and only about 10% were higher than 6 feet. Andrews et al. found *D. californicus* holes from ground level up to 7 feet high – of 133 measurements, approximately 65 percent were less than 3 feet high, and approximately 35 percent were between 1 and 2 feet. Eya (1976) reported holes from 0.3 to 10 feet from the ground. Halstead (1990) reported finding at least one exit hole as high as 25 feet above the ground, but also reported that exit hole occurrences are most common between ground level and four feet. A more recent study by Collinge et al. (2001) found exit holes from ground level to approximately six feet above ground.

A variety of branch sizes are utilized for larval development and pupation although most of those measured in Barr's study (1991) were 2 – 4 inches in diameter at the exit hole. Infrequently, smaller branches (less than 1.5 inches in diameter) that contained exit holes were encountered. Lang et al. (1989) found no current-year exit holes on stems less than 2.5 cm (1 inch).

Evidence supporting the notion that beetles are attracted to damaged or stressed elderberry plants has remained untested; personal observations have been referenced in government and scientific literature (Arnold unpublished data), however, other references provide conflicting information (Jones and Stokes 1985).

Reasons for Decline. Loss of elderberry habitat has been attributed to loss or degradation of the riparian forest ecosystem as a result of agricultural and urban development (Barbour et al 1993; Eng 1984; Kucera and Barrett 1995; Katibah 1984). Colonization by the Argentine ant (*Linepithema humile*) may also pose a biological threat to VELB through egg predation (Huxel 2000).

SURVEYS

Since VELB is dependent on elderberry plants, surveys for suitable habitat have involved locating elderberry plants within defined boundaries of PG&E ROWs, licenses, and easements. Extensive surveys have been conducted for the Transmission Separation Project on USFS lands (Foster Wheeler Environmental Corporation 2000a, 2000b, and 2001). Survey results have been previously provided to the FWS. Beyond the boundaries of USFS land, the Company has performed extensive elderberry surveys along specific portions of its electric transmission system in support of relicensing of the Mokelumne River Project (PG&E 1998a), the Rock Creek-Cresta Project (PG&E 1998b), and the Haas-Kings River Project (PG&E 1998c) (Table 3). In addition, recent VELB surveys of Company facilities on BLM property related to the Transmission Separation Project were conducted by Garcia and Associates (2003a and 2003b).

Consistent with its state law responsibilities, the Company conducts various surveys of its gas and electric transmission and distribution lines on a regular basis. In Fall 2000, the Company began to survey for and identify the locations of elderberry plants that occur within its electric transmission and distribution rights-of-way, licenses and franchises and began developing a comprehensive database of known elderberry plant locations. Elderberry within 20 feet of other vegetation requiring trimming has been documented by address, while elderberry that requires trimming has been surveyed in greater detail (e.g., VELB habitat quality, presence of exit holes, and plant community characteristics). Data have been collected from the following Company divisions responsible for vegetation management: North Valley, Sacramento, Sierra, Stockton, Diablo, Yosemite, and Fresno. In 2001, a sample (10%) of known elderberry occurrences was surveyed for global position, beetle occupancy, height, canopy width, and general habitat quality.

Elderberry surveys were also conducted for major construction projects such as the Gasline 401 Expansion project (PG&E 1992) and the Oakhurst 115 kV Tap Pole Replacement Project (PG&E 1997). The Company is using data from these various projects and activities to develop a database of known elderberry locations along its facilities.

ELDERBERRY OCCURRENCE AND VELB OCCUPANCY

Elderberry surveys of USFS lands within the Transmission Separation Project showed that 117 plants presently exist within that project area (Foster Wheeler Environmental Corporation 2000). Evidence of past beetle occupancy was reported at approximately 4% (1 out of 23 plants where exit hole determinations were made)[4] (PG&E 1998b, 1998c, Garcia and Associates 2000, PG&E 1999). As reported in documentation already provided to the FWS, based upon the anticipated extent of routine maintenance and operations activity (clearance trimming, road maintenance, etc.), potential impacts to a total of 18 plants could be expected (Table 3).

Recent surveys of BLM properties (Garcia and Associates 2003a and 2003b) identified 37 elderberry shrubs within the Transmission Separation Project in four separate areas – Kerckhoff (FERC #96), Battle Creek (FERC #1121), Spring Gap-Stanislaus (FERC #2130), and Mokelumne River (FERC #137). Based on exit hole observations, historic VELB occupancy of the shrubs surveyed was reported to average 73% (Table 3). The Company estimates that approximately 27 shrubs on BLM lands could potentially be impacted by the Company's routine maintenance and operations activity.

Previous surveys identified a total of 244 elderberry plants within the Mokelumne River[5], the Haas-Kings River, and the Rock Creek-Cresta FERC projects in association with electric transmission lines on primarily non-federal lands. Beetle occupancy averaged 29% across the three projects. As documented in previous reports (PG&E 1998a, 1998b, and 1998c), 22 plants could be impacted by routine maintenance and operations activity associated with these transmission lines (Table 3).

Vegetation management activity in 2001 and 2002 occurred across approximately 55,500 miles of electric transmission and distribution lines within the potential habitat range of the VELB. Although no removals occurred, elderberry plants were trimmed or pruned to maintain the regulatory conductor clearance requirements. This activity affected as many as 151 plants in 2001 and 172 plants in 2002 (Table 3). No VELB, dead or alive, were reported or identified during these activities. From a limited survey (a sub-sample of all sites reported in 2001), evidence of previous beetle occupation occurred at 22% of elderberry locations.

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[4] Occupancy was not determined for the remaining 88 plants.

[5] Three elderberry shrubs identified in 1998 surveys by PG&E may overlap with 2003 survey results from Garcia and Associates.

Although major construction activities are not covered by this project, examples of potential impacts to elderberry during major construction projects include the aforementioned Oakhurst 115kV Pole Replacement Project and the Gasline 401 Expansion Project. Ten plants out of 56 were impacted during the Oakhurst 115kV Pole Replacement Project, where past beetle occupancy was 20% (PG&E 1997). During the Gasline 401 Expansion Project, 427 plants were impacted (PG&E 1992). Both of these projects were permitted and impacts to VELB were mitigated.

The number of elderberry plants identified in surveys conducted for the aforementioned projects is shown in Table 3. Average VELB occupancy rates (per shrub, as evidenced by presence of exit holes) within the surveyed areas vary widely, ranging between 20% and 100%. For all surveys where elderberry shrubs and VELB exit holes were recorded, occupancy averages 28.7%. Although surveys were directed toward Company land and/or facilities, this value is comparable to the 27.8% occupancy (64 out of 230 sites surveyed) reported by Barr (1991).

Table 3. Elderberry/VELB surveys along Company facilities and potential impacts to shrubs.

Project Type/Name/Description	Survey Period	Survey Area	Plant #'s	Occupancy	Number of Plants Potentially Impacted
Transmission Separation Project - USFS Lands					
Plumas National Forest	1998-2000	31 miles T/L; 401 acres	21	indeterminable	2
Sierra National Forest	1998-2000	23 miles T/L; 193 acres	86	4% (23 plant sample)	12
Sequoia National Forest	1998-2000	4.6 miles T/L; 52 acres	10	indeterminable	4
Shasta-Trinity National Forest	2000	23.1 acres	0	-	0
Tahoe National Forest	2000	No lands below 3000 feet	0	-	0
El Dorado National Forest	2000	11.7 acres	0	-	0
Stanislaus National Forest	2000	No lands below 3000 feet	0	-	0
Transmission Separation Project - BLM* Lands (FERC non-jurisdict.)					
Kerckhoff 1 and 2 (FERC #96)	2002	2.6 miles T/L; 15.9 acres	10	40%	8
Mokelumne (FERC #137)	2002	4.5 miles T/L; 59.7 acres	6	83%	3
De Sabla-Centerville (FERC #803)	2002	0.9 miles T/L; 17.9 acres	0	-	0
Battle Creek (FERC #1121)	2002	11.3 miles T/L; 44.6	11	73%	11
Crane Valley (FERC #1354)	2002	0.1 miles T/L; 5.0 acres	0	-	0
Spring Gap-Stanislaus (FERC #2130)	2002	1.7 miles T/L; 21.8 acres	10	100%	5
Drum-Spaulding (FERC #2310)	2002	3.5 miles T/L; 42.2 acres	0	-	0
Rock Creek-Cresta (FERC #1962)	2002	1.2 miles T/L; 11.1 acres	0	-	0
Haas-Kings River (FERC #1988)	2002	0.5 miles T/L; 1.5 acres	0	-	0
Various Hydro Projects With VELB (Within FERC Boundaries, Non-USFS, Non-BLM)					
Rock Creek-Cresta Project	1998	73 miles T/L ROW, roads; 775 acres	85	27%	9
Haas-Kings River Project	1998	40 miles T/L ROW, roads; 1000 acres	81	20%	7
Mokelumne River Project	1997	45 miles T/L ROW, roads; 1200 acres	78	40%	6
Ongoing O&M					
Electric Distribution & Transmission Vegetation Management	2001	~55000 miles trans/dist ROW	est. between 1110-6500	22%**	151
Electric Distribution & Transmission Vegetation Management	2002	~55000 miles trans/dist ROW	est. between 1110-6500	n/a	172
Previously Permitted Major Construction Projects					
Gasline 401 Expansion Project	1992	840 miles	1203	n/a	427
Oakhurst 115kV Pole Replacement	1997	13 miles T/L ROW, 75' corridor	56	20%	10

*Company facilities on all BLM lands include 117 miles of electric transmission lines, 220.5 miles of electric distribution lines, and 15.7 miles of gas pipeline. The Rock Creek-Cresta and Haas-Kings River projects have existing BLM right-of-way grants.
**Systemwide, VELB Occupancy was estimated by sampling 10% of documented elderberry shrubs throughout the VELB's range.

POTENTIAL EFFECTS

The proposed action may have both direct and indirect effects on the VELB. Direct effects include disturbance of habitat (elderberry) associated with operation and maintenance activity of electric transmission lines, electric distribution lines, access roads, gas lines, and hydroelectric generation and related facilities. Beetles could be killed during trimming/pruning of elderberry stems during routine vegetation management activity (as adults, post-emergence, or as larvae if stems being removed are $\geq$1" at or near the level of the cut). Indirect effects to larvae or beetles, although difficult to measure, may result from impact (pruning) to the elderberry plant. Researchers at University of California, Davis are currently conducting a multi-year elderberry management study to help determine the influence of trimming/cutting plants on beetle biology/ecology (Holyoak pers. com.).

Although the Company operates approximately 5,000 circuit miles of underground distribution lines within potential range of the VELB, most impacts to elderberry plants will occur through vegetation management activity around overhead electric transmission and distribution lines. Due to regulatory and public safety requirements, proper clearance between electric conductors and vegetation must be maintained. Certain electric lines (primarily distribution), by nature of their construction and voltage capacity, may have smaller ground-to-midspan conductor clearance than others (e.g., 12kV distribution v. 500-kV transmission). For example, depending on topography and clearance requirements, conductors on distribution lines may have as little as 25 feet for vehicle access, or 17 feet for pedestrian access, between the ground and conductors at mid-span. Taking into account voltage and CPUC/CPRC requirements for vegetation clearance, vegetation (including elderberry) probably could not exceed 21 feet in height at mid-span. In many areas, however, vegetation-conductor clearance is great enough to preclude the need for pruning elderberry plants or other vegetation. The Company conducted a limited study of the trimming needed at 18 elderberry locations and found that the average height of elderberry at these locations, after routine vegetation management activity, was 21.4 ft. Although elderberry is considered to be a low-growing shrub, larger plants are, by definition, more likely to conflict with power lines (Figure 1).

Even in instances where ground-to-conductor clearance is limited (e.g. 17 feet for pedestrian access), aggressive trimming might reduce an elderberry to 12 or 13 feet in height. Based on exit hole data summarized earlier, such trimming could preserve 90% or more of potentially occupied elderberry galleries and would not necessarily have a direct impact on feeding larvae. While more indirect effects on the VELB may be difficult to determine, physical impacts to elderberry are most easily tracked in terms

of plant numbers. The numbers of known plants along Company facilities that may be affected by particular activities or projects are presented and summarized in Table 3.

Figure 1. An older, well-established elderberry that had an estimated maximum height of approximately 28 feet and a maximum crown width of 45 feet.

The Transmission Separation Project, with its defined activities, is expected to impact 18 plants on USFS lands. The impact would be counted at the time of the activity and would be defined as the first time of trimming or, if absolutely necessary, when the plant is removed. These impacts would be related to or result from the routine operation and maintenance activities described for that project.

The Transmission Separation Project is expected to impact 27 plants on BLM lands. Impacts are also anticipated for 22 plants associated with the Mokelumne River, Haas-Kings River, and Rock Creek-Cresta (FERC) projects, although these plants are not located within USFS or BLM boundaries. These impacts would be related to the operation and maintenance activities described for transmission facilities outside USFS boundaries and would be defined as the first time of trimming or, if absolutely necessary, when the plant is removed.

Based on previous information provided to the FWS (e.g., email notifications), routine vegetation management activity within electric transmission and distribution rights-of-way affected as many as 151

elderberry plants in 2001 (the first full year of program-level tracking). According to internal Company records, as many as 172 plants were trimmed in 2002 as a part of routine electric system maintenance and regulatory compliance. Although it is not possible to accurately determine which new, or as yet unaffected, plants might require trimming/pruning at any given time, based upon the surveys conducted by the Company in 2001 and 2002, the Company anticipates that at least 150-170 plants will need to be pruned each year during routine vegetation management activity. Elderberry counts are expected to increase where mature plants are located, due to seed dispersal/natural propagation. Thus, it is anticipated that trimming of more new (previously untrimmed) elderberry plants will be required over time, particularly beneath electric lines. A limited ground survey of reported elderberry locations in 2001 showed that approximately 35% of plants had been trimmed previously, and potentially repeatedly, during Company and non-Company activities (by other agencies or individuals). Based upon the numbers of elderberry located adjacent to Company facilities, including those that are part of hydroelectric projects, and routine maintenance needs, it is anticipated that approximately 250 plants per year may need to be trimmed. Additionally, it is anticipated that a relatively small number of plants (20/year) would need to be removed in their entirety (versus trimming/pruning) due, for example, to their locations within facility access roads.

This anticipated level of impact is expected to be more than offset by the Company's VELB Conservation Program. The Company has significant experience in previous VELB mitigation efforts. As of 2001, a total of 6 acres of elderberry and associated vegetation were planted on PG&E fee property adjacent to the Company's Herndon Substation, along the San Joaquin River. A portion of this effort served as mitigation requirements for the Oakhurst 115kV Pole Replacement Project. Monitoring for VELB will occur as plants become established. Also, in 1992 and 1993, over 3,000 elderberry plants were started in conservation plantings across 15 locations to compensate for project impacts to elderberry associated with the Gas Line (G/L) 401 Expansion Project (PG&E 1992). Since that time, more than 60% of those sites have shown evidence of beetle occupation and the actual number of plants required to achieve 80% survivorship was exceeded (138% survivorship in 2001; detailed monitoring reports for the G/L 401 Expansion Project conservation areas have been submitted to the FWS on a yearly basis by PG&E consultant, Richard Arnold). Based on results of Collinge et al. (2001), success of such conservation plantings may be due more to proximity to, or connectivity with, well-established sites occupied by the beetle rather than the quantity of elderberry used in conservation plantings in isolation.

The Company's VELB Conservation Program, discussed in detail below, provides funding for research to determine optimum placement of several elderberry conservation areas in order to maximize the success

of the program. Funding is also provided for acquisition and/or long-term management of such conservation areas. If established adjacent to occupied beetle habitat, these areas, like the Gasline 401 conservation areas, could become significant harbor for the VELB, assist the FWS in recovery efforts for the beetle, and more than offset Company impacts to elderberry and the VELB.

CONSERVATION MEASURES

This section presents the measures recommended by the Company to avoid potential impacts to VELB, and to provide for the conservation of the VELB. Measures to avoid and minimize impacts to the beetle and to provide for the conservation of the beetle would be accomplished by implementing the following steps:

1. VELB Conservation Program

Because habitat modification is, presumably, one of the leading causes of the VELB's rarity, the intent of the Conservation Program is to increase or improve VELB habitat through acquisition, development, and/or protection of lands in those areas expected to be the most productive and most at risk, such as along major drainages within the range of the VELB. In order to achieve the desired conservation benefits associated with this Conservation Program, and consistent with the VELB Recovery Plan (1984), PG&E will provide incremental funding (up to $8M total over eight years), in an escrow or other appropriate account, for acquisition and/or long-term management of up to 1,000 acres of high quality habitat near or adjacent to existing VELB populations of the Sacramento and San Joaquin Valleys. Thus, the Company anticipates the acquisition and/or long-term management of 125± acres/year, on an average annual basis, subject to acquisition and management opportunities. These conservation areas will be selected in consultation with the FWS, USFS, and BLM. Property acquisition and/or long-term management activities will begin within 18 months of issuance of the Biological Opinion and after completion of the VELB habitat identification component (discussed below). The properties will be selected based upon the presence of elderberry plants and associated habitat and, if appropriate, the potential for the addition of elderberry plants. Although it is difficult to project the number of plants that may be protected and/or enhanced under the plan, current VELB mitigation bank practices suggest that one thousand acres could potentially protect and/or enhance close to 100,000 elderberry plants and ultimately support multiple generations of VELB and thousands[6] of individual beetles.

[6] Assuming an average overall occupancy rate of 20% and one beetle per plant, over 20,000 beetles could be produced within VELB conservation areas.

In order to determine the most beneficial habitat areas, the Company will provide funding (up to $200,000) to begin identification of available properties in high quality, priority conservation areas, where VELB protection and restoration activities will improve the long-term viability of the species, near or adjacent to existing VELB habitat. This research will rely on existing data and consolidation of that data and will be a short-term project to be completed within six months of issuance of the Biological Opinion. Once prime VELB areas are identified, the means used in this conservation effort may include, but are not limited to, fee purchase, conservation easement, and PG&E fee properties, as well as efforts to preserve, protect, manage, enhance or otherwise take advantage of other available opportunities to consolidate and connect corridors of riparian habitat along California's rivers to ensure VELB survival and recovery.

In order to maximize the benefits for the recovery of the VELB, and to maximize the conservation benefits of the Conservation Program, PG&E will work with a variety of public and/or private conservation organizations for participation in this collaborative conservation program, to manage the areas as well as to maximize the conservation benefits of the VELB restoration areas.

2. Environmental Training and Education Program

An environmental sensitivity training and education program is in progress and would continue for all personnel who are likely to encounter elderberry/VELB issues during execution of their job responsibilities. Training will be mandatory for Company employees and contractors who perform routine maintenance activities, supervisors overseeing such activity (crew foreman, transmission troubleman), or those assigned to perform pre-inspections for vegetation management purposes or lead maintenance crews within the right-of-way for determining the physical condition of gas, electric, or related facilities. Company supervisors will be responsible for employee and contractor conduct when performing work within potential VELB habitat and for compliance with Pacific Gas and Electric Company's VELB Conservation Program. The Company will provide this training to ensure that field activities fully comply with the standards and requirements contained in this document and in any VELB biological opinion that is applicable to these activities.

The environmental sensitivity training course includes education regarding the life history requirements of the VELB, the identification of potential VELB habitat, the legal requirements and penalties of the ESA, and the measures necessary to avoid and protect the host elderberry plant. The

training would be summarized in a management manual and will be required every two years or as needed when new employees or contractors enter into these activities.

All Pacific Gas and Electric Company and contractor vehicles that are used to conduct routine maintenance activities will carry a VELB informational brochure prepared by Pacific Gas and Electric Company that will include images of VELB habitat and will describe the required VELB habitat avoidance, protection and minimization measures set forth herein.

3. Avoidance and Protective Measures

When the Company is undertaking routine operations maintenance activities in an area of potential VELB habitat, a qualified individual (as trained above) will survey for the presence of elderberry plants within a minimum of 20 feet from the work site within the utility easement, right-of-way, franchise or license and flag those areas needed to avoid or minimize potential impact to elderberry plants. Potential VELB habitat is defined as elderberry plants with one or more stems measuring one inch or greater in diameter at ground level at sites throughout California's Central Valley and associated foothills from about 3000 feet in elevation on the east to the watershed of the Central Valley on the west. If no elderberry plants meeting these criteria are present, no additional minimization, avoidance and protective measures are required.

The following minimization, avoidance, and protective measures will be followed during routine vegetation management activity and routine gas and electric transmission/distribution activity.

a. Routine Gas and Electric Transmission/Distribution Facility Operation and Maintenance (Vegetation Management-Related)

(1) When elderberry occurs within the work area (e.g. actual work on an elderberry or other vegetation management work within 20 feet of an elderberry), a qualified individual (Company employee or contractor) will survey and "flag" at least twenty feet from the drip line of each elderberry plant with pin-flagging, or other appropriate means, prior to commencing maintenance activities. Work crews will be briefed on the location of habitat and will review the avoidance, protection and minimization measures set forth herein. Briefings will be each morning prior to commencing planned work and will be tailored to the specific work area to be covered during the day. Pacific Gas and Electric Company will be responsible for ensuring that personnel minimize any ground disturbance within 20 feet of elderberry.

(2) Pacific Gas and Electric Company shall not use herbicides within approximately 20 feet of elderberry, except for cut stump treatment of removed trees and to help ensure compliance with California Public Resources Code Section 4292 (i.e., subject pole clearing at base of certain power poles or towers), or where herbicide use is otherwise permitted.

(3) Trees in the vicinity of an elderberry plant will be directionally felled away from the plant so as to avoid the 20-foot zone around the elderberry plant, where possible. If there is potential to inadvertently fell a tree into the 20-foot zone, the tree will be removed in sections. When a fallen tree is lopped and scattered, resulting material will not be placed within the 20-foot zone around the elderberry plant.

(4) When trimming non-elderberry plants or trees in the vicinity of an elderberry plant, only trim shrubs or trees when necessary to comply with state law. Ensure that trimmed materials do not fall into the elderberry plant and that, to the extent practicable, no other disturbance occurs to the elderberry plant.

(5) If the ground is disturbed during a vegetation management activity, appropriate erosion control measures will be implemented to prevent movement of soil or other material into the 20-foot zone around elderberry plants.

(6) Vehicles required to perform vegetation management activities will avoid the 20-foot zone around an elderberry plant to the extent practicable.

(7) Trimming, rather than removal of elderberry plants, will be preferentially used where feasible and except where otherwise authorized by the FWS consistent with the biological opinion.

b. Routine Gas and Electric Transmission/Distribution Facility Operation and Maintenance (Non-vegetation Management)

Routine gas and electric transmission/distribution facility maintenance activities include a variety of actions required to keep these existing facilities in operation. Potential impacts to VELB or its habitat are most likely to occur when traveling access roads and when large equipment must reach individual tower/pole, valve sites, or testing locations. Road maintenance is generally performed only when a particular problem occurs on a road. Such intermittent maintenance will only have the potential to affect VELB and elderberry plants in circumstances when the plant grows on or adjacent to a road. No impact to VELB or its habitat would be expected from work activities when plants are greater than 20 feet from a gas or electric facility or access route.

(1) When Pacific Gas and Electric Company is undertaking routine maintenance activities in an area of potential VELB habitat, the qualified individual (Company employee or contractor) will survey for the presence of elderberry plants within a minimum of 20 feet from the work site (defined as the area of actual work and potential ground disturbance including access and material and equipment staging and lay down area). The qualified individual will "flag" at least twenty feet from the drip line of each elderberry plant with standard construction tape, or other appropriate means, prior to commencing maintenance activities.

(2) When elderberry occurs within the work area or within 20 feet of the work area, the qualified individual will brief field workers on the location of the plant(s) and will review the avoidance, protection and minimization measures set forth herein. Pacific Gas and Electric Company qualified individuals will be responsible for insuring that maintenance personnel minimize any ground disturbance within 20 feet of elderberry.

(3) If ground-disturbing activities are planned, the qualified individual will incorporate erosion control measures into the work plan to prevent movement of soil or other materials into the 20-foot zone around each elderberry plant. The work plan will also consider maintaining the site's hydrological condition so as not to increase or decrease the flow of water to an elderberry plant.

(4) The qualified individual will survey all project access roads prior to performing routine road maintenance or road grading associated with a routine transmission/distribution facility

maintenance activity. The qualified individual will "flag" at least twenty feet from the drip line of each elderberry plant with pin flagging, or other appropriate means, prior to commencing maintenance activities. In certain situations, elderberry plants are located on or immediately adjacent to project access roads. If at all possible, road maintenance activities will avoid removing the elderberry plant. In addition, the qualified individual will develop a work plan to prevent movement of soil within the 20-foot zone of an elderberry plant.

(5) Any vehicles that travel near elderberry plants will avoid the 20-foot zone around the elderberry plants unless the plants are immediately on or adjacent to an existing project access road.

c. Emergency Activities.

If PG&E must undertake emergency activities in areas of potential VELB habitat, PG&E will not remove or otherwise disturb any elderberry plant or any vegetation within twenty feet of the drip line of elderberry unless required to do so to restore utility service or to meet public safety or fire prevention regulations. Following restoration of utility service Pacific Gas and Electric Company will inspect the emergency work site area for damage to elderberry and restore the disturbed surface area to natural conditions as much as practical.

4. Reporting and Monitoring Plan

The Company will identify VELB habitat locations during routine operation and maintenance of its facilities (where VELB could be affected) and will continue to develop and maintain, a database of this information. The Company will track impacts (pruning, removal, or other acute disturbances) to individual elderberry plants on an annual basis. The Company will provide the FWS with a biennial monitoring report, for the first six years of the program (three reports), and every five years thereafter. This monitoring report will summarize VELB habitat locations associated with annual impacts to elderberry. The monitoring report will also describe the results of a more detailed representative survey of a limited and mutually agreed upon percentage of VELB habitat impacted by PG&E routine operation and maintenance activities. The detailed survey will be conducted by a qualified biologist on an appropriate limited sampling of VELB habitat impacted during the preceding year. The sampling will be conducted across a representative range of potential VELB habitat impacted by routine Company operation and maintenance activities. The detailed survey described in the monitoring report will collect information on global position, habitat type, evidence of historic beetle

occupancy, impact type and date, and the general condition of the plant. Maps of survey locations, cumulative effect tallies, and analyses of effects, beetle sign, and habitat types will be provided in the report. Any occurrence of dead or injured beetles or larvae will also be described in the report. The monitoring report will also include information on the progress of the Company's VELB Conservation Program toward the acquisition, development, and/or protection of VELB habitat or the status of areas already acquired.

Monitoring of project effects and implementation of conservation measures will provide a foundation for adaptive management and allow for modification of the plan based upon the mutual agreement of the Company and the FWS. Any adaptive management evaluation will take into consideration the level of conservation provided by the program, which may exceed, by a significant margin, the potential effects associated with the activities covered.

5. Transmission System Corridor Management

PG&E manages its utility corridors for public safety and reliable electric and gas service by converting right-of-way plant communities from predominately tall-growing plant species to communities dominated by low-growing plant species. PG&E utilizes an integrated vegetation management program on its ROWs and employs best management practices (Appendix C) that are designed to protect wildlife, groundwater, surface water, soils and the general public, all within the limits of state law requirements and landowner restrictions. In addition, PG&E promotes the Wire Zone/Border Zone approach to vegetation management along electric transmission ROWs (Appendix C). The Wire Zone/Border Zone concept is an industry standard that has developed as a result of long-term ongoing research into the effects of ROW vegetation management on wildlife (including deer, small mammals, songbirds, amphibians, reptiles, and butterflies). The benefits of the Wire Zone/Border Zone strategy include creation of diverse habitat types: the Wire Zone consists of low-growing shrub-forb-grass plant communities (early successional); the Border Zone consists of taller shrubs and brush plant communities (transition zone).

As part of the overall VELB conservation commitment, PG&E will continue to promote wildlife/habitat diversity through implementation of the aforementioned BMP's and the Wire Zone/Border Zone concept. It is understood that these activities may attract threatened and endangered species and that PG&E may apply for safe harbor protection or other appropriate assurances under the ESA. PG&E's utility electric transmission corridor management strategy will

continue to maintain these beneficial natural conditions under its electric transmission lines within the limits of state law requirements and landowner restrictions.

CONCLUSION AND DETERMINATION

The VELB Conservation Program is designed to protect existing VELB habitat (insofar as it does not conflict with regulatory obligations, employee or public health and safety) and over-compensate for future disturbance or loss of VELB habitat through otherwise lawful operation and maintenance activity. The program provides funding for determining placement of several VELB conservation sites, as well as maintaining those areas to the benefit of the VELB. These efforts are intended to invigorate the VELB Recovery Plan (1984). Based on available data regarding beetle occupancy habits and typical elderberry pruning height, few beetles are likely to be killed or injured during routine operation and maintenance activities, including vegetation management activity. Company training and education programs coupled with minimization and avoidance measures will further reduce the likelihood of take (as defined by ESA) of individual beetles during routine operation and maintenance activities throughout the Company's gas and electric system. The project areas and activities under consideration will not affect designated VELB Critical Habitat. These activities will significantly contribute to the protection and recovery of the beetle.

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APPENDIX A

Detailed Activity Descriptions

Description of O&M Activities for the Natural Gas System

G1. Patrols

1) **Aerial Patrol**. Aerial patrol of certain pipelines and associated facilities are conducted on a weekly basis using fixed-wing aircraft or helicopters.
2) **Ground Patrol**. The CPUC General Order 112-E requires periodic ground patrols of the gas transmission lines. Ground patrols of the pipelines and associated facilities are conducted on an annual basis using a light truck on existing access and pipeline patrol roads. The purpose of the patrols is to observe surface conditions on, and adjacent to, the transmission line ROW for indications of leaks, construction activity, and other factors affecting safety and operation. Ground patrols include reading gas meters.
3) **Leak Detection Patrol**. Leak detection patrol is conducted by foot or small off-road vehicles ("quads") at least once per year in suburban/urban areas and once every fifth year in rural areas. Rural areas are also patrolled every year by helicopter, except in the fifth year (when a foot patrol is conducted). The Company uses either a portable hydrogen-flame ionization gas detector or a laser-methane detector to sample air above the gas line.

G2. Inspections

The following facilities are inspected by air, on foot, or in a vehicle by existing access roads:

1) **Valves**. The valve sites along the pipelines are inspected and operated three to four times per year. Access is by light truck on existing access and pipeline patrol roads. Valves are lubricated as necessary using a gun pump to administer either motor oil or grease, such as 1033.
2) **Telecommunication Sites**. Routine inspections of telecommunication sites are conducted every month unless problems are identified at specific sites. Access is by light truck on existing access and pipeline patrol roads or by helicopter.
3) **Anode Beds**. Cathodic protection is inspected every two months by checking the electrical current at various test locations along the line and at anode bed sites. Access is by light truck on existing access and pipeline patrol roads.

4) **Pressure Limiting Stations (PLS)**. Routine inspections of existing pressure limiting stations are conducted every two months. Access is by light truck on existing access and pipeline patrol roads.

G3. Remedial Maintenance

Remedial maintenance corrects weather erosion, vandalism, and line coating problems. Vandalism can occur to any structures located above ground; these impacts usually result in visual (spray paint) rather than structural impacts. Maintenance materials may include riprap, soil matting, concrete, and concrete pillow systems as site-specific solutions to erosion problems. In the rare event of insufficient depth of cover, concrete can be used as a cap cover. During these procedures, the pipeline remains in operation.

G4. Compressor Station Maintenance

Typical maintenance tasks include overhauling compressors and engines, retrofitting emission systems, maintaining or reconstructing the cooling water tower, repairing and replacing piping, painting the station, and drilling or cleaning water well(s). In addition, operational and air quality standards may require modifications of, or upgrades to, the station equipment. Such improvements will continue in order to meet the standards.

G5. Pipeline Electric Test System Installation

Electric Test Systems (ETSs) are installed 1–5 miles apart on pipelines to determine pipe corrosion, measure conductivity, and to locate the pipe during excavation. This methodology avoids the need to systematically expose the pipe and physically examine the pipe for signs of corrosion. The ETS consists of two leads (wires) attached to the pipe with a liquid weld material; they are exposed at the surface inside a 4-foot-tall, 4-inch-diameter plastic tube. Installation includes exposing a 3–5 foot-long section of pipe, attaching the leads with non-hazardous liquid weld, and recovering the pipe. Surface disturbance typically includes about 100 square feet. ETS sites are located next to existing access roads. During this activity, the pipeline remains in operation.

G6. Pipeline Valve Recoating

Pipeline valve recoating involves excavating around and under an existing valve and recoating it with epoxy to prevent corrosion of the valve assembly. A 50-foot-wide, terraced hole is dug around the existing valve, and the coating is removed by hand or is sand blasted. The size of the hole may

vary to meet Cal-OSHA requirements. Clearing the site and excavating generally disturbs about 5,000 square feet of surface, although the area disturbed would depend on the length of pipeline needing repair. A small lay-down area (about 50 x 50 feet) next to the valve site is required. The pipeline is not disturbed or opened, and remains operational during the recoating activity. Most valve sites are accessible by existing access roads.

G7. Pipeline Valve Replacement

Mainline valves, which regulate the flow of gas through the pipeline, occasionally malfunction or wear out, causing leaks. The faulty valves are replaced for operational and public safety reasons. Mainline valves generally are 10–20 miles apart. Prior to valve replacement, a portion of the gas line must be "blown down" (gas is evacuated from the affected section of pipe at a control point, without affecting the environment). Valve replacement involves excavating approximately 75 feet of the pipe on either side of the valve, with a working strip approximately 100–150 feet wide. A laydown area (generally 50 x 50 feet) may be required and, if so, the surface area may be cleared. Once the valve is replaced, the pipeline must be hydrostatically tested; water is pumped into the pipe and sustained at a pressure certain to ensure the integrity of the pipeline and the valve. This activity can occur anytime depending on weather and on operational restrictions related to the need to shut down the line temporarily.

G8. Pipeline Cathodic Protection

As a pipeline's coating degrades over time, it requires increased *cathodic protection* to prevent corrosion. Increased cathodic protection current speeds the consumption of *anode* beds and decreases their effectiveness. Consequently, anode beds need to be replaced periodically, and additional anode beds may be needed. There is some flexibility as to where the anode beds can be located. It is more common for pipe coatings to degrade faster in areas of high moisture content (resulting from precipitation or irrigation) than in dryer areas. Anode beds are usually located approximately every 10 to 20 miles along the pipeline and must be constructed approximately 1,000 feet away from the pipeline to adequately distribute the current. During this activity the pipeline continues to operate. Installing anode beds involves drilling deep ground wells (to more than 300 feet deep) and installing zinc or magnesium bars, platinum anode rods, or ground mats. Once an anode bed is installed, it is connected to the pipeline by an underground cable. This installation method is used where pipelines are exposed to large amounts of induced AC current (typically from adjacent high-voltage electric transmission lines), or where the soil conditions dictate.

Clearing the site and erecting additional poles to carry power from the existing distribution line to the anode bed causes surface disturbance. An approximately 30-foot-wide construction strip and an approximately 15-foot-wide permanent ROW are needed to place the underground cable from the anode bed to the pipeline. The preferred means is to provide electricity to the underground cable rather than using solar power. An approximately 50- x 75-foot fenced area is constructed to house a solar battery/electrical source for use where electric utility power is unavailable.

G9. Pipeline Lowering

In agricultural areas, areas of intense land use, and also in areas where spans (pipe structures exposed) may occur, gas pipelines may need to be lowered to increase the depth below surface and thereby improve public safety. Lowering involves trenching parallel to the existing pipeline to a lower depth. The trench extends approximately 300–500 feet beyond both ends of the section of pipeline to be lowered. Gas pressure is reduced to the lowest possible operating pressure, for safety, and the pipeline is briefly taken out of service (*line clearance*). The existing pipeline is cut and moved to the lower trench section. Prefabricated bends are used to connect the lowered section of the pipe to the remaining pipeline. The pipe may also be rewrapped. The activity requires an approximately 100- to 150-foot-wide construction strip. This activity can occur at any time of the year, depending on operational restrictions relating to the need to shut down the pipeline temporarily.

G10. Pipeline Coating Replacement

Natural gas pipelines are coated to protect them from degradation and external corrosion. When a pipeline's coating has deteriorated to the point it needs to be replaced, the pipe is rewrapped with epoxy. To determine whether the coating has maintained its integrity, the voltage to ground is measured along the pipeline. Pipeline coating needs to be replaced about every 30 to 40 years, depending on the site-specific soil conditions. To avoid bending or affecting the integrity of the pipe, the pipeline must be excavated in sections and supported at intervals of (typically) 40 feet. The old coating is removed by jetting, scraping, and/or sand blasting. The surface is then prepared for the new wrap by running a self-contained grit- or shot-blasting machine over the pipe. The coating is then applied using a coating machine. During this activity, the pipeline continues to operate. An approximately 100-foot-wide working strip is needed.

G11. Pipeline Replacement

Public safety sometimes necessitates replacing sections of pipe. Development alongside the pipeline can result in a change in class location (maintenance classes, refer to glossary) or the pipe ages, corrodes, or is damaged by people or acts of nature. In the case of class location changes, the line must be moved or replaced with thicker-walled pipe to comply with the CPUC-mandated safety factor. The Company uses standard pipeline construction techniques. As the old pipeline is removed from service for the tie-in to the new line, it is blown down. Any gas condensate is captured and removed from the old pipeline and disposed of in compliance with current regulatory standards. The existing pipeline is either abandoned in place by filling it with an inert gas and capping it, or it is removed after the new/replacement section of pipe is operational. The length of pipe affected varies depending on why it is being replaced. The minimum section of pipe replaced is typically 40 feet long (one joint of pipe). Once installed, the pipeline is hydrostatically tested and backfilled. This activity can occur at any time of the year, depending on operational restrictions relating to the need to shut down the pipeline temporarily.

G12. Pipeline Telecommunication Site Maintenance

A Supervisory Control and Data Acquisition (SCADA) system monitors pipeline functions. This remote monitoring system transmits pipeline operational information about the system to the Company's operations offices. Periodic vehicle or helicopter access is required to check the telecommunication facilities, replace batteries, conduct minor maintenance, or make adjustments to the facilities or components. In the event of major storm damage, reconstruction of the facility or a component replacement is required as soon as weather permits. Access roads may need periodic blading to keep them passable for four-wheel-drive trucks. A staging area may be required for storm damage repairs. Generally the staging area is located either next to the site or at a distant location (for helicopter transport of workers and materials). During these maintenance activities, the pipelines continue to operate.

G13. Vegetation Management

The Company manages the pipeline ROWs' vegetation to prevent damage to the natural gas system, facilitate inspections, and comply with regulations. The vegetation management program is designed to: eliminate weeds, brush, and trees around equipment and facilities for fire hazard reduction, security, safety, and maintenance access (the Company prefers that tree canopies obscuring the ROW be removed to facilitate aerial inspection of the ROW). Vegetation

management is usually accomplished by manually removing large-diameter woody vegetation, then mechanically removing other vegetation (with a brush hog, hydro-axe, or brush rake), usually to achieve a maximum height of 1 foot or less when permitted. Herbicides used include selective and nonselective, inorganic and organic, contact or systemic, and pre-emergent and post-emergent types. All herbicide use is subject to landowner approval and is applied by a qualified applicator (licensed by the California Department of Food and Agriculture).

G14. Access Road Maintenance

Periodic road maintenance is necessary to ensure safe and reliable access to Company facilities. Such maintenance typically involves blading of an existing dirt/gravel road that has been eroded by weather.

Description of O&M Activities for the Electrical System

E1. Patrols

1) **Aerial Patrol**. The Company conducts aerial patrols of certain transmission lines, distribution lines, and associated facilities on both a scheduled and as-needed basis (emergency patrols), using helicopters.
2) **Ground Patrol**. Company personnel conduct ground patrols of the transmission lines and associated facilities on a quarterly to 18-month cycle, using either a light truck or ATV (quad) on existing access and ROW patrol roads. Electric distribution lines typically are patrolled for electric maintenance issues (not including vegetation issues) every 3 years. Vegetation management personnel conduct annual patrols of all transmission and distribution lines using vehicles and ground patrols. Hydro-generation personnel conduct regular inspections of water storage/conveyance and related communications structures.

E2. Inspections

The following inspections are conducted on foot or in a vehicle by existing access roads:

1) **Tower, Pole, and Equipment Inspection**. Tower footings and poles are routinely inspected to verify stability, structural integrity, and equipment condition (fuses, breakers, relays, cutouts, switches, transformers, etc).
2) **Outage Inspection**. When outages, and CPUC Reportable Incidents, occur because of weather, accidents, equipment failure, or other reasons, the Company inspects lines to determine the location and probable cause of the outage.
3) **Substation Inspection**. All 648 of the substations (within potential VELB range) are inspected monthly.

E3. Electric Insulator Washing

Insulators periodically are washed to prevent faults caused by the accumulation of conductive debris, such as airborne particles or bird contamination, on ceramic insulators. Insulators are washed using a truck- or trailer-mounted spray system or by helicopter. Distilled water, typically from local sources, is used to wash the insulators. Dry washing, using ground corn hulls, also is used. Dry wash and wet washing are typically done during energized conditions and all activities involving water use and disposal are conducted in compliance with current regulatory requirements.

E4. Electric Substation Maintenance

Most of the Company's substations are located near load centers, such as residential, commercial, and industrial areas. Typical maintenance tasks at these substations include transformer, switch, fuse, cutout, meter, and insulator repair and replacement.

E5. Electric System Outage Repair

Outage repair activities take place when a fault occurs, typically caused by weather, equipment failure, accidents, or fire. When an outage is reported, the line is patrolled until the cause of the outage is determined. Depending on the cause of the outage, repair may entail anything from reclosing a switch to replacing a transformer or pole.

E6. Electric System Tower Replacement or Repair

Tower replacement or repair typically involves raising towers or strengthening the foundations or superstructure of towers. Superstructures are typically strengthened by replacement, modification, or addition of pieces of steel lattice, as determined by engineering analysis specific to each tower.

E7. Facility Installations (Shoo-Fly)

Poles/towers and equipment (anchors, cross arms, insulators, wires, cables, guys, switches, etc.) need to be replaced or repaired when they fail or become unsafe. Installation of a support system (shoo-fly) could be required for new additions to existing transmission line facilities or tap lines from the old facilities. Typical "shoo-fly" installations add temporary poles or structures around existing permanent facilities to limit service interruptions until permanent repairs can be made.

E8. Electric System Pole and Equipment Replacement and Repair

Poles and equipment (cross arms, insulators, pins, transformers, wires, cables, guys, anchors, switches, fuses, etc.) need to be replaced or repaired when they fail or become unsafe. When pole replacement is warranted, the new pole is constructed adjacent to the existing pole to minimize ground disturbance. A hole is augured with a line truck, and the new pole is framed (cross arms, pins, insulators, grounds, bonding, markers, and any equipment are installed) before setting it. The pole is set, the conductors moved to the new pole, and the old pole is removed.

E9. Electric Line Reconductoring

New conductors, or wires, are installed by temporarily splicing them to the ends of the existing conductors and pulling them through travelers (pulleys) attached to the arms of the towers or pole cross arms. Travelers are installed at each tower or pole using a boom truck. Where a boom truck cannot be used, a winch is used to install the travelers. In some limited cases, the conductors are installed by helicopter.

E10. Vegetation Management

The Company manages vegetation in its electric transmission and distribution ROWs in accordance with California Public Resource Code (4292 and 4293) and California Public Utility Code (General Order 95, Rule 35). Vegetation management activity is also conducted to:

1) Reduce fire-fuel loading under transmission lines, in compliance with Independent System Operator (ISO) Maintenance Practices;

2) Provide access to tower/pole structures for patrols and maintenance activity;
3) Facilitate inspections - footings at the bases of towers need to be visually inspected for stability;
4) Maintain safe employee access to, and structural integrity of, water conveyance/storage and related facilities (e.g., buildings, communications structures, etc.) associated with hydroelectric generation projects.

E11 Wood Pole Test and Treat

All wood poles 10 years or older are evaluated to determine if they are suitable candidates for replacement, trussing, stubbing, or fiber wrapping. Transmission line segments are identified for testing based on age and priority of line.

E12. Access Road Maintenance

Periodic road maintenance is necessary to ensure safe and reliable access to the Company's gas, electric, or hydroelectric facilities. Such maintenance typically involves blading of an existing dirt/gravel road that has been eroded by weather and/or cleaning culverts to preserve the integrity of existing access roads.

APPENDIX B

Maps - Linear Facilities Within Potential Range of the VELB

- Gas Transmission Lines
- Electric Transmission Lines
- Electric Distribution Lines

APPENDIX C

Transmission System Corridor Maintenance (Vegetation Management)

- Wire Zone/Border Zone Concept (ROW Vegetation Management)
- Best Management Practices for Vegetation Management on Electric Transmission Right-of-Ways

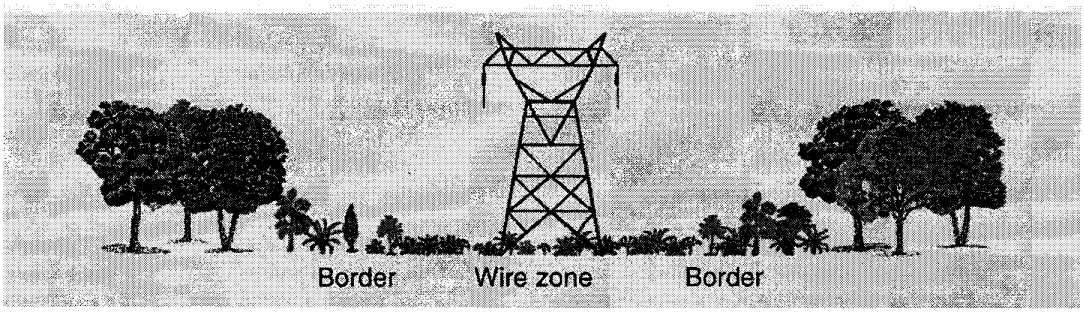
PG&E
Right-of-Way Vegetation Management

The Goal is Resource Management

- Prevent Vegetation caused fires
  - Protects resources both inside and outside the ROW
- Protect transmission system in the event of a fire – system reliability
- Allow access for inspection and maintenance activities

Strategy

1. Wire Zone/Border Zone Concept
   a. Developed as a result of long term (since 1953) ongoing research into the effects of ROW vegetation management on wildlife (including deer, small mammals, songbirds, amphibians, reptiles and butterflies)
2. Benefits
   a. Creates diverse habitat types
      i. Wire Zone – consists of low-growing shrub-forb-grass plant community (early successional)
      ii. Border Zone – consists of taller shrubs, and brush plant community (transition zone)
   b. Creates a plant community that is resistant to tree invasion
   c. ROW can be managed for specific plants and varying goals – i.e. Habitat for Threatened, Endangered and Sensitive species such as Valley Elderberry Longhorn Beetle or Lotus Blue Butterfly can be created and maintained
   d. Partnerships can be created with agencies, and organizations such as Quail Unlimited, National Wild Turkey Federation, Butterfly Lovers International, CA Fish & Game, and California State Parks



BEST MANAGEMENT PRACTICES
For Vegetation Management on
Electric Transmission Right-of-Ways

Best Management Practices (BMPs) have been prepared to minimize the overall risk to people and the environment while providing for safe and reliable electric transmission operations. They are included as part of these guidelines to assist in the planning and implementation of successful vegetation management.

The purpose is to provide principles for current and future vegetation managers that will minimize overall risk to people and the environment while providing safe and reliable service. The approach is designed to protect wildlife, groundwater, surface water, soils, utility customers, utility workers and the general public.

These Best Management Practices should be applied to all vegetation management activities including manual, mechanical, cultural, and biological techniques as well as herbicide applications. Where the BMPs focus on herbicide applications they are intended to supplement and not replace the herbicide labels.

1. The following factors should be considered in the planning of any vegetation management activity:
    - Target species
    - TE&S species
    - Height and density of brush
    - Land use: within and adjacent to the right-of-way
    - Legal restrictions
    - Legal requirements
    - Natural and man-made restrictions
    - Safety
        - Worker Safety
            - Potential for physical injury from chain saws
            - Exposure to poison oak
            - Exposure to poisonous snakes
            - Required Safety Equipment
            - Exposure to chemicals (petroleum, herbicides)
            - Tripping Hazards
        - Public Safety
            - Exposure to poison oak
            - Exposure to poisonous snakes
            - Tripping Hazards
            - Exposure to chemicals (petroleum, herbicides)
            - Potential for facility failure
        - Fire Safety
            - PRC 4435 and 4431, Federal Regulations
    - Environmental Quality
        - Water Quality
        - Wildlife Species and/or Habitat
        - Soil Compaction
        - Soil Erosion

    - Fire Potential
- Cultural Resources
    - Potential for disturbing recorded sites
- Facility Safety
- Cost Effectiveness

2. All herbicide applications will be made in compliance of all label requirements as well as all appropriate federal, state and local laws.
3. Only Federal and California EPA registered herbicides will be applied.
4. Operator ID numbers and Site ID numbers will be obtained for each facility as required by the County Agricultural Commissioner.
5. Licensed Pest Control Advisors will write "Pest Control Recommendations" for each application.
6. All herbicide applications will be supervised by a Licensed Pest Control Advisor.
7. All fire regulations relating to manual, mechanical, or burning activities will be strictly adhered to.
8. County Agricultural Commissioners will be invited to make inspections of applications as appropriate.
9. The amount of each herbicide used will be reported monthly to the County Agricultural Commissioner by the Pest Control Business License holder.
10. PG&E will conduct annual worker safety training sessions for all employees involved in the herbicide applications and manual/mechanical clearing.
11. Contractor will conduct annual worker safety training sessions for all employees involved in the herbicide applications and manual/mechanical clearing.
12. Selective application techniques should be used wherever practical so that desirable vegetation is not adversely affected.
13. Backpack equipment or hand guns will be used for all directed foliar applications.
14. Herbicide containers will be reused, recycled or otherwise disposed of in a proper manner.
15. Minimum operating pressures will be used. Coarse nozzle tips should be used to minimize drift.
16. Pesticides will not be transported in the same compartment with persons, food or feed. Pesticide containers will be secured to the vehicle during transportation in a manner that will prevent spillage into or off the vehicle.
17. The contractor will have a written training program for employees who handle pesticides. The written program must describe the materials and the information that will be provided and used to train the employees.
18. Training must be completed before an employee is allowed to handle any pesticide and be continually updated to cover any new pesticides that will be handled. Training must be repeated at least annually thereafter.
19. These special precautions will be observed during periods of inclement weather:
    - Applications will not be made in, immediately prior to, or immediately following rain when runoff could be expected.
    - Applications will not be made when wind and/or fog conditions have the potential to cause drift.
    - Basal bark applications will not be made when stems are wet with rain, snow or ice.

Appendix E

Migratory Bird Protection Program

Appendix E

Bird Protection Program

Introduction

Bird interaction with electric powerlines has been a concern for PG&E and other electric utilities for many years. These interactions often affect system reliability and elicit attention of customers, the general public, and regulatory agencies that enforce regulations protecting migratory birds and listed bird species. The large size and nature of PG&E's electric distribution and transmission system create opportunity for such interactions. In 1993, PG&E received a notice of violation (NOV) for electrocution of several raptors protected by the Migratory Bird Treaty Act (MBTA). Continued scrutiny of company operations by the US Fish and Wildlife Service led to negotiations and a subsequent settlement aimed at reducing raptor electrocutions throughout the system. As a part of this settlement, PG&E formalized the Migratory Bird Protection Program in 2002. This program has several goals, which are listed below and explained in detail in subsequent sections:

1. Comply with state and federal bird protection laws
2. Decrease risk of electrocution to raptors and other birds through corrective and preventative actions, while increasing system reliability
3. Collect and maintain data associated with bird electrocution incidents for the purposes of identifying high-risk poles and equipment and their geographical distribution
4. Provide information and guidance on bird-related issues throughout the company (e.g., facility-nest issues)

1.0 State and Federal Law

Federal laws protecting birds include the MBTA (16 U.S.C. 703-712), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668C), and the Endangered Species Act (16 U.S.C. 1531-1543). California Fish and Game Code (Sections 355-357, 3503, 3503.5, and 3513) and the California Endangered Species Act (Fish and Game Code 2050 et seq.) protect birds at the state level. Violation of any of these laws can result in mandated remedial obligations, fines and/or imprisonment.

2.0 Corrective And Preventative Action

In some locations, bird-caused power outages account for as much as 20% of unplanned outages. Birds involved in these outages are frequently electrocuted while using poles and equipment for perches or nest foundations. The Bird Protection Program has established procedures for installation of bird-safe materials and implementation of other bird safe measures (these procedures are collectively referred to bird-safe retrofits). Bird-safe retrofits can generally be categorized as **reactive** (i.e., corrective action in response to bird electrocutions) or **proactive** (i.e., preventative action in advance of bird electrocutions). The Company utilizes standards developed by the Avian Powerline Interaction Committee (ALPIC, Suggested Practices 1996) in retrofitting poles. Bird-safe retrofits can include any combination of the following modifications, depending on current pole and equipment configurations:

- Insulation and/or relocation of exposed jumper wires
- Installation of bushing covers
- Interruption of ground links (floating grounds)
- Increasing phase separation
- Installation of perch deterrents and conductor covers
- Reconductoring with insulated conductor
- Installation of bird flight diverters

PG&E maintains a catalogue of bird protection devices, material, and equipment that are approved for use in company operations, maintenance, and construction. Durability and effectiveness of these items are continually monitored.

Reactive retrofits are made to all poles/equipment involving an electrocuted raptor. A raptor electrocution also triggers a risk assessment of five adjacent poles in all directions away from the incident pole. Adjacent pole evaluation combines bird use, pole type and habitat in the vicinity of the Incident pole. Equipment poles (poles with transformers, cutouts, risers, reclosers, and/or sectionalizers) and line and buck poles present a greater risk of bird/raptor electrocution than ‘straight-line’ or ‘tangent’ poles, (poles that support no equipment) and require bird-safe retrofit, particularly in areas where natural or agricultural habitat is present. In most instances, equipment and line & buck poles can be made bird-safe by covering all jumper wires and bushings. Cover-ups are one of the most effective ways to achieve these goals and emphasis is placed on prescribing these relatively inexpensive, yet effective add-on devices. When a non-raptor is electrocuted, only the incident pole is evaluated. Corrections are made if work is required above the secondary level and the pole is located in a raptor concentration zone (described below).

Proactive retrofits are made in accordance with the 2002 settlement agreement. The Bird Protection Program identifies 2,000 poles per year to be made bird-safe. Currently, poles prioritized for retrofits are equipment and line/buck poles, as described previously. These poles are units of high-risk circuits (or sometimes several circuits within a small geographical range) identified by possessing one or more of the following risk identification factors:

- Relatively high concentrations of bird-caused outage records (since 1998)
- Multiple electrocution incident reports (since May 2002)
- Proximity to wildlife refuges

In an effort to create and validate an objective process for identification of risk factors for bird/raptor electrocutions, PG&E is participating in a California Energy Commission (CEC) joint research effort, with Southern California Edison. This research project is evaluating a 'scorecard' approach to assessing multiple raptor electrocution factors, including circuit design and equipment, as well as a broad range of habitat and land use factors.

To facilitate appropriate installation of bird-safe equipment on new facilities and reconstruction of existing facilities, a raptor concentration zone (RCZ) was developed for PG&E's service territory, with the assistance of consulting bird ecologists. The RCZ, which incorporates a large percentage of the service area, is maintained as a map overlay. Bird-safe solutions are applied within the boundaries of the RCZ, which is being refined and updated as new information is obtained.

3.0 Bird Incident Data Collection

Data associated with bird electrocution incidents are collected for the purposes of identifying high-risk poles and equipment and their geographical distribution. Each time an employee finds a dead bird in immediate proximity to a company electric facility, a Bird Incident Reporting Form is filed with the Bird Protection Program. The form documents the time and location of the incident, as well as the type of bird and electric equipment involved. This information is used to track (bird-safe) work performed and select candidate locations for the proactive retrofit program. Pole and equipment information is also collected and compiled to develop a predictive model for identification of specific equipment features of high-risk poles.

4.0 Other Bird-Related Issues

Formal establishment of the company's Bird Protection Program has facilitated an increasing awareness of regulations protecting birds within the electric transmission and distribution organization. Beyond bird and raptor electrocution issues, this increased awareness has brought attention to other utility-bird

interactions. The purview of the Bird Protection Program has been expanding to include increasing involvement in such issues as:

5. Hazard nest removal from poles, towers, and substations
6. Development of guidelines to protect birds (nests) during vegetation management activity and other routine or project work
7. Bird-flight diverter effectiveness

4.1 Federal Nest Manipulation Permit and Guidelines

Poles and towers provide nesting opportunities for raptors and non-raptor species. Frequently, these nests create an operating hazard for electrical equipment and have caused equipment failure, fire, and property damage. Cavity nesting species, such as acorn woodpeckers, cause enough damage to wooden poles to jeopardize their structural integrity. Although, nests may be used year after year and are often rebuilt once removed, PG&E must remove or relocate nests that present safety and operational hazards to human life, equipment, and property.

A nest can be defined as a hazard if the answer to one or more of the following questions is 'yes':

1. Does the nest in its current location pose a threat for an electrical outage now or in the future?
2. Will the nest likely result in problems with operating switches or controls?
3. Will excrement from nesting birds likely result in excess contamination to facilities that could lead to an electrical outage?
4. Will the birds that return to the nest pose a threat or impediment to required maintenance activity or other projects that are planned to occur during nesting season?

Although state and federal laws incorporate protection for occupied and unoccupied bird nests, nest conflicts are addressed through a Federal Fish and Wildlife Permit (Special Permit No. MB057942-0), granted to PG&E by the Migratory Bird Permit Office (Portland, OR) on 5 June 2002. This permit, conditioned on strict observance of all applicable state, local, and federal law, covers PG&E property statewide for the following nest manipulation activity:

- Authorized emergency removal of nests from electric transmission & distribution systems to prevent electrocution of birds and associated power outages (excludes eagles and endangered species). Notification to permit office is required in writing within 72 hours of such activity.
- Removal and/or relocation of active nests that could be affected by construction, reconstruction, modification or maintenance of PG&E facilities only with prior written permission from USFWS permit office on a case-by-

case basis. Nest manipulations required by state/federal regulatory agency under conditions of a project license must be conducted in this same manner.

- Authorities granted by this permit may not be exercised when prohibited by state laws, or without corresponding California Dept. of Fish and Game permit(s).

The federal special permit also provides the following permissions and guidance for the handling of dead migratory birds:

- In remote areas, leave the bird carcass at the site
- In semi-remote or rural areas, bury the carcass at the site to discourage vandals from taking parts of the bird(s).
- In urban areas, take the bird carcass to a remote site and immediately bury it.
- If burial cannot be completed, dispose of the bird carcass in a trash bag at the local PG&E Service Center. Do not throw the bird carcass into the trash without putting it in a trash bag.
- For bald or golden eagles, pick up the bird and attempt to preserve it on ice or in a cooler; contact the PG&E bird protection program manager immediately. Eagles must be submitted to the National Eagle Repository in Colorado.

When dealing with nest problems, the Bird Protection Program provides the following additional guidance:

- Consider temporal and/or spatial avoidance measures to minimize impact to an active nest (e.g., work during non-nesting season, establish operating boundaries that maintain a buffer between an active nest and work activities)
- For raptor species, consider whether a nest can be contained, removed, and relocated away from electric facilities. If birds have used a nest repeatedly, they will likely attempt to rebuild the nest next spring. This would be a reason to relocate the nest to a nearby structure (i.e., install a nesting platform).
- To minimize disturbance to species that nest in electric facilities, hazard nests should be removed during fall/winter months when they are unoccupied (no viable eggs or young). Note: this point of guidance does not apply to eagle nests or nests of listed species which must be addressed through consultation with state and federal agencies.
- In fall/winter months, for cavity-nesting species, cover cavities in locations where work will be performed during nesting season. This would include, for example, woodpecker nests in poles targeted for replacement or kestrels in hollow brackets on transmission poles.
- Consider installing bird protection after nest removal (e.g., perch guards), if appropriate, to improve reliability and decrease susceptibility to nest hazards.
- Specific questions regarding problem bird nests can be addressed to the Bird Program or the Technical and Ecological Services Terrestrial Biology Unit.

- PG&E is not required to report on or seek authorization to disturb the active nests of English sparrows, Brewers blackbirds, red-winged blackbirds, yellow-headed blackbirds, brown-headed cowbirds, crows, common grackles, and magpies (50 CFR 21.43 and 21.44) or starlings and pigeons as they are not covered by the MBTA.

4.2 Bird Nest Guidelines for Vegetation Management and Other Activity

The guidelines listed above are currently being developed for application to vegetation management activity on electric distribution and transmission facilities for purposes of complying with California Public Utilities Commission General Order 95, Rule 35 and California Public Resource Code 4293. Similar guidelines are prescribed by the Technical and Ecological Services department for special (non-routine) gas and electric maintenance/new construction projects. Text for the brochure to vegetation management staff, including a flowchart, is provided in Attachment E-1.

4.3 Bird Flight Diverters

PG&E is participating in an upcoming study, sponsored by the California Energy Commission, to be conducted at Staten Island in the Sacramento-San Joaquin River Delta. The study will evaluate the effectiveness of bird flight diverters (BFD's) in reducing the risk of Sand hill crane powerline collision. The study is expected to get underway in 2004.

Although PG&E maintains a list of tested and approved bird flight diverters for distribution level powerlines, their effectiveness and durability is being monitored. The necessity for BFD's on PG&E transmission lines has not yet been demonstrated. In addition, transmission line-rated BFD designs have not been extensively tested for effectiveness and durability on PG&E transmission lines. PG&E will continue to monitor advances and successes in flight diverter effectiveness and consider compatibility with the electric transmission and distribution system.

Attachment E-1

Vegetation Management Best Management Practices for Bird Protection

PG&E is committed to complying fully with environmental laws and regulations and to providing safe, economical and reliable products and services in a responsible and environmentally sensitive manner. These Best Management Practices (BMPs) for Bird Protection help fulfill this commitment and must be implemented for non-emergency work where it is safe to do so.

One of the key laws protecting birds is the Migratory Bird Treaty Act (MBTA). The MBTA states that it is unlawful to pursue, hunt, capture, kill, possess for sale, purchase, deliver for shipment, or cause to be exported, any migratory bird including their eggs, nest, and body parts unless allowed by rule or appropriate federal and State permits. The MBTA covers the majority of all native birds found in the U.S. The Endangered Species Act and other federal and State laws provide additional protections for some bird species. Of particular importance to Vegetation Management (VM) is the MBTA prohibition against any activity that may cause nest abandonment or loss of reproductive success. It means that the MBTA can be violated by removing or destroying active nests or eggs from a worksite by pruning or removing trees or shrubs. Any person violating the MBTA may be subject to a fine or imprisonment. Also significant to VM activities is California Fish and Game Code Section 3503 and 3503.5 which protects all bird nests and raptor nests.

To help PG&E stay in compliance with laws protecting birds, **during pre-inspection activities;**

- The presence of a nest of any kind that is in, or adjacent to, the vegetation to be worked should be indicated in the handheld comments section.
- In addition, the Pre-Inspector should inform his or her supervisor, or the Vegetation Program Manager (VPM) or Forester, of active bird-of-prey nests or inactive eagle-sized nests (four feet or more in diameter).
- **If you find a raptor nest:** even if the nest is not active, the Bird Program Manager must be notified prior to performing the work.
- **If you find a nest during VM trimming or removal activities,** follow the flow diagram on the reverse side. In following the flow diagram, keep in mind these definitions.

Active nest: a nest that contains eggs or young birds.

Bird-of-prey: an eagle, hawk, osprey, owl, or falcon.

Destroyed nest: an entire nest (or a significant portion of it) dislodged from its original position in a tree.

Emergency: Imminent risk of a safety hazard, fire, or an outage.

Eagle-sized: 4’ diameter or more.

Also follow these Minimization Measures for working in vegetation with active nests (use only with non-bird-of-prey nests):

- Whenever possible use a lift truck to work the tree.
- Tie in and climb as far away as possible from the nest.
- Where possible, avoid tying to a limb that supports the nest or tying in a way that causes a rope to brush by a nest.
- Where possible, avoid climbing on the limb that supports the nest.
- When performing the trimming work, use the tool that will cause the least disruption to the nest, considering noise volume, vibration and length of time to perform the work.
- When practical, do not chip debris within the canopy drip line of the tree containing the nest.

Injured/Dead Birds

If, in the process of performing VM work, you find a bird that has been killed or injured as a result of interaction with electric facilities, call the VPM office. Based on the information you provide, the office will complete a Bird Incident Protection Program Manager within one business day. Birds are assumed to be dead or injured as a result of contact with electric facilities if they are found within 20 feet of the base of a pole, or under lines, or have evident burn mark.

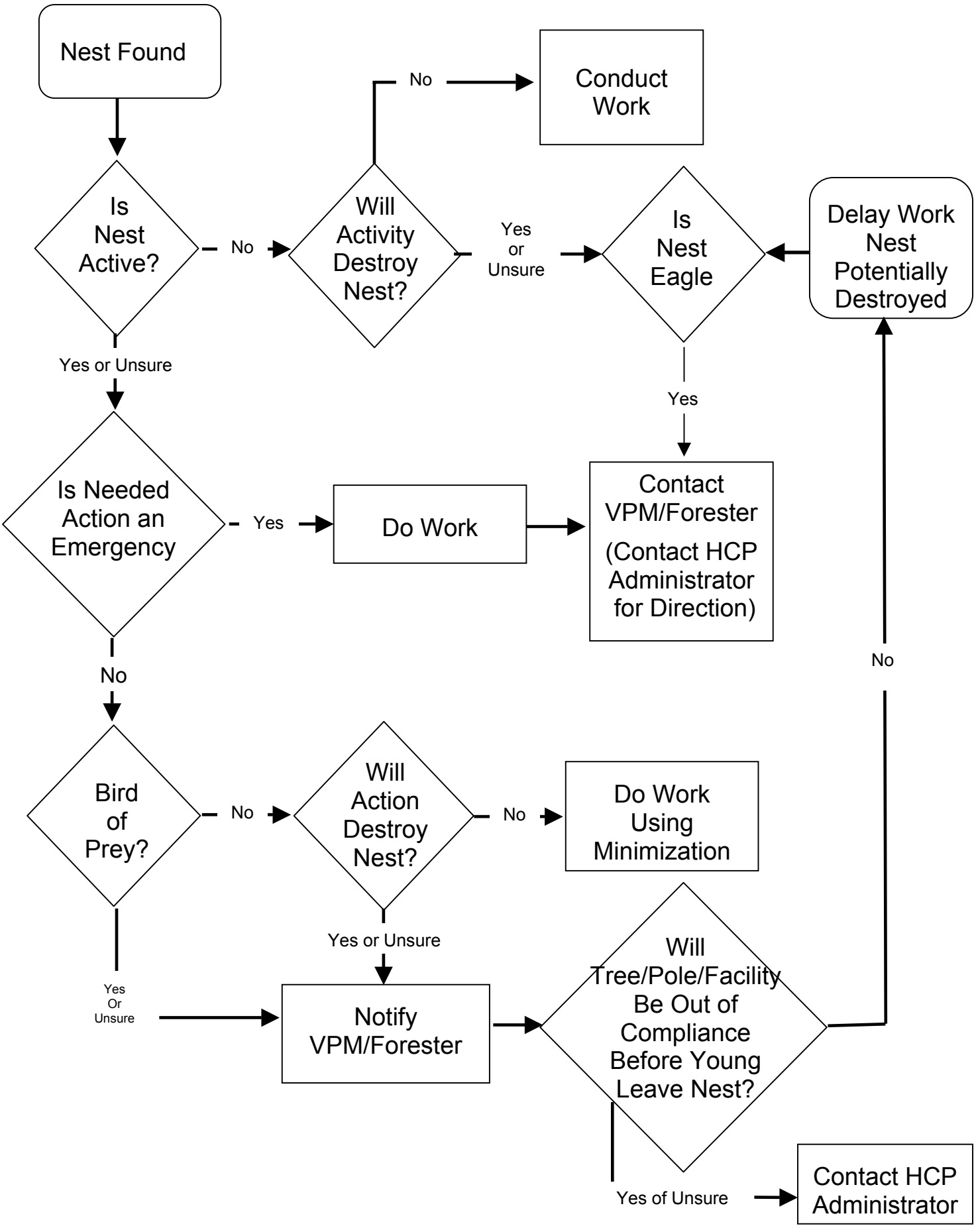
Emergency: An imminent risk of a safety hazard, fire, or outage.

[Graphic]

Consider: Noise, volume, and vibration.

[Graphic]

VM Migratory Bird Nest Process



Appendix F

Analysis of Potential Effects on Covered Plant Species

Introduction

Determining the effects of O&M activities upon covered plant species is complicated by not knowing the location of all populations near PG&E facilities, and by not knowing the exact location of O&M activities over the next thirty years. Habitat losses can be estimated however, on the basis of known habitat attributes of covered species, the distribution of documented populations and PG&E facilities, and the total area to be disturbed.

We used this information to estimate the total acreage of habitat occupied by covered plant species that would be disturbed over the 30 year term of this HCP, and to develop several indicators of the likelihood of affecting particular species. These indicators are the:

- Potential geographic range of a species within the study area;
- Abundance of a species within its potential geographic range;
- Portion of a species' potential geographic range that will be disturbed by PG&E activities; and
- Proximity of documented populations to PG&E facilities.

The development of these indicators and the analyses based on them are described in the following methods section.

Methods

Constructing Models of Potential Geographic Ranges

Potential geographic ranges were based on the counties, elevations and soil map units of sites where a species has been documented and include only areas in natural land cover types. For each species, these habitat attributes are summarized in Table ~~G~~F-1. In constructing potential geographic ranges, the land cover layer (described in Appendix A) was used to identify areas in natural land cover types; the State Soil Geographic Data Base (STATSGO, NRCS 1995) was the source of soils information; and the study area was broken into four elevation zones: <125 m (<410 ft), 125-250 m (410-820 ft), 250-500 m (820-1640 ft) and

>500 m (>1640 ft). Depending on available information and habitat attributes, one of three approaches was used in constructing a species' range. All three of these approaches limited a species' range to natural land cover within the counties and elevations where they have been documented (CNDDB 2002, Hickman 1993). However, approaches differed in their use of soil attributes. The three approaches were:

1) Range restricted to soil map units with habitat attributes;

2) Range restricted to soil map units associated with specific occurrences; and

3) Range not restricted to specific soil map units.

The first approach was taken for species of vernal pool and saline habitats. These species are: *Atriplex minuscula, A. tularensis, Castilleja campestris ssp. succulenta, Chamaesyce hooveri, Cordylanthus mollis ssp. hispidus, Cordylanthus palmatus, Gratiola heterosepala, Legenere limosa, Navarretia myersii, Neostafia colusana, Orcuttia inaequalis, O. pilosa* and *Tuctoria greenei*. These species are strongly associated with specific soil attributes that are consistently included in descriptions of soil series. A senior soil scientist at Jones & Stokes reviewed official descriptions of soil series (NRCS 2001) within the project area to identify those potentially with vernal pools or saline-alkaline conditions. More specifically, for each soil series comprising each STATSGO map unit (NRCS 1995), he reviewed the official series description for information regarding the soil parent material, slope, microtopography, native vegetation, drainage class, surface and subsurface soil horizon textures, electrical conductivity, pH, and other such characteristics that, taken together, would suggest the presence of either vernal pools or saline-alkaline conditions. This information was supplemented by the soil scientist's knowledge of certain of the series.

The second approach was taken for species with specific occurrences within the study area, but without a well-documented association with specific soil attributes. These species are: *Blepharizonia plumosa* ssp. *plumosa, Calyptridium pulchellum, Carpenteria californica, Cirsium crassicaule, Clarkia biloba* ssp. *australis, C. lingulata, C. springvillensis, Eremalche parryi* ssp. *kernensis, Eriophyllum congdonii, Eryngium racemosum, Fritillaria striata, Layia heteroticha, L. leuocpappa, Lepidium jaredii* ssp. *album, Lewisia congdonii, Lilaeopsis masonii, Lupinus citrinus* var. *deflexus, Madia radiata, Malacothamnus hallii, Monolopia congdonii,Opuntia basilaris* var. *treleasei, Pseudobahia bahiifolia, P. peirsonii, Sidalcea keckii* and *Stylocline citroleum*. (Location information for Twisselmannia *californica* was not available from CNDDB.) Each specific occurrence identifies a STATSGO soil map unit on which conditions are suitable for the species. These suitable conditions may include a small or large portion of the landform represented by the STATSGO map unit. Because the soil series providing those conditions was not known, within each county in the species' range, the species' potential range included all categories of STATSGO map units for which at least one polygon contained a specific occurrence.

The third approach was taken for species without a well-documented association with specific soil attributes, and without specific occurrences within the study area. These species are: *Amsinckia grandiflora* and *Clarkia tembloriensis* ssp. *calientensis*. *Caulanthus californicus* also was included in this category because very few specific occurrences have been documented versus a large number of non-specific occurrences that appear to be on a wide range of soils. The potential range of these species was not limited on the basis of soils. Rather, their potential range was based entirely upon the area of natural vegetation in their elevation range within the broad geographic region (e.g., inner coast ranges, Sierran foothills) and counties they have been documented in.

The area within a species potential range was calculated as the area in each county where the species has been documented, in natural land cover types, within the elevation range of the species, and (for most species) in associated STATSGO map units. This was done by combining land cover, elevation and soil coverages into a single land cover-elevation-soil coverage for each county. The area within a species range was then determined by combining the area of all polygons with the appropriate attributes. For example, the area of the potential range of *Layia leucopappa* in Kern County equaled the sum of polygons below 500 m in elevation, in a natural land cover type, and in one of three STATSGO map units. For species of vernal pools and saline-alkaline conditions, the particular soil series providing suitable conditions were known. Therefore, for these species, only the portion of polygon occupied by those soil series was included in the species' potential range.

Disturbance within the Potential Geographic Range of Each Species

PG&E facilities are not uniformly distributed throughout the study area, and thus species differed in the percent of their range that will be disturbed by PG&E activities. Therefore, as an indicator of the likelihood of affecting a species, we calculated the portion of each species potential range that will be disturbed.

The miles of PG&E facilities within the potential range of each species was determined by intersecting GIS layers of PG&E facilities with the land cover-elevation-soil coverage. For species of vernal pools and saline-alkaline conditions, the particular soil series providing suitable conditions were known. Therefore, the length of PG&E facilities within the range of these species was the sum for suitable polygons of the product of facility length within a polygon and the portion of the polygon occupied by soils providing suitable conditions.

The acres of disturbance expected within each species potential range was based on the length of each system (i.e., electric transmission, electric distribution, gas transmission, gas distribution) within the species range. For each system, the total acres of disturbance anticipated over 30 years (as estimated in Chapter 3 of the HCP) were divided by the total length of the system's facilities to determine the average disturbance per mile of facility. For each system, to calculate the area disturbed within a species' potential range, the average area disturbed per

mile of facility was multiplied by the length of facilities within a species potential range. This was done separately for temporary and permanent disturbances.

The portion of the potential range to be disturbed was calculated by dividing the total area of disturbance by the area of the potential range.

Abundance of Species within Their Potential Geographic Ranges

Covered plant species differ in the number of acres their populations are known to occupy. Furthermore, for these species, there is no relationship between the size of the geographic range and the number of acres of occupied habitat. As a result, species occupy different portions of their geographic ranges, and thus species differ in the likelihood of encountering them at a site within their range. Therefore, for each species, we calculated the portion of its geographic range that it is known to occupy, as an indicator of the likelihood of affecting the species. For each species we summed the area of all extant occurrences in the California Natural Diversity Database (CNNDB) (2002). We then divided this sum by the area of the species' potential geographic range. To occurrences without an area in CNDDB, we assigned an area of 1 acre, unless the description and comment fields of the database explicitly stated a different area. Though, smaller than the average area of an occurrence, one acre is a reasonable estimate of the average size of occurrences lacking a stated area. (Many occurrences consist of one-several plants or occupy areas of 10–1,000 ft^2 yet none of these occurrences has an acreage in the area field of the CNDDB.)

Proximity of Documented Populations to PG&E Facilities

Only populations within approximately 100 ft of a PG&E facility could be affected by most O&M activities. Consequently, the presence of documented populations in the vicinity of facilities is a strong indicator of species likely to be affected by PG&E activities. Therefore, we used ArcInfo coverages of PG&E facilities and CNDDB occurrences to identify known occurrences of covered species in the vicinity of facilities. A 200 m (656 ft) buffer was placed around facilities and then all specific occurrences within these buffers were selected.

Statistical Modeling

Species without populations within approximately 100 ft of a PG&E facility are unlikely to be affected directly by O&M activities. NDDB records can be used to identify species known to have occupied habitat in the vicinity of PG&E facilities. However, these records are not sufficient to determine the area of

occupied habitat within 100 ft of a facility and thus not sufficient to determine the area of occupied habitat lost. In addition, undocumented populations probably exist for most covered species. Statistical modeling was used to overcome these limitations of the CNDDB data and to provide an estimate of the total area of occupied habitat for all covered species combined that would be disturbed.

ArcInfo coverages of PG&E facilities and CNDDB occurrences were used to identify known occurrences of covered species in the vicinity of facilities. A 200 m (656 ft) buffer was placed around facilities and then CNDDB occurrences within these buffers were selected.

In our statistical modeling, patches of occupied habitat were randomly located within a 400 m (1312 ft) wide corridor (200 m on each side of the "facility"), randomly assigned an area, and the portion of that area within 100 ft of the facility (and thus potentially within a work zone) was recorded.

Areas were randomly assigned through bootstrapping based on a set of values from CNDDB records. For most occurrences, CNDDB reports the area of occupied habitat. We assumed that the distribution of these areas for documented occurrences within 200 m of a facility was representative of all occurrences, both documented and undocumented, whose center is within 200 m of a facility. This assumption is somewhat conservative as smaller occurrences are more likely to have escaped notice than are larger occurrences. These occurrences were compiled in a list. For occurrences without a reported area, an area of 1 acre was added to the list. In the model, areas were randomly selected with replacement from this list, and assigned to the randomly located patches. To simplify calculations within the model, patches were all treated as square in outline.

Two scenarios differing in the number of patches of occupied habitat were simulated. In the first, documented occurrences were assumed to represent 50% of all occupied habitat, and in the second, documented occurrences were assumed to represent 25% of the total. These two scenarios were intended to represent the upper and lower limits of the range in number of undocumented occurrences likely to exist. For both scenarios, 1000 simulations were run and the mean number of patches within 100 ft of facilities and the mean of the total area of occupied habitat within 100 ft of a facility were calculated. These means are estimates of the occupied habitat that would be affected if O & M activities disturbed all land within 100 ft of a facility during the next 30 years.

However, only a portion of this area will be disturbed during the 30 year term of the HCP: 21% of this zone around gas transmission facilities, 1% around gas distribution facilities, 5% and >1% around electric transmission and distribution facilities, and 2.6% for all facilities combined. Therefore, to estimate the total area of occupied habitat lost, the mean of the simulations was multiplied by 0.026. To estimate the area of occupied habitat disturbed by each system, the total area of occupied habitat to be disturbed was multiplied by the percent of total facility length in sensitive land cover types accounted for by the system, and

the percent of area within 100 ft of the system's facilities that will be disturbed over 30 years.

Results

Twenty one of the 42 covered plant species have documented occurrences within 200 m (656 ft) of a PG&E facility (Table ~~G~~F-2). Combined these species were represented by 81 occurrences. *Blepharizonia plumosa* ssp. *plumosa*, *Castilleja campestris* ssp. *succulenta*, *Cirsium crassicaule*, *Clarkia biloba* ssp. *australis*, *Lilaeopsis masonii*, *Monolopia congdonii*, *Opuntia basilaris* var. *treleasei* and *Pseudobahia peirsonii* all had four or more occurrences within 200 m of a PG&E facility.

Simulations had means of 70–141 occurrences and 170–342 acres of occupied habitat within 100 ft of a PG&E facility (based on documented occurrences representing 50–25% of total occurrences), and <5% of this area will be disturbed by PG&E activities. This corresponds to 9-17 acres of disturbed habitat during the 30 year term of the HCP. The electric distribution and transmission systems account for 1 and 2-5 of these acres, respectively. The gas distribution and transmission systems account for 1 and 3-8 acres, respectively. Small occurrences (1 acres or less), which have the most difficulty recovering from a disturbance, are unlikely to be disturbed by PG&E activities. Simulations had means of 0–1 occurrences affected by a PG&E activity during the 30 year term of the HCP.

O&M activities will disturb land within the geographic range of every covered plant species. On average, 0.04% of a species range will be disturbed by O&M activities during the next 30 years (Range (0.0003-0.2%; Table ~~G~~F-3). Species also differed substantially in the portion of their potential geographic range they are known to occupy. On average, species occupied 0.3 % of their potential geographic range (range 0.01–1.8 %, Table ~~G~~F-3). If the occupied portion of a species' range were treated as the probability of encountering the species at work sites within its range, then multiplying this portion by the acres of disturbance within the species range would yield an estimate of the area of occupied habitat to be disturbed. Assuming the known occupied area to be 25–50% of the total, 25-50 acres of occupied habitat would be disturbed. Though this estimate probably is less accurate than the estimates based on the statistical modeling, it is based on different assumptions than the modeling and should be taken into consideration.

Conclusions

- In the absence of avoidance and minimization measures, 7-50 acres of occupied habitat would likely be disturbed by O&M activities over the 30 year term of the HCP. Avoidance and minimization measures should be able to reduce this acreage considerably, but are unlikely to avoid all effects.

Therefore, planning to compensate for disturbance of half this area (4-25 acres) would be more realistic.

- Three species are likely to have occupied habitat disturbed during the 30 year term of the HCP: *Castilleja campestris* ssp *succulenta*, *Lilaeopsis masonii* and *Opuntia basilaris* var. *treleasei*. These species each have 9–15 occurrences within 200 m (656 ft) of a PG&E facility, and relative to other species will have a moderate portion of their range disturbed and are moderately widespread within their range.
- Twenty nine species have an intermediate likelihood of having occupied habitat disturbed: *Amsinckia grandiflora, Atriplex minuscula, A. tularensis, Blepharizonia plumosa* ssp *plumosa, Calyptridium pulchellum, Carpenteria californica, Chamaesyce hooveri, Cirsium crassicaule, Clarkia biloba* ssp *australis, Clarkia lingulata, Clarkia springvillensis, Cordylanthus palmatus, Eremalche kernensis, Eriophyllum congdonii, Eryngium racemosum, Fritillaria striata, Layia hgeterotricha, L. leucopappa, Legenere limosa, Lupinus citrinus* var *deflexus, Madia radiata, Monolopia congdonii, Neostafia colusana, Orcuttia inaequalis, Pseudobahia bahiifolia, P. peirsonii, Sidalcea keckii* and *Twisselmannia californica.* These species either have at least one documented occurrence within 200 m of a facility or a moderate likelihood of having an undocumented population within 200 m of a facility. Most of these species will not have occupied habitat disturbed during the 30-year term of the HCP. However, as a set they likely will account for several acres of disturbed habitat. Available information is insufficient to determine the precise acreage that will be disturbed for each species.
- Ten species are unlikely to have occupied habitat disturbed during the 30-year term of the HCP. These species have no documented occurrences within 200 m of a PG&E facility, <0.05% of their range will be disturbed by O&M activities, and occupy <0.1% of their geographic ranges as well. These species are *Caulanthus californicus, Clarkia temblorensis* ssp. *calientensis, Gratiola heterosepala, Lepidium jaredii* ssp. *album, Lewisia congdonii, Malacothamnus hallii, Navarretia myersii, Orcuttia pilosa, Stylocline citroleum* and *Tuctoria greenei*.
- To further ensure that the rarest of plant species are not adversely affected, AMMs would be applied to work areas for ground-disturbing activities that are 1) within 200m of the boundaries of all CNDDB specific occurrences (CNDDB accuracy classes 1 and 2) and non-specific occurrences mapped as bounded features (CNDDB accuracy class 3) that are presumed extant; or 2) within the zone associated with a CNDDB non-specific occurrences mapped as circular feature with an accuracy of 1 km or less (CNDDB accuracy classes 4-7). These AMMs would not be applied in zones associated with occurrences whose locations have been poorly documented (i.e., CNDDB accuracy classes 8-10) (Table ~~G~~F-4).
- Non-specific occurrences mapped as circular features are treated differently because their location has not been accurately documented, and the probability of an O&M activity affecting occupied habitat in the vicinity of these occurrences is much lower than in the vicinity of specific occurrences

and of those non-specific occurrences that can be mapped as bounded features. For occurrences mapped as circular features, the circle's centroid represents the best estimate of the plant population's (i.e., the occurrence's) location and the circle's radius defines a zone in which the occurrence may be located. These zones range in size from 18 to over 50,000 acres (i.e., circles with radii of 150-8000 m) depending on the accuracy class to which the occurrence has been assigned. Because most occurrences occupy small areas (i.e., typically much less than 1 acre), there is only a low likelihood of encountering occupied habitat within the zones associated with the less accurately documented occurrences. (Also, many occurrences with poorly documented locations are older records that have not been relocated in recent decades and may in fact be extirpated.)

- The minimization measures described above will be applied only to areas where the likelihood of encountering occupied habitat is substantially greater than in natural vegetation elsewhere in the plan area. Therefore, PG&E will still apply the minimization measures described above to occurrences whose location is considered to be within a 1 km radius because there is still an intermediate to low probability that a ground-disturbing activity could affect occupied habitat in these zones. However, the probability of affecting occupied habitat at the most poorly documented occurrences (i.e., CNDDB accuracy classes 8-10) is very low and not substantially greater than elsewhere within the plan area. Thus, the additional measures described above will not be applied within zones associated with these occurrences.

Table F-1. Habitat Attributes for Special-Status Plant Species

Species	Counties[1]	Land Cover Types[2]	Elevation (meters)	Soil Map Units or Soil Types[3]	Additional Attributes
Large-flowered fiddleneck *Amsinckia grandiflora*	San Joaquin	Grassland, Blue oak woodland	250–550	-4	–
Lesser saltscale *Atriplex minuscula*	Fresno, Madera, Merced, Kern	Grassland, Seasonal wetland, Upland scrub	< 100	Garces-Panoche-Kimberlina, Waukena-Temple-Pond, Fresno-Dinuba-Lewis	Alkali sink and alkali grasslands on margins of vernal pools and slick spots
Bakersfield smallscale *Atriplex tularensis*	Kern	Upland scrub, Grassland, Seasonal wetland	50–150	Lokern-Buttonwillow	Saline alkali meadow with saltgrass
Big tarplant *Blepharizonia plumosa* ssp. *plumosa*	San Joaquin, Stanislaus	Grassland	< 500	Arburua-Wisflat-Badland	Dry hills and plains usually on slopes and often on recently burned areas
Mariposa pussypaws *Calyptridium pulchellum*	Madera, Mariposa	Blue oak/Foothill pine	400–1100	Ahwahnee-Auberry-Rock Oucrop, Coarsegold-Rock Outcrop-Friant, Blasingame-Las Posas-Millerton	Granite domes with exposed sites
Tree-anemone *Carpenteria californica*	Fresno, Madera	Blue oak/Foothill pine, Shrub, Montane hardwood	300–1350	Ahwahnee-Auberry-Rock Outcrop	North facing slopes and ravines, well drained sites
Succulent owl's-clover *Castilleja campestris* ssp. *succulenta*	Madera, Mariposa, Fresno, Merced, Stanislaus, San Joaquin	Seasonal wetland, Grassland	50–750	San Joaquin-Cometa-Madera, Coarsegold-Rock Outcrop-Friant, Ahwahnee-Auberry-Rock Outcrop, Hanford-Delhi-Tujunga, Amador-Hornitos-Rock Outcrop, Porterville-Seville-Yokohl, Redding-Pentz-Corning, San Joaquin-Bruella-Kimball	Vernal pools
California jewelflower *Caulanthus californicus*	Kern, Kings, Fresno, Tulare	Blue oak woodland, Grassland	50–900	Kettleman-Delgado-Elkhills, Gaviota-Vaquero-Altamont5	Various valley habitats in central valley and carrizo plain, apparently at sites with varied soils
Hoover's spurge *Chamaesyce hooveri*	Tulare, Merced, Stanislaus	Seasonal wetland	< 150	Centerville-Porterville-Cibo, San Joaquin-Cometa-Madera, Fresno-Dinuba-Lewis, Whitney-Montpellier-Rocklin	Vernal pools
Slough thistle *Cirsium crassicaule*	San Joaquin, Kings, Kern,	Permanent freshwater wetland	< 100	Lethent-Nahrub-Twisselman, Kimberlina-Wasco-Panoche, Cajon-Westhaven-Excelsior, Gepford-Westcamp-Armona	Sloughs, riverbanks, and marshy areas

Species	Counties[1]	Land Cover Types[2]	Elevation (meters)	Soil Map Units or Soil Types[3]	Additional Attributes
Mariposa clarkia *Clarkia biloba* ssp. *australis*	Mariposa	Blue oak woodland, Blue oak/Foothill pine, Shrub, Conifer, Montane hardwood	300–950	Maymen-Mariposa-Auburn	Chaparral, woodland areas and woodland/riparian ecotone
Merced clarkia *Clarkia lingulata*	Mariposa	Blue oak woodland, Blue oak/Foothill pine, Conifer, Shrub, Montane hardwood	400–500	Maymen-Mariposa-Auburn	North-facing slopes and in canyon bottoms
Springville clarkia *Clarkia springvillensis*	Tulare	Blue oak woodland, Blue oak/Foothill pine, Grassland, Shrub	300–1250	Ahwahnee-Aubery-Rock Outcrop, Vista-Rock Outcrop-Cieneba, Holland-Chaix-Chawanakee	Cutbanks and openings
Vasek's clarkia *Clarkia tembloriensis* ssp. *calientensis*	Kern	Grassland	250–350	-4	North-facing slopes
Hispid bird's-beak *Cordylanthus mollis* ssp. *hispidus*	Merced	Grassland, Seasonal wetland	< 200	Triangle-Turlock-Britto	Saline alkaline meadows and alkali sinks with salt grass
Palmate-bracted bird's-beak *Cordylanthus palmatus*	Fresno, Madera	Grassland, Seasonal wetland, Upland scrub	< 200	Waukena-Pescadero-Pond, Fresno-Dinuba-Lewis	Saline alkaline soils, Chenopod scrub and grasslands with salt grass and frankenia
Kern mallow *Eremalche parryi* ssp. *kernensis*	Kern	Upland scrub, Grassland, Valley oak woodland	50–550	Kettleman-Delgado-Elkhills, Kimberlina-Wasco-Panoche, Panoche-Milham-Kimberlina	Dry saltbrush, often at edge of balds.
~~Hoover's Eriastrum *Eriastrum hooveri*~~	~~Kern, Tulare, Fresno, Kings~~	~~Upland scrub, Grassland~~	~~50–900~~	~~Kettleman-Delgado-Elkhills, Kimberlina-Wasco-Panoche, Garces-Panoche-Kiimberlina~~	~~Alkaline alluvial fans and sandy soils.~~
Congdon's woolly sunflower *Eriophyllum congdonii*	Mariposa	Blue oak woodland, Blue oak/Foothill pine, Conifer, Montane hardwood, Shrub	500–1900	Maymen-Marioposa-Auburn	Talus, Cracks in rock outcroppings
Delta button-celery *Eryngium racemosum*	Stanislaus, Merced, San Joaquin	Woody Riparian, Seasonal wetland	< 100	Edminster-Kesterson-Dos Palos, Waukena-Pescadero-Pond, Merced-Temple-Grangeville, Merritt-Columbia-Tujunga	Seasonally inundated floodplains, at sites with soils described as "clay"

Species	Counties[1]	Land Cover Types[2]	Elevation (meters)	Soil Map Units or Soil Types[3]	Additional Attributes
Striped adobe-lily *Fritillaria striata*	Kern, Tulare	Blue oak woodland, Blue oak/foothill pine, Shrub	100–1500	Torriorthents-Elkhills-Kimberlina, Walong-Edmundston-Rock Outcrop, Jilson-Soper-Rock Outcrop, Vista-Rock Outcrop-Cieneba, Cibo-Rock Outcrop-Las Posas	At sites with soils described as "heavy clay"
Bogg's Lake hedge-hyssop *Gratiola heterosepala*	Merced, San Joaquin, Madera, Fresno	Seasonal wetland	< 2400	Ahwahnee-Aubery-Rock Outcrop, Coarsegold-Rock Outcrop-Friant, Redding-Pentz-Corning, Pentz-Peters-Pardee, Redding-Corning-Pentz	Vernal pools
Pale-yellow layia *Layia heterotricha*	Fresno, Kings, Kern	Blue oak/Foothill pine, Blue oak woodland, Grassland	300–1600	Hillbrick-Kilmer-Aido, Kettleman-Delgado-Elkhills, Grazer-Exclose-Wisflat, Roacha-Litten-Altamont	Open areas
Comanche Point layia *Layia leucopappa*	Kern	Upland scrub, Grassland	100–350	Chanac-Pleito-Walong, Hesperia-Arvin-Wasioja, Lokern-Buttonwillow	Dry hills, at sites with soils described as "white-gray clay"
Legenere *Legenere limosa*	Stanislaus, San Joaquin	Permanent freshwater wetland, Seasonal wetland, Grassland	< 900	-4	Vernal pools
Panoche~~Jared's~~ pepper-grass *Lepidium jaredii* ssp. *album~~jaredii~~*	Fresno~~Kern~~	Grassland	200-750~~50-950~~	~~Kettleman-Delgado-Elkhills~~Grazer-Exclose-Chino	Along~~Alkali bottoms, slopes,~~ washes, creeks and seps~~alluvial fans~~, at sites with soils described as "clay and gypsum-rich"
Congdon's lewisia *Lewisia congdonii*	Mariposa	Conifer, Shrub, Blue oak woodland	600–2100	Maymen-Mariposa-Auburn	Northern exposures, rocky sites, in crevices among rocks
Mason's lilaeopsis *Lilaeopsis masonii*	San Joaquin	Permanent freshwater wetland	< 10	Egbert-Sailboat-Sycamore, Rindge-Gazwell-Egbert, Kingile-Retryde-Webile, Merritt-Columbia-Tujunga, Peltier-Egbert-Retryde	Tidal zones in muddy areas formed through river deposition of river bank erosion
Mariposa lupine *Lupinus citrinus* var. *deflexus*	Mariposa	Blue oak woodland, Blue oak/Foothill pine, Montane hardwood, Shrub	400–650	Ahwahnee-Auberry-Rock Outcrop, Blasingame-Las Posas-Millerton	Hilltops and hillsides with southern exposures, at sites with coarse textured soils from granitic parent material
Showy madia *Madia radiata*	San Joaquin, Fresno, Kern, Kings	Blue oak/Foothill pine, Blue oak woodland, Grassland, Shrub	< 1150	Kimberlina-Wasco-Panoche, Panoche-Milham-Kimberlina, Kettleman-Delgado-Elkhills, Grazer-Exclose-Wisflat, Arbura-Wisflat-Badland	At sites with soils described as "Adobe clay"

Species	Counties[1]	Land Cover Types[2]	Elevation (meters)	Soil Map Units or Soil Types[3]	Additional Attributes
Hall's bush mallow *Malacothamnus hallii*	Stanislaus, Merced	Shrub	< 550	Millsholm-Quinto-Rock Outcrop, Honker-Gonzaga-Vallecitos	Some populations on serpentine
San Joaquin woollythreads *Monolopia congdonii*	Fresno, Kings, Kern	Grassland, Upland scrub	50–800	Kimberlina-Wasco-Panoche, Cajon-Westhaven-Excelsior, Milham-Garces-Kimberlina, Kettleman-Delgado-Elkhills, Panoche-Milham-Kimberlina, Gaviota-Vaquero-Altamont, Monoridge-Badland-Exclose, Panoche-Ciervo-Cerini, Polvadero-Gujarral-Milham	Plains with grasses in Chenopod scrub
Pincushion navarretia *Navarretia myersii*	Merced	Grassland, Seasonal wetland	< 350	Amador-Hornitos-Rock Outcrop	Vernal pools
Colusa grass *Neostapfia colusana*	Merced, Stanislaus	Seasonal wetland, Grassland	< 150	Pentz-Peters-Pardee, Redding-Pentz-Corning, Zacharias-Yokohl-Honcut, Delhi-Hilmar-Atwater, Waukena-Pescadero-Pond, Fresno-Dinuba-Lewis, Whitney-Montpellier-Rocklin	Large or deep vernal pool bottoms with Adobe soils
Bakersfield cactus *Opuntia basilaris* var. *treleasei*	Kern	Upland scrub, Grassland	50–550	Kimberlina-Wasco-Panoche, Chanac-Delano-Premier, Walong-Edmundston-Rock Outcrop, Torriothents-Elkhills-Kimberlina, Nacimiento-Los Osos-Balcom, Jilson-Soper-Rock Outcrop, Hesperia-Arvin-Wasioja, Chanac-Pleito-Walong, Cajon-Westhaven-Excelsior	Bluffs, low hills, and flats within grasslands, at sites with soils described as coarse textured soils from granitic parent material
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	Fresno, Merced, Stanislaus, Madera, Tulare	Seasonal wetland, Grassland	< 800	San Joaquin-Cometa-Madera, Coarsegold-Rockoutcrop-Friant, Hanford-Delhi-Tujunga, Redding-Pentz-Corning, Amador-Hornitos-Rock Outcrop, Whitney-Montpellier-Rocklin, Madera-San Joaquin-Manteca, Merritt-Columbia-Tujunga	Vernal pools
Hairy Orcutt grass *Orcuttia pilosa*	Merced, Stanislaus, Madera	Seasonal wetland, Grassland	50–200	San Joaquin-Cometa-Madera, Hanford-Delhi-Tujunga, Redding-Pentz-Corning, Merritt-Columbia-Tujunga, Grangeville-Pachappa-Traver	Vernal pools
Hartweg's golden sunburst	Fresno, Merced,	Grassland, Blue oak	< 150	San Joaquin-Cometa-Madera, Hanford-Delhi-Tujunga, Auburn-Whiterock-Rock	Northern slopes of knolls and shady creeks or near vernal pools,

Species	Counties[1]	Land Cover Types[2]	Elevation (meters)	Soil Map Units or Soil Types[3]	Additional Attributes
Pseudobahia bahiifolia	Madera, Stanislaus	woodland		Outcrop, Amador-Hornitos-Rock Outcrop, Whitney-Montpellier-Rocklin, Rossmoor-Ryer-Columbia	at sites with soils described as clay
San Joaquin adobe sunburst *Pseudobahia peirsonii*	Fresno, Tulare, Kern	Grassland, Blue oak woodland	50–800	San Joaquin-Cometa-Madera, Centerville-Porterville-Cibo, Cibo-Rock Outcrop-Las Posas, Vista-Rock Outcrop-Cieneba, Ahwahnee-Auberry-Rock Outcrop, Jilson-Soper-Rock Outcrop, Chanac-Delano-Premeir, Torriorthents-Elkhills-Kimberlina	Valley floors and foothills, at sites with soils described as heavy clay
Keck's checkerbloom *Sidalcea keckii*	Tulare, Fresno	Blue oak woodland, Grassland	150–450	Blasingame-Las Posas-Millerton, Cibo-Rock Outcrop-Las Posas	Slopes
Oil netstraw *Stylocline citroleum*	Kern	Upland scrub	50–300	Kettleman-Delgado-Elkhills, Kimberlina-Wasco-Panoche, Chanac-Delano-Premier, Cajon-Westhaven-Excelsior	Flats in oil-producing areas
Greene's tuctoria *Tuctoria greenei*	San Joaquin, Fresno, Stanislaus, Merced, Madera, Tulare	Seasonal wetland, Grassland	< 1100	Redding-Pentz-Corning, Amador-Hornitos-Rock Outcrop, San Joaquin-Cometa-Madera, Hanford-Delhi-Tujunga, Archerdale-Cogna-Finrod	Vernal pools
Kings gold *Twisselmannia californica*	Kings	Upland scrub	< 100	-[6]	Chenopod scrub

Notes:

1 Based on California Natural Diversity Database records (CNDDB 2002)

2 List includes cover types habitat is likely to be mapped within on land cover map prepared for PG&E by Jones & Stokes.

3 STATSGO map units (NRCS 1995) that a specific occurrence was mapped within.

4 This species had no specific occurrences within the study area.

5 *Caulanthus californicus* is known primarily from non-specific occurrences that appear to be at sites with widely varying soils.

6 Location information for *Twisselmannia californica* has been suppressed by CNDDB, and thus soil associations cannot be determined.

Table F-2. Distribution of Covered Species near PG&E ROWs

Common and Scientific Name	Status[1]			Documented Extant Occurrences[2]		Documented Occupied Habitat[3] (acres)
	Federal	State	CNPS	San Joaquin Valley	Within 200 m of Facilities	
Large-flowered fiddleneck *Amsinckia grandiflora*	E	R	1B	3	–	2
Lesser saltscale *Atriplex minuscula*	–	E	1B	7	–	155
Bakersfield smallscale *Atriplex tularensis*	SC	T	1B	1	–	5
Big tarplant *Blepharizonia plumosa* ssp. *plumosa*	–	E	1B	17	4	67
Mariposa pussypaws *Calyptridium pulchellum*	T	–	1B	6	3	19
Tree-anemone *Carpenteria californica*	SC	–	1B	4	1	1348
Succulent owl's-clover *Castilleja campestris* ssp. *succulenta*	T	–	1B	62	9	1479
California jewelflower *Caulanthus californicus*	E	–	1B	20	–	38
Hoover's spurge *Chamaesyce hooveri*	T	R	1B	8	2	83
Slough thistle *Cirsium crassicaule*	SC	R	1B	17	4	911
Mariposa clarkia *Clarkia biloba* ssp. *australis*	–	T	1B	13	6	494
Merced clarkia *Clarkia lingulata*	SC	–	1B	2	2	63
Springeville clarkia *Clarkia springvillensis*	T	–	1B	10	1	123.3
Vasek's clarkia *Clarkia tembloriensis* ssp. *calientensis*	SC	–	1B	3	–	1
Hispid bird's-beak *Cordylanthus mollis* ssp. *hispidus*	SC	–	1B	23	–	2086
Palmate-bracted bird's-beak *Cordylanthus palmatus*	E	E	1B	8	3	63
Kern mallow *Eremalche parryi* ssp. *kernensis*	E	E	1B	13	2	899
~~Hoover's eriastrum *Eriastrum hooveri*~~	~~T~~	~~–~~	~~4~~	~~24~~	~~2~~	~~6~~
Congdon's woolly sunflower *Eriophyllum congdonii*	–	E	1B	2	–	475

Table F-2. Continued

Common and Scientific Name	Status[1]			Documented Extant Occurrences[2]		Documented Occupied Habitat[3] (acres)
	Federal	State	CNPS	San Joaquin Valley	Within 200 m of Facilities	
Delta button-celery *Eryngium racemosum*	SC	E	1B	19	1	1558
Striped adobe-lily *Fritillaria striata*	SC	E	1B	18	2	138
Bogg's Lake hedge-hyssop *Gratiola heterosepala*	–	E	1B	11	–	52
Pale-yellow layia *Layia heterotricha*	SC	–	1B	7	2	642
Comanche Point layia *Layia leucopappa*	SC	–	1B	8	–	304
Legenere *Legenere limosa*	SC	R	1B	1	–	1
Panoche~~Jared's~~ pepper-grass *Lepidium jaredii* ssp. *album~~jaredii~~*	SC	–	1B	3~~1~~	–	5.2~~7~~
Congdon's lewisia *Lewisia congdonii*	–	R	1B	2	–	36
Mason's lilaeopsis *Lilaeopsis masonii*	SC	R	1B	44	15	278
Mariposa lupine *Lupinus citrinus* var. *deflexus*	SC	T	1B	6	–	123
Showy madia *Madia radiata*	–	–	1B	12	–	1371
Hall's bush mallow *Malacothamnus hallii*	–	–	1B	4	–	85
San Joaquin woollythreads *Monolopia (Lembertia) congdonii*	E	–	1B	46	6	1626
Pincushion navarretia *Navarretia myersii (a.k.a. N.m.ssp. m.)*	–	–	1B	3	–	29
Colusa grass *Neostapfia colusana*	T	E	1B	44	1	435
Bakersfield cactus *Opuntia basilaris* var. *treleasei*	E	E	1B	34	10	1636
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	T	E	1B	28	2	356
Hairy Orcutt grass *Orcuttia pilosa*	E	E	1B	8	–	83
Hartweg's golden sunburst *Pseudobahia bahiifolia*	E	E	1B	15	1	326

Table F-2. Continued

Common and Scientific Name	Status[1]			Documented Extant Occurrences[2]		Documented Occupied Habitat[3] (acres)
	Federal	State	CNPS	San Joaquin Valley	Within 200 m of Facilities	
San Joaquin adobe sunburst *Pseudobahia peirsonii*	T	E	1B	32	4	862
Keck's checkerbloom *Sidalcea keckii*	E	–	1B	2	–	3
Oil neststraw *Stylocline citroleum*	–	–	1B	8	–	163
Greene's tuctoria *Tuctoria greenei*	E	R	1B	9	–	54
Kings gold *Twisselmannia californica*	-	-	1B	1	1	1

Notes:

[1] Status explanations:

Federal

E = listed as endangered under the federal Endangered Species Act.

T = listed as threatened under the federal Endangered Species Act.

– = no status.

State

E = listed as endangered under the California Endangered Species Act.

T = listed as threatened under the California Endangered Species Act.

R = listed as rare under the California Native Plant Protection Act. Thus category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation

– = no status.

CNPS California Native Plant Society

1A = List 1A species: plants presumed extinct in California

1B = List 1B species: rare, threatened, or endangered in California and elsewhere

4 = List 4 species: plants of limited distribution.

[2] Based on California Natural Diversity Data Base (2002).

[3] Within study area based on area field in California Natural Diversity Data Base (2002) and occurrences without an entry in that field were assigned an area of 1 acre.

Table F-3. Occupied Habitat and Disturbance within Potential Range of Species

Common and Scientific Names	Range (~~1,000~~ acres)[1]	Occupied Habitat (acres)[2]	Disturbance due to PG&E activities (acres)[3]	Portion of Range Occupied	Portion of Range Disturbed
Large-flowered fiddleneck *Amsinckia grandiflora*	44,000	2	83~~50~~	0.00005	0.00191~~116~~
Lesser saltscale *Atriplex minuscula*	379,000	155	343~~208~~	0.00041	0.00091~~55~~
Bakersfield smallscale *Atriplex tularensis*	140,000	45	193~~117~~	0.00003	0.00137~~083~~
Big tarplant *Blepharizonia plumosa* ssp. *plumosa*	119,000	67	76~~46~~	0.00056	0.00064~~39~~
Mariposa pussypaws *Calyptridium pulchellum*	361,000	19	73~~44~~	0.00005	0.00020~~12~~
Tree-anemone *Carpenteria californica*	306,000	1348	120~~73~~	0.00441	0.00040~~24~~
Succulent owl's-clover *Castilleja campestris* ssp. *succulenta*	216,000	1479	140~~85~~	0.00684	0.00064~~39~~
California jewelflower *Caulanthus californicus*	263,000	38	1048~~635~~	0.00001	0.00040~~24~~
Hoover's spurge *Chamaesyce hooveri*	110,000	83	30~~18~~	0.00075	0.00026~~16~~
Slough thistle *Cirsium crassicaule*	285,000	911	563~~341~~	0.00320	0.00198~~20~~
Mariposa clarkia *Clarkia biloba* ssp. *australis*	65,000	494	25~~15~~	0.00762	0.00038~~23~~
Merced clarkia *Clarkia lingulata*	65,000	63	25~~15~~	0.00100	0.00038~~23~~
Springeville clarkia *Clarkia springvillensis*	317,000	123	12~~7~~	0.00039	0.00003~~2~~
Vasek's clarkia *Clarkia tembloriensis* ssp. *calientensis*	40,000	1	2~~1~~	0.00002	0.00005~~3~~
Hispid bird's-beak *Cordylanthus mollis* ssp. *hispidus*	129,000	2086	53~~32~~	0.01616	0.00041~~25~~

Table F-3. Continued

Common and Scientific Names	Range (~~1,000~~ acres)[1]	Occupied Habitat (acres)[2]	Disturbance due to PG&E activities (acres)[3]	Portion of Range Occupied	Portion of Range Disturbed
Palmate-bracted bird's-beak *Cordylanthus palmatus*	121,000	63	92~~56~~	0.00052	0.00078~~47~~
Kern mallow *Eremalche parryi* ssp. *kernensis*	429,000	899	411~~249~~	0.00210	0.00096~~58~~
~~Hoover's eriastrum *Eriastrum hooveri*~~	~~347,000~~	~~636~~	~~264~~	~~0.0018~~	~~0.00076~~
Congdon's woolly sunflower *Eriophyllum congdonii*	52,000	475	15~~9~~	0.00918	0.00030~~18~~
Delta button-celery *Eryngium racemosum*	86,000	1558	71~~43~~	0.01804	0.00083~~50~~
Striped adobe-lily *Fritillaria striata*	96,000	138	1378~~835~~	0.00014	0.00144~~087~~
Bogg's Lake hedge-hyssop *Gratiola heterosepala*	204,000	52	132~~80~~	0.00025	0.00064~~39~~
Pale-yellow layia *Layia heterotricha*	52,000	642	295~~179~~	0.00124	0.00050~~30~~
Comanche Point layia *Layia leucopappa*	45,000	304	40~~24~~	0.00676	0.00089~~54~~
Legenere *Legenere limosa*	67,000	1	79~~48~~	0.00001	0.00011~~771~~
Panoche~~Jared's~~ pepper-grass *Lepidium jaredii* ssp. *album~~jaredii~~*	112~~9~~,000	5~~7~~	~~39~~2	0.00004~~6~~	0.00001~~33~~
Congdon's lewisia *Lewisia congdonii*	244,000	36	54~~33~~	0.00015	0.00023~~14~~
Mason's lilaeopsis *Lilaeopsis masonii*	28,000	278	94~~57~~	0.00984	0.00332~~201~~
Mariposa lupine *Lupinus citrinus* var. *deflexus*	51,000	123	5~~3~~	0.00239	0.00010~~06~~
Showy madia *Madia radiata*	475,000	1371	383~~232~~	0.00289	0.00081~~49~~

Common and Scientific Names	Range (~~1,000~~ acres)[1]	Occupied Habitat (acres)[2]	Disturbance due to PG&E activities (acres)[3]	Portion of Range Occupied	Portion of Range Disturbed
Hall's bush mallow *Malacothamnus hallii*	152,000	85	2~~1~~	0.00056	0.00002~~1~~
San Joaquin woollythreads *Monolopia (Lembertia) congdonii*	802,000	1626	530~~321~~	0.00203	0.000664~~0~~
Pincushion navarretia *Navarretia myersii (a.k.a. N.m.ssp. m.)*	93,000	29	21~~13~~	0.00031	0.000231~~4~~
Colusa grass *Neostapfia colusana*	102,000	435	28~~17~~	0.00425	0.000281~~7~~
Bakersfield cactus *Opuntia basilaris* var. *treleasei*	398,000	1636	267~~162~~	0.00411	0.000684~~1~~
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	165,000	356	69~~42~~	0.00216	0.000412~~5~~
Hairy Orcutt grass *Orcuttia pilosa*	149,000	83	56~~34~~	0.00056	0.000382~~3~~
Hartweg's golden sunburst *Pseudobahia bahiifolia*	320,000	326	215~~130~~	0.00102	0.000684~~1~~
San Joaquin adobe sunburst *Pseudobahia peirsonii*	991,000	862	178~~108~~	0.00087	0.000181~~1~~
Keck's checkerbloom *Sidalcea keckii*	103,000	3	54~~33~~	0.00003	0.000053~~2~~
Oil neststraw *Stylocline citroleum*	361,000	163	446~~270~~	0.00045	0.001240~~7~~5
Greene's tuctoria *Tuctoria greenei*	222,000	54	140~~85~~	0.00024	0.000633~~8~~
Kings gold *Twisselmannia californica*[4]	-	-	-	-	-

Common and Scientific Names	Range (~~1,000~~ acres)[1]	Occupied Habitat (acres)[2]	Disturbance due to PG&E activities (acres)[3]	Portion of Range Occupied	Portion of Range Disturbed

Notes:

[1] Potential geographic range based on distribution of known occurrences, elevation range and associated soils.

[2] Sum of occurrence areas in CNDDB; an area of 1 acre was assigned to occurrences without a recorded area.

~~[3]~~[3] Based on miles of PG&E facilities within potential range and acres of disturbance (temporary and permanent) per mile of facility over 30 years.

[4] CNDDB has suppressed location information for *Twisselmannia californica* and thus values in table could not be calculated.

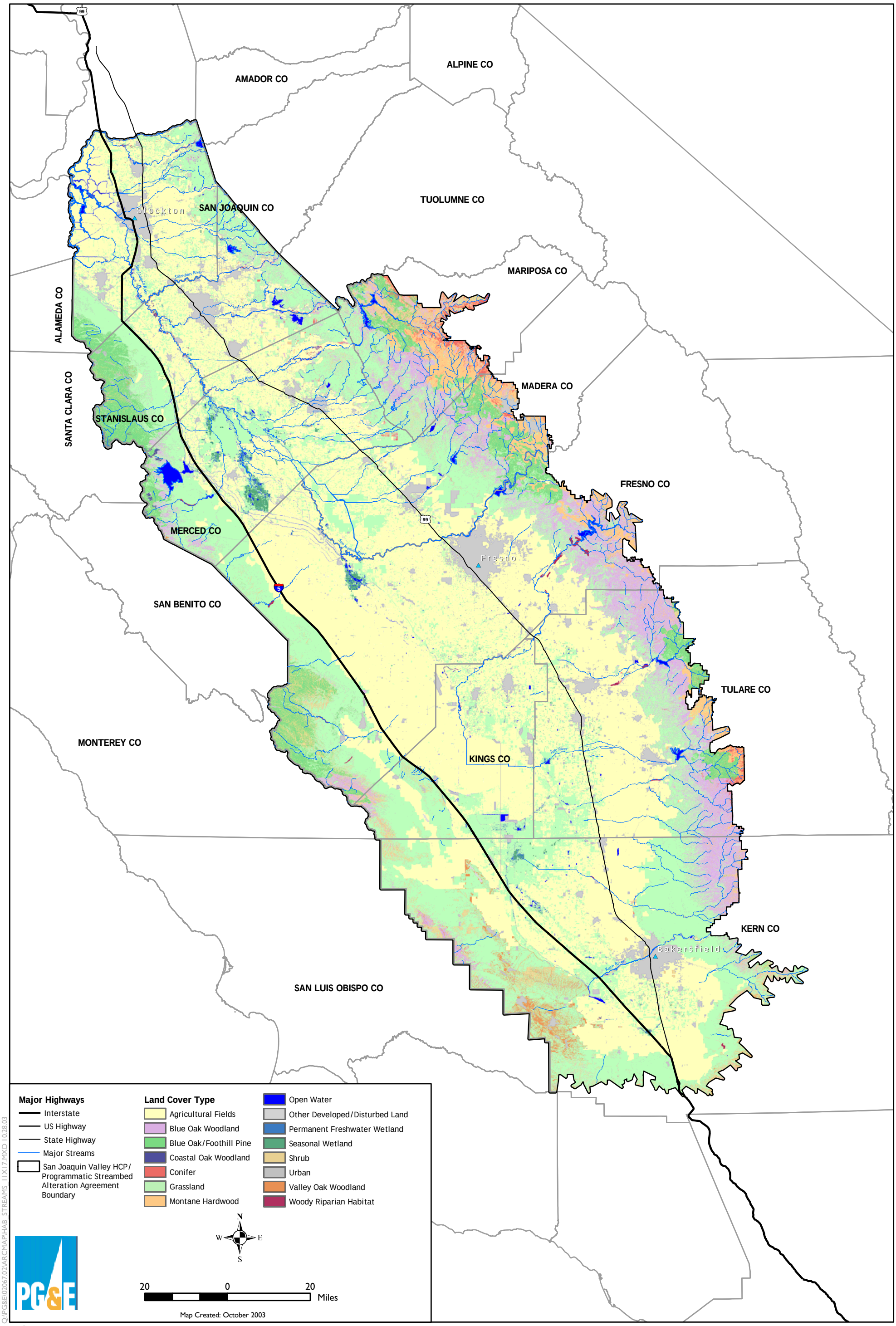
Table F-4. CNDDB Accuracy Class Description

ACC_CLASS
Accuracy Class refers to the precision or accuracy level of a given graphic feature in CNDDB. Accuracy Class represents spatial uncertainty in a relative way on a scale of one to ten (from most accurate to least accurate). ACC_CLASS integrates accuracy type and accuracy value (see below).

ACC_CLASS	Description
1	Specific bounded area with an 80 meter radius. Per Heritage methodology, this is considered a point.
2	Specific, non-circular bounded area
3	Non-specific bounded area
4	Non-specific, circular feature with a 150 meter radius (1/10 mile)
5	Non-specific, circular feature with a 300 meter radius (1/5 mile)
6	Non-specific, circular feature with a 600 meter radius (2/5 mile)
7	Non-specific, circular feature with a 1000 meter radius (3/5 mile)
8	Non-specific, circular feature with a 1300 meter radius (4/5 mile)
9	Non-specific, circular feature with a 1600 meter radius (1 mile)
10	Non-specific, circular feature with a 8000 meter radius (5 miles)

SPECIFIC:
Specific features are depictions of the spatial location of an EO accurate to plus or minus the minimum mappable unit. ACC_CLASS values 1 and 2 are specific features. They represent very precise data that can be accurately mapped within an error range of as small as 12 acres.

NON-SPECIFIC:
Non-Specific Polygons and circles of increasing size indicate progressively less precise source data. Larger circles do NOT represent larger populations, but rather greater uncertainty of the EO's exact location. Polygons of increasing size indicate progressively less precise source data. ACC_CLASS values 3 - 10 are non-specific features.



Jones & Stokes

Figure F-1
Land Cover Types and Rivers in the Plan Area

Appendix G

Environmental Awareness Training Program

Habitat Conservation Plan Environmental Training

San Joaquin Valley Operation & Maintenance Activities

August, 2004

Goals of this Training

For you to understand:

- The environmental requirements for conducting ongoing operations and maintenance activities.
- The process for determining, communicating and ensuring compliance with these requirements.
- Your personal and company responsibilities.

Overview

- Introduction
- Key environmental concerns
- Avoidance and minimization measures
- Determining and ensuring compliance with the Habitat Conservation Plan (HCP)
- Questions

Introduction

- PG&E's commitment
- Federal and State Endangered Species Acts
- The Habitat Conservation Plan

PG&E's Commitment

- O&M activities will be conducted in full compliance with federal, state and local laws and regulations.
- Recognition that non-compliance will have serious potential consequences, such as:
  - Work stoppage and delays
  - Fines and penalties to PG&E, contractors and subcontractors
  - Personal legal liabilities

Federal and State Endangered Species Acts

- Enforced by U.S. Fish and Wildlife Service and California Department of Fish and Game.
- Applies to endangered and threatened plants and animals and their habitat.

Federal and State Endangered Species Acts

- It is unlawful to "take" a protected species.
- Take means to *harass*, *harm*, *pursue*, *hunt*, *wound*, *kill*, *trap*, *capture*, *or collect*.
- Penalties for illegal "take" of sensitive species can include: up to $100,000 in fines and/or one year in prison for individuals; $200,000 in fines for organizations.

The Habitat Conservation Plan

- Includes terms and conditions PG&E must comply with. These include measures to be followed during O & M activities, documentation of effects and compensation for those effects
- Provides an "Incidental Take Permit" that allows PG&E to conduct O&M activities that may incidentally "take" a protected species
- Covers O&M activities in the San Joaquin Valley during the next 30 years

Key Environmental Concerns

- Total of 70 species (25 wildlife and 45 plant species) covered by HCP
- Habitat these plants and animals might use

Examples of Covered Species and Their Habitats

- San Joaquin Kit Fox
- Burrowing Owl
- Vernal Pool Animals and Plants

San Joaquin Kit Fox

- Cat-sized canine
- Use grasslands and lands peripheral to agricultural and urban areas
- Active at dusk and during the night
- Sleep in underground dens during the day

Burrowing Owl

- Small owl 8-10” long
- Use grasslands and lands peripheral to urban and agricultural areas
- Dwell in burrows
- Often form colonies

Vernal Pools

- Shallow depressions underlain with clay or hardpan
- Fill with water in fall-winter
- Dry out in spring
- A unique habitat for animals and plants

Animals that Live in Vernal Pools

- Vernal pool crustaceans
- Small to microscopic swimming animals
- Uniquely adapted to live in vernal pools: hatch, grow, reproduce and die in 4-40 days.
- Embryos persist inside protective shells during summer and dry years.

Plants that Live in Vernal Pools

- Annuals that germinate, grow, flower and die within several months
- Tolerant of inundation
- Persist through summer and dry years as seed

Habitat for Covered Plants and Animals

- Any natural vegetation could be habitat for a covered plant or animal.
- What is natural vegetation?
  - All land covered by plants except for landscaping and agricultural vegetation (including orchards, row crops and irrigated pastures)
  - However, vacant lots,neglected patches, and trees in urban areas are part of developed land not natural vegetation

Avoidance and Minimization Measures

- Measures implemented to avoid or reduce the impact of an activity on a species or its habitat.
- Two types of measures are required by the HCP:
  - Rules to follow whenever working in natural vegetation; and
  - Site-specific measures that a survey identified the need for.

Rules for Activities in Natural Vegetation

- Park vehicles on pavement, existing roads or previously disturbed areas whenever possible.
- Minimize access to ROW roads.
- Do not exceed 15 mph on ROWs or unpaved private roads.
- Do not bring pets or guns to work site.
- Do not start fires or barbecues
- Promptly remove trash generated by activities.

More Rules for Activities in Natural Vegetation

- Don't refuel vehicles within 100' of wetlands or waterways.
- Follow the Company's guidelines for reducing the risk of wildlife electrocution.
- Enact fire prevention measures.
- Avoid clearing vegetation for new vehicle access.
- Implement necessary erosion control measures.

Surveys for Covered Plants and Animals

- Required prior to some types of O & M activities.
- Examples of activities requiring a survey: electric line reconductoring and gas pipeline coating replacement.
- If surveys find covered plants or animals near the work site, additional protective measures will be needed, primarily exclusion zones.

Exclusion Zones

- Purpose is to protect animals and habitat.
- Set up by biologist in consultation with work supervisor and regulatory agencies
- Marked with orange barrier fencing or stakes and flagging.
- DO NOT enter exclusion zones except:
  - on existing roads, or
  - on foot.
- Biologist will monitor work near exclusion zone.

At Sites with Protected Plants

- Exclusion zones will be established around plants
- Topsoil will be stockpiled separately during excavation, and when replaced compaction will be minimized
- No herbicide will be applied within 100' of exclusion zones (unless injected or applied to cut or frilled stumps).

If You Encounter Injured or Dead Wildlife at a Work Site:

- Do not move the animal unless it compromises worker safety;
- Contact the HCP administrator immediately and they will provide guidance; and
- Afterwards complete an animal incident report in the HCP database

Frequently Asked Questions about Avoidance & Minimization Measures

- Who decided on these?
- How will they affect my ability to perform my job?
- What happens if we don't follow them?
- Where can I go for help interpreting and implementing the measures?

Determining and Ensuring Compliance with the HCP

- The HCP Database
- The HCP Coordinator

The HCP Database

- An accounting system that documents compliance of O&M activities with HCP
- A tool that identifies surveys and avoidance and minimization measures for any job

Using the HCP Database

- For all jobs, basic information is entered before work occurs
- Database identifies required surveys (if any)
- Results of surveys entered prior to work on job
- Database then provides complete list of avoidance and minimization measures
- After job completed measures followed are entered, and explanations for measures not followed

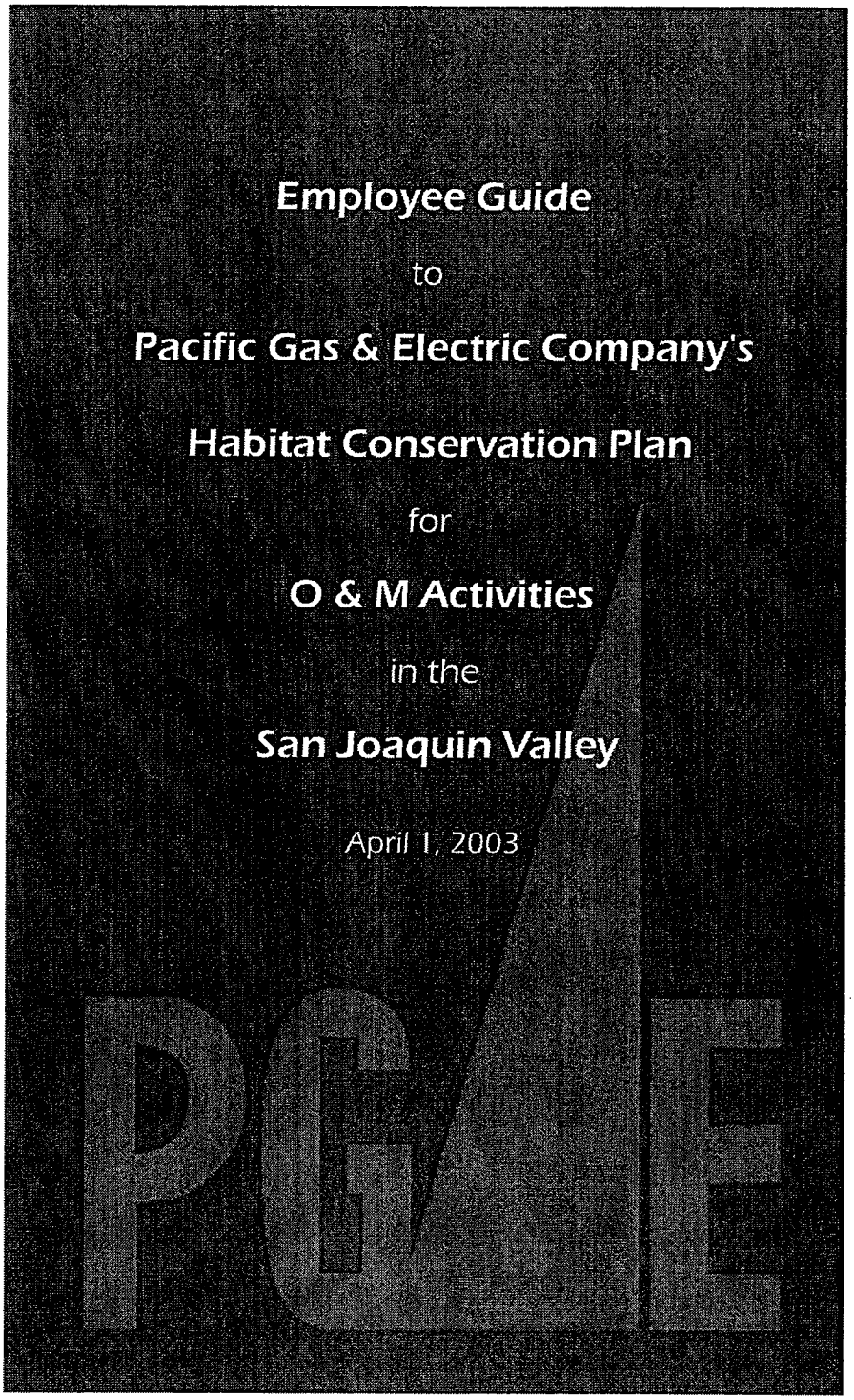
The HCP Coordinator

- Answers HCP-related questions
- Maintains HCP database
- Coordinates plant and animal surveys
- Serves as point of contact for USFWS and DFG
- Audits activities for compliance with HCP
- Prepares reports documenting HCP compliance


Questions?

Appendix H

Operations Manual


Employee Guide
to
Pacific Gas & Electric Company's
Habitat Conservation Plan
for
O & M Activities
in the
San Joaquin Valley
April 1, 2003
PG&E

About This Guide

This guide introduces you to the Habitat Conservation Plan, and provides you with the information necessary for compliance. The guide is divided into eight sections:

- *What is the Habitat Conservation Plan?*
- *What is Natural Vegetation?*
- *What are the Rules for Working in Natural Vegetation?*
- *What are Exclusion Zones and How do They Affect My Work?*
- *What if I encounter Injured or Dead Wildlife?*
- *What Surveys are Required for Protected Plants and Animals?*
- *How is Compliance Documented?*
- *Questions?*

What is the Habitat Conservation Plan [HCP]?

The Habitat Conservation Plan provides coverage of Pacific Gas & Electric Company's operations and maintenance (O & M) activities, and a limited amount of minor construction, in the San Joaquin Valley for the next 30 years.

The plan includes an incidental take permit that allows PG&E to conduct O & M activities that may incidentally take a protected species.

This permit includes the terms and conditions for compliance. These terms and conditions include measures to be followed during O & M activities, documentation of O & M activities and their effects, and compensation for those effects.

What is Natural Vegetation?

Natural vegetation includes plants covering all land types, except landscaping and agricultural vegetation (including row crops, orchards, and irrigated pasture. Ruderal vegetation present in vacant lots and other small neglected patches within urban areas are considered developed, and therefore not natural vegetation.

Any natural vegetation could be habitat for a covered plant or animal!

What are the Rules for Working in Natural Vegetation?

Park on existing roads or previously disturbed areas. To the extent possible, equipment shall be parked on pavement, existing unpaved roads and previously disturbed areas.

Minimize access to ROW roads. Access to existing roads shall be minimized to the extent practicable. The development of new access roads is discouraged unless absolutely necessary.

Speed limits should not exceed 15 mph. Except in emergencies, vehicles shall not exceed a speed of 15 mph in the ROWs or on unpaved roads within sensitive land cover types.

No pets, guns, fires or trash dumping at work sites. Trash dumping, firearms, open fires (such as barbecues), hunting, and pets are prohibited at work sites.

Refueling vehicles near waterways or wetlands is prohibited. No vehicles shall be refueled within 100 feet of a wetland, stream or other waterway, unless a bermed and lined refueling area is constructed.

Follow the Company's guidelines for reducing the risk of wildlife electrocution. In areas with a high risk of wildlife electrocution (e.g., nut/fruit orchards, riparian corridors, areas along canal or creek banks), during any reconstruction of existing overhead electric facilities, use insulated jumper wires and bird/animal guards for equipment insulator bushings or construct lines to conform to PG&E's latest Engineering Standards for electricutions.

What are the Rules for Working in Natural Vegetation? [Continued]

Enact fire prevention measures. *As fire prevention measures, use fire resistant mats and or wind screens when welding, curtail welding during "red flag" conditions as determined by California Department of Forestry and Fire Protection, all motorized equipment must have federal or state spark arrestors, all vehicles must carry a backpack pump and shovel during May-October, each fuel truck must carry a large fire extinguisher with a minimum rating of 40 B:C, and all equipment parking areas, storage areas, and small stationary engine sites must be cleared of all flammable materials.*

Avoid clearing vegetation for new vehicle access. *PG&E has agreed to avoid clearing vegetation and blading for vehicle access, to the extent practicable.*

Implement erosion control. *Erosion control measures are necessary where wetlands, waterways or protected plant habitat could be affected by erosion or sediment.*

There will be situations where it is not practical, or even possible, to follow a rule. These exceptions need to be documented (see section entitled How is Compliance with the HCP documented?).

Surveys for protected plants and animals may identify the need for additional site-specific measures, primarily exclusion zones.

What Surveys are Required for Protected Plants and Animals?

If the following activities are to occur within natural vegetation, a preconstruction survey for protected plants and animals should occur:

- *Pipeline valve recoating*
- *Pipeline valve replacement*
- *Pipeline lowering*
- *Pipeline coating replacement*
- *Construction of a gas pipeline pressure limiting station*
- *Construction of a pipeline valve installation*
- *Construction of new or replacement pipelines*
- *Electric line reconductoring*
- *Electric pole line reconstruction/relocation*
- *Tower line minor construction*
- *Substation minor construction/expansion*

Preconstruction surveys for covered wildlife species shall occur within 30 days prior to work on site.

Surveys for protected plants shall occur during their flowering period.

Additional information is provided by the HCP database and can be obtained from the HCP administrator (whose contact information is on the last page).

What are Exclusion Zones and How Do They Affect My Work?

- *Exclusion zones are established by a qualified biologist in consultation with the work supervisor and regulatory agencies (CDFG, USFWS).*
- *Their purpose is to protect wildlife, plants or habitat.*
- *They are marked with orange barrier fencing, stakes and flagging.*
- *DO NOT enter exclusion zones except along existing roads or on foot.*
- *A qualified biologist will monitor work near exclusion zones.*

What if I Encounter Injured or Dead Wildlife?

If you encounter dead or injured wildlife at a work site:

- *Do not move the animal unless it compromises worker safety;*
- *Contact the HCP administrator immediately and they will provide guidance; and*
- *Afterwards, complete an animal incident report in the HCP database.*

Note: *The HCP administrator does not need to be contacted for dead animals not covered by the HCP (e.g., deer, skunks, raccons, cats), nor does an animal incident report need to be completed for such animals.*

How is Compliance with the HCP Documented?

Compliance with the HCP is tracked through the HCP database.

Information regarding every O & M activity must be entered into this database in order to successfully document the Company's compliance.

HCP database use involves:

- *Entering basic job information before prior to the activity,*
- *The database then will identify required surveys (if any),*
- *Results of required preconstruction surveys are entered prior to work on the job,*
- *The database then provides a complete list of rules and site-specific measures to follow, and*
- *At job completion the list of rules and site specific measure(s) appropriate to the job and followed is entered.*

Questions?

Contact the HCP Administrator at:
[Phone Number]
[Email]
[Address]

Appendix I

Designated Occupied Habitat Maps

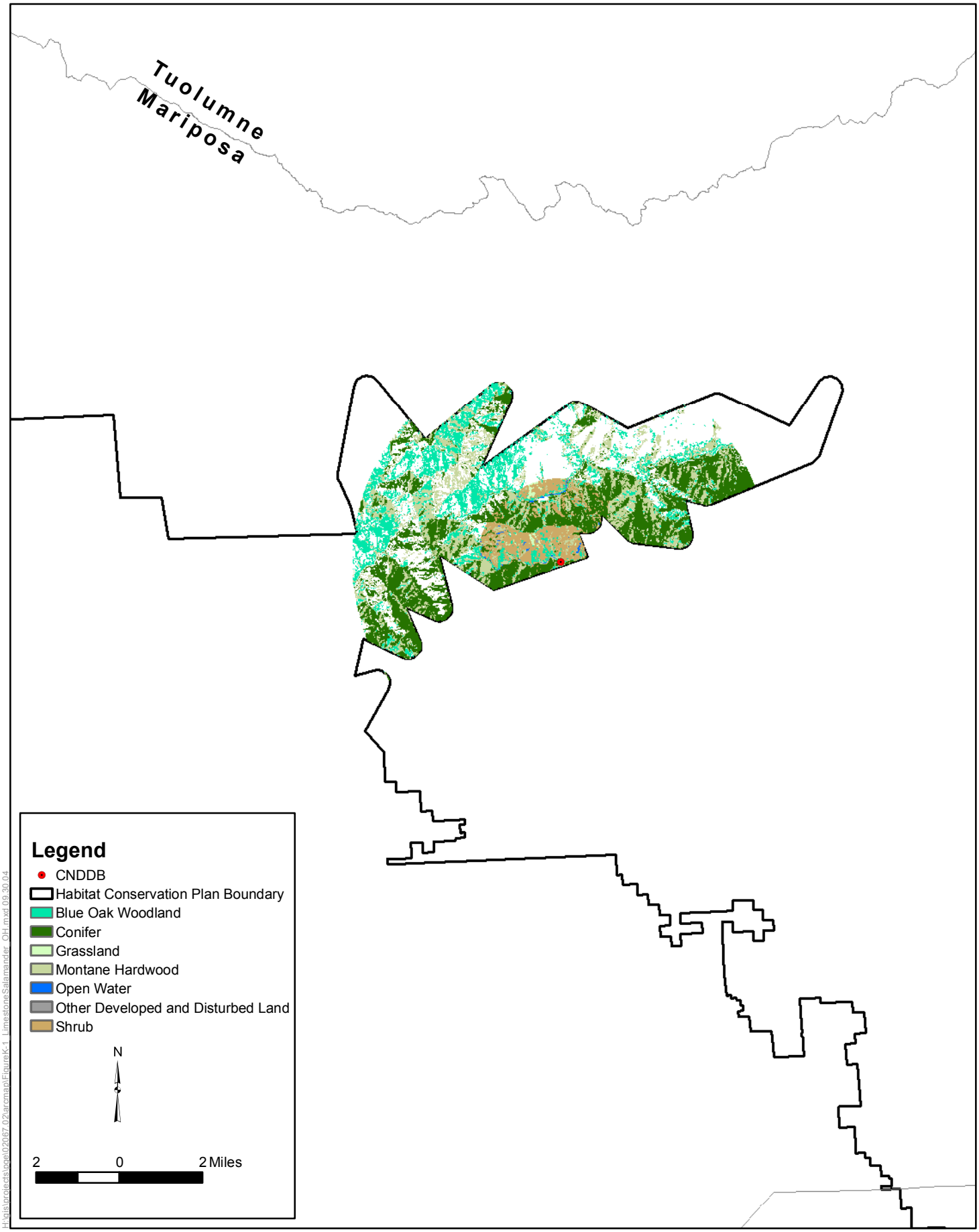


Figure I-1
Designated Occupied Habitat
for the Limestone Salamander for PG&E's O&M HCP

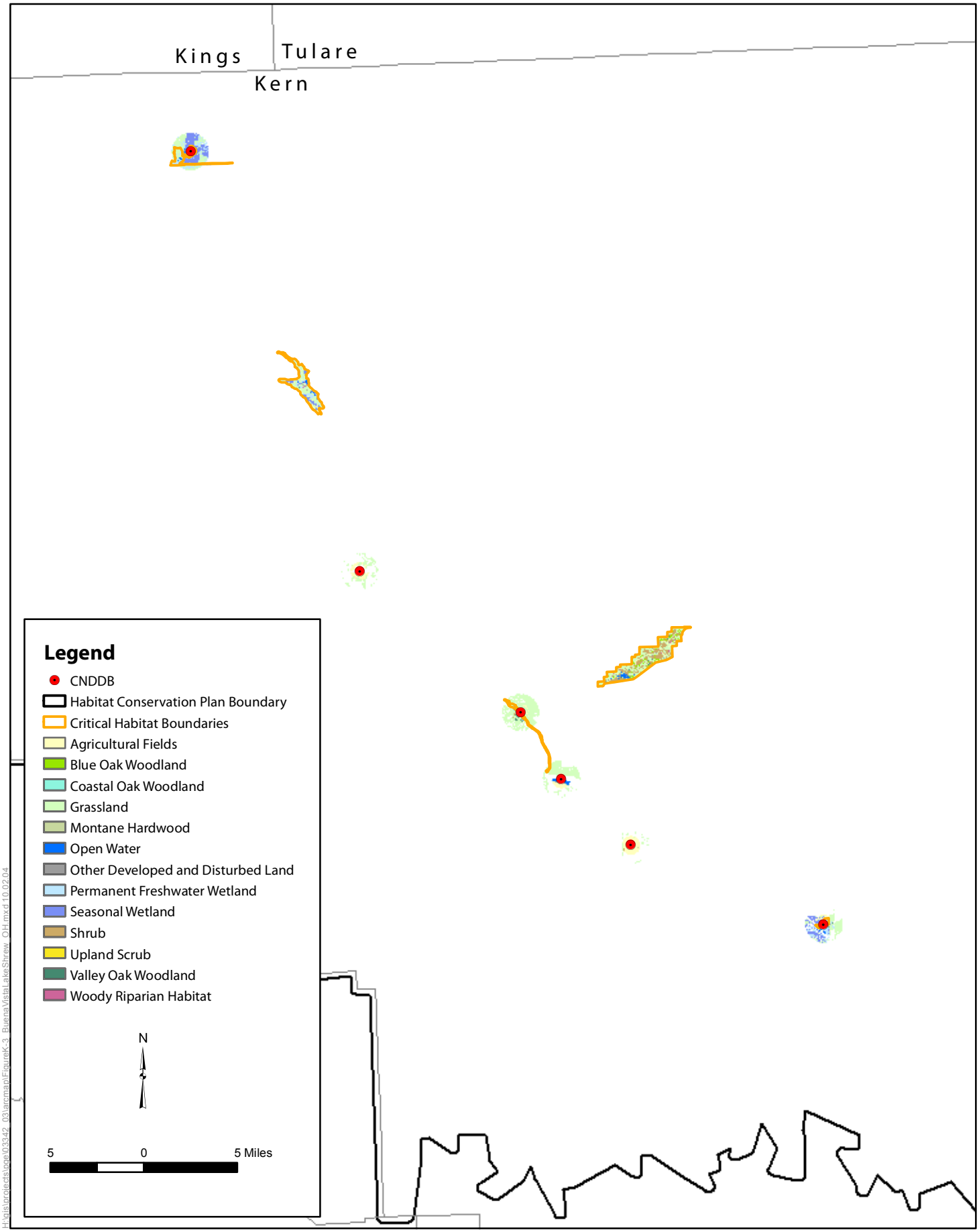


Figure I-2
Designated Occupied Habitat for the
Buena Vista Lake Shrew for PG&E's HCP

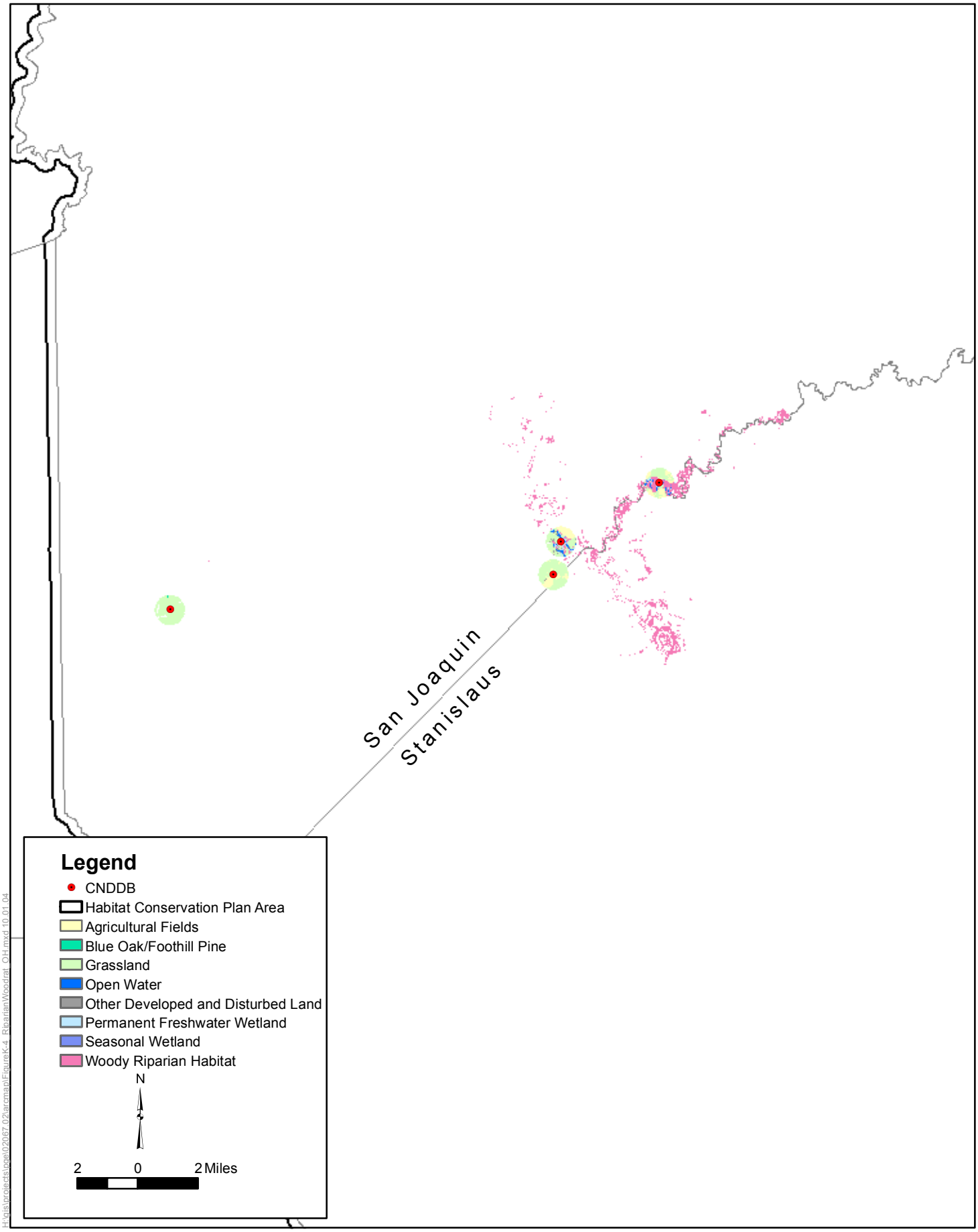


Figure I-3
Designated Occupied Habitat for the
Riparian Woodrat for PG&E's O&M HCP

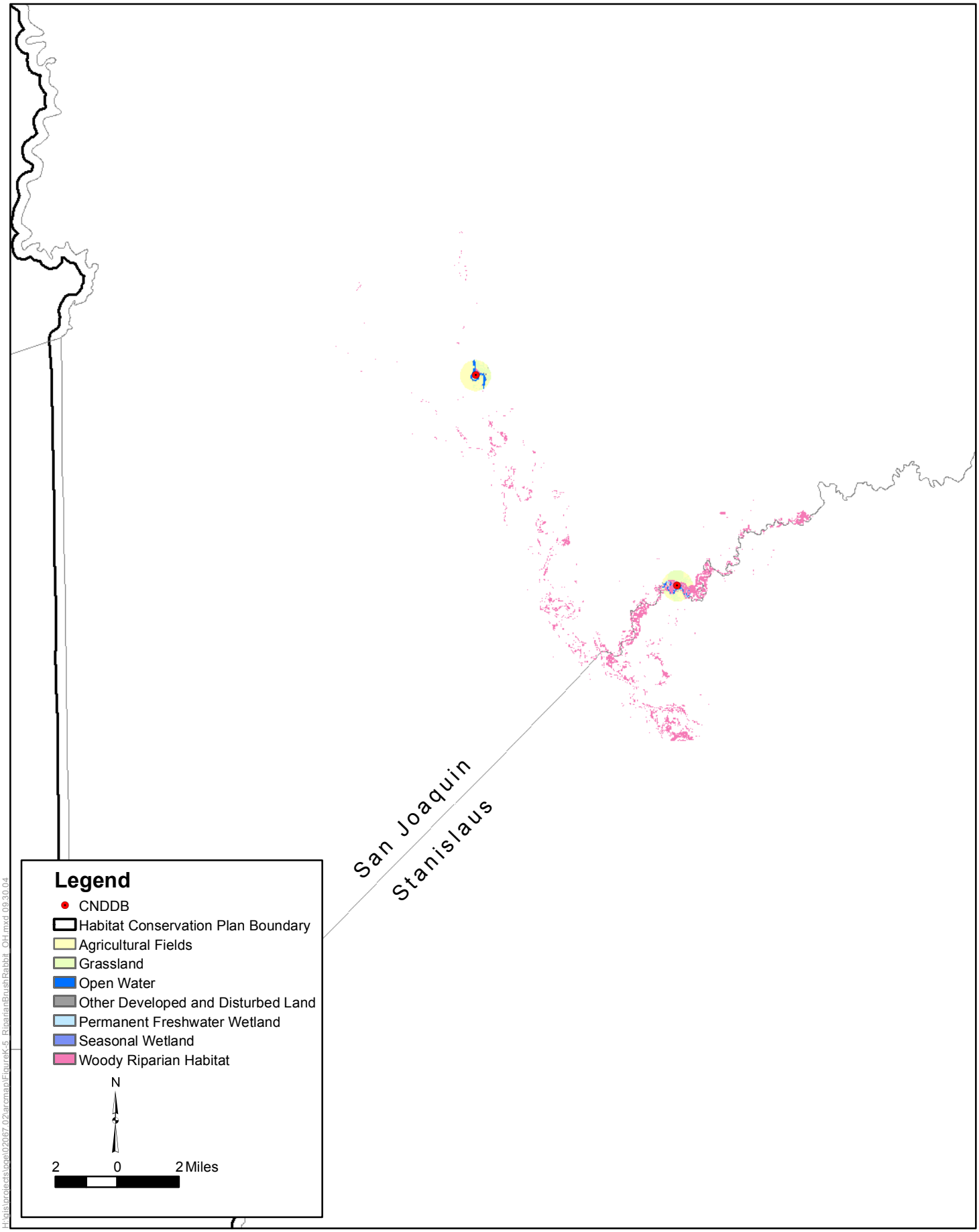


Figure I-4
Designated Occupied Habitat for the
Riparian Brush Rabbit for PG&E's O&M HCP

Appendix J

Proposed Mitigation Acquisition Approval Process

Appendix J

PG&E's Mitigation Acquisition Approval Process with U.S. Fish and Wildlife Service and California Department of Fish and Game

Purpose

The purpose of this document is to describe the process to obtain mitigation acquisition approvals from U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (DFG) in relation to PG&E's San Joaquin Valley Habitat Conservation Plan (HCP) and, as appropriate, PG&E's other mitigation needs. (Note: Other mitigation needs are included in this document as the HCP has not been finalized and as USFWS and DFG actions cannot be taken before a decision is made to issue the permit.)

Draft HCP as Framework

PG&E is committed to avoiding, minimizing, and mitigating potential endangered species effects associated with its activities. The San Joaquin Valley Operations and Management (O&M) HCP provides a framework that estimates the potential magnitude of these effects. PG&E's future compensation obligations are outlined in the Draft HCP prepared in September 2005. Chapters 4, 5, 6, and 7 capture the key elements of the program and should be referenced with respect to specific compensation commitments.

In the event the incidental take permit is not approved, PG&E's future compensation obligations would be determined on a case-by-case basis but would be likely to be of a similar size and affect a similar suite of species. Therefore, the mitigation land secured with the intent to be used for the HCP would be applied to other projects as needed and as approved by the wildlife agencies.

Attributes of Compensation Parcels

Generally, the compensation land site selection criteria will consider:

- size: larger contiguous areas of habitat are preferable to an equal acreage of smaller discontinuous areas;
- surrounding land uses: compensation habitat should be surrounded by compatible land uses;
- coordination with other regional conservation efforts: compensation land should be integrated with other related conservation efforts; and
    - location relative to impact areas: compensation habitat that is in kind and close to the affected site is preferable to more distant habitat or different habitat types.

More specifically, preserve sites will be selected to maximize habitat values; the following characteristics are considered desirable attributes:

- proximity to other compensation lands or mitigation banks;
- proximity to other important habitats (e.g., wetlands, vernal pools, riparian areas) that may not be a target of compensation efforts;
- minimum of past site disturbance or high capability of restoration from disturbance;
- verification of demonstrated species use (if possible); and
    - overall habitat suitability and quality.

The following three specific selection criteria must be met in order for a site to be suitable for compensation:

1. Overall consistency with the HCP [or other] compensation requirements (e.g., surrounding land use is consistent with the species long-term conservation goals).
2. Species presence, as determined by
    a. documented species occurrence; or
    b. previous determination of occupation (e.g., California Energy Commission habitat evaluation); or
    c. proximity to CNDDB or other qualified biologists' records (the quality of a potential site could be partially assessed based on a records search for covered species and the CNNDB or other records from a qualified biologist); or
    d. where applicable, the proposed site is consistent with the site-specific protection requirements listed in Table 5 of the USFWS's September 30, 1998, Recovery Plan for Upland Species of the San Joaquin Valley, California.

3. Suitability, as determined by

   a. biologist indicating the property is suitable for the species proposed for coverage; or

   b. biologist's qualitative assessment about the presence, suitability for presence, or ability of the site to support presence, including vegetation structure and habitat suitability of the site, and observations of tail drags, scat, seed stacks, or other signs of covered species' presence; or

   c. previous determination of occupation or suitability (e.g., California Energy Commission habitat evaluation).

Parcels that meet these criteria are suitable for compensation. Vernal pool wetlands must have demonstrated occupancy for vernal pool crustaceans at the time of acquisition for compensation. Similarly, demonstrated occupancy must be shown for plant mitigation.

Specific habitat objectives are identified in the HCP [or other planning documents] and should also be considered.

Acquisition Approval Request

PG&E, or its designee (Center for Natural Lands Management), will submit a standardized form to USFWS and DFG requesting approval for an acquisition. The data request form is intended to expedite the approval process and contains a signature line for agency staff. Time is of the essence for many of these parcels as landowners' concerns and availability are limiting factors to completing the transactions.

Content

PG&E will submit a request for approval of an acquisition that includes the information in the attached template (Figure 1). This template generally includes information on:

- parcel/mitigation bank name
- acres of mitigation proposed
- relevant parcel information (including assessor's parcel number, site description and location map)
- a list of species for which the parcel is suitable and occupancy information (if possible)
- proximity to other compensation lands or mitigation banks;

- proximity to other important habitats (e.g., wetlands, vernal pools, riparian areas) that may not be a target of compensation efforts;
- information on past site disturbance and capability of restoration from disturbance, if necessary; and
    - overall habitat suitability and quality.

Approval

USFWS and DFG will process the request as soon as possible (ideally within 14 – 28 days after receipt). If the parcel is acceptable, the resource agency will sign and fax back the request. If the parcel is conditionally acceptable, the resource agency will note the conditions in a brief attachment to the request. If the parcel is not acceptable, the resource agency will note the reasons for denying the acquisition.

Post-Acquisition Requirements

The major goal for all compensation land management and habitat enhancement activities is the maintenance and protection of habitat quality for covered species. Post-acquisition requirements include management, reporting, and access. If the parcel is adjacent to an existing preserve or management unit and the use remains the same, the parcel will follow the terms of the existing preserve or management unit.

If the parcel is a new acquisition and does not fall under an existing management unit's terms, or is of a different use, a management plan will be developed within 120 days of the acquisition. The plan will be reviewed and approved by USFWS and DFG. The management plan will include the following:

- goals;
- description of proposed management/enhancement activities;
- maps of existing habitat;
- table of acreage of each habitat type included within the preserve;
- maps of fence and sign locations;
- O&M schedule, where possible;
- description of anticipated management activities to be performed on the preserve (including vegetation management) and a schedule for conducting other necessary management activities;
- maps of habitat anticipated to result from enhancement, if any;
- success criteria for any lands to be enhanced or restored and remediation plans to be implemented if success criteria are not met;

- description of applicable monitoring activities;
- name of holder of conservation easement, if any;
- cost of the acquisition, management, and endowment;
- source of funding for management activities;
- name of managing entity;
- description of other activities allowed on the preserve (e.g., recreation, education, flood control) and how their effects on covered species will be minimized;
- determination of whether public access would be permitted;
- description of potential revenue-generating activities to be permitted, if applicable;
- description of how unwanted or illegal activities in the preserve will be eliminated or reduced; and
    - control of potential predators (e.g., feral cats, red fox) if necessary.

Annual reports will document the past year's activities on the preserve land and will be submitted to USFWS and DFG by the end of the calendar year.

USFWS and DFG will be allowed access to the parcel as needed. USFWS and DFG will also be allowed access to information, as requested and as is reasonably available, in the course of carrying out its quality control/mitigation assurance requirements and other duties as needed.

Figure 1. Land Acquisition Proposal Template
Land Acquisition Proposal for PG&E

Proposal # <Insert text here>

Date submitted:	<Insert text here>
Submitted by:	<Insert text here>
	<Insert text here>
Parcel/mitigation bank name:	(If a mitigation bank, complete Sections 1c-1e, 2a, 2c and 3)
Assessor's parcel number:	<Insert text here>
GPS coordinates, if known: (include projection):	<Insert text here>
Nearest City:	<Insert text here>
County:	<Insert text here>
Size:	<Insert text here>
Map:	(Include a 7 ½ minute quad or finer with a regional location insert.)

1. Parcel Summary

1a. Habitat Characterization

<Narrative description of the habitats on the property.>

1b. Threatened, Endangered, and Other Species

<Narrative description of species seen on site or nearby, plus boxes to check in the table below.>

1c. Wildlife Species, Habitat and Mitigation Evaluation

	Habitat Evaluation			Mitigation Evaluation	
Common and Scientific Name	Observations	Distance (km) to CNDDB or Other Obsrvtns	Foraging, dispersal, or other habitat suitability	Total needed to achieve PG&E's 5-year goal[1]	Property satisfies 5-year goals
Vernal pool fairy shrimp *Branchinecta lynchi*	☐	<#>	☐	1.03 ac N. 2.31 ac C. 0.55 ac S.	☐ ☐ ☐
Midvalley fairy shrimp *Branchinecta mesovallensis*	☐	<#>	☐	1.03 ac N. 2.31 ac C. 0.55 ac S.[2]	☐ ☐ ☐
Vernal pool tadpole shrimp *Lepidurus packardi*	☐	<#>	☐	1.03 ac N. 2.31 ac C. 0.55 ac S.	☐ ☐ ☐
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	☐	<#>	☐	–	☐
California tiger salamander *Ambystoma californiense* (*A. tigrinum c*.)	☐	<#>	☐	24.3 ac N. 28.5 ac C. 33.95 ac S.	☐ ☐ ☐
Limestone salamander *Hydromantes brunus*	☐	<#>	☐	2.1 ac N.	☐
California red-legged frog *Rana aurora draytoni*	☐	<#>	☐	4.35 ac N. 6.75 ac C. 4.25 ac S.	☐ ☐ ☐
Blunt-nosed leopard lizard *Gambelia (Crotaphytus) silus*	☐	<#>	☐	27.35 ac C. 33.25 ac S.	☐ ☐
Giant garter snake *Thamnophis gigas*	☐	<#>	☐	3.85 ac N. 4.7 ac C.	☐ ☐
Swainson's hawk *Buteo swainsoni*	☐	<#>	☐	–	☐
White-tailed kite *Elanus caeruleus*	☐	<#>	☐	–	☐

[1] N. = North; C. = Central; S. = South
[2] This species has not been recorded in the Southern San Joaquin Valley to date (2005).

	Habitat Evaluation			Mitigation Evaluation	
Common and Scientific Name	Observations	Distance (km) to CNDDB or Other Obsrvtns	Foraging, dispersal, or other habitat suitability	Total needed to achieve PG&E's 5-year goal[1]	Property satisfies 5-year goals
Golden eagle *Aquila chrysaetos*	☐	<#>	☐	–	☐
Bald eagle *Haliaeetus leucocephalus*	☐	<#>	☐	–	☐
Western burrowing owl *Athene cunicularia hypugea*	☐	<#>	☐	3.75 ac N. 4.65 ac C. 5.7 ac S.	☐ ☐ ☐
Bank swallow *Riparia riparia*	☐	<#>	☐	–	☐
Tricolored blackbird *Agelaius tricolor*	☐	<#>	☐	1.85 ac N. 4.55 ac C. 2.85 ac S.	☐ ☐ ☐
Buena Vista Lake shrew *Sorex ornatus relictus*	☐	<#>	☐	–	☐
Riparian brush rabbit *Sylvilagus bachmani riparius*	☐	<#>	☐	0.1 ac N.	☐
Riparian (San Joaquin Valley) woodrat *Neotoma fuscipes riparia*	☐	<#>	☐	0.1 ac N.	☐
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	☐	<#>	☐	11.4 ac S.	☐
Giant kangaroo rat *Dipodomys ingens*	☐	<#>	☐	3.7 ac C. 10.85 ac S.	☐ ☐
San Joaquin (Nelson's) antelope squirrel *Ammospermophilus nelsoni*	☐	<#>	☐	45.5 ac C. 55.15 ac S.	☐ ☐
San Joaquin kit fox *Vulpes macrotis mutica*	☐	<#>	☐	52.1 ac N. 64.7 ac C. 77.4 ac S.	☐ ☐ ☐

1d. Covered Plants

Potential:

High ☐ Moderate ☐ Low ☐

Known or possible species:

<Narrative of the potential for listed plants.>

1e. Contribution Toward PG&E's Mitigation Goals

Mitigation applies to San Joaquin Valley: North ☐ Central ☐ South ☐

If surplus mitigation, acreage to be applied toward:

Next 5 years: ☐

Other Projects: ☐

Bank for future PG&E needs: ☐

Name, if known: <Insert text here>

1f. Land Use, Access, and Fencing

<Narrative description of historical land use, adjacent land use, access, and fencing. Attach a map.>

2. Management Issues

<Narrative description of site disturbance and restoration if needed.>

2a. Funding:

Approximate purchase price:	<Insert text here>
Approximate management costs:	<Insert text here>
Approximate endowment:	<Insert text here>
Approximate transaction costs:	<Insert text here>
Approximate total costs:	<Insert text here>

<Narrative description of assumptions going into the above costs.>

2b. Other Purchase Issues

Preliminary title report conducted? Yes ☐ No ☐

Are there encumbrances? Yes ☐ No ☐

If yes, which? <Include firm name here>

Phase I Environmental Assessment conducted? Yes ☐ No ☐

If yes, who conducted? <Include firm name here>

If yes, Phase I EA findings:
<Include summary here>

Appraisal conducted? Yes ☐ No ☐

If yes, appraisal value: <Insert amount here>

2c. Title Holder, Easement Holder, and Manager

Proposed title holder: <CNLM>

Easement holder: <CNLM>

Manager: <CNLM>

DFG and USFWS named as 3rd party beneficiaries. Yes ☐ No ☐

2d. Regional Context

Proximity to other conservation lands or mitigation banks:

Within: ☐ _____

Adjacent: ☐ _____

Nearby: ☐

- 0.1–1 mile: ☐
- 1–2 miles: ☐
- 2–5 miles: ☐

More than 5 miles: ☐

Name of nearest conservation lands or bank: <Insert name here>

Proximity to other important habitats (e.g., wetlands, vernal pools, riparian areas):

Wetlands: ☐ <Insert text here>

Vernal Pools: ☐ <Insert text here>

Riparian areas: ☐ <Insert text here>

Other: ☐ Type:

Within: ☐

Adjacent: ☐

Nearby: ☐

0.1–1 mile: ☐

1–2 miles: ☐

2–5 miles: ☐

More than 5 miles: ☐

3. Accuracy and Authorization

Proposal Preparer: Center for Natural Lands Management

Signature: _____

Name: <Insert text here> Date: <Insert date here>

Title: <Insert text here>

USFWS Authorization

Parcel is acceptable for mitigation: Yes ☐ No ☐

Signature: _____

Name: <Insert text here> Date: <Insert date here>

Title: <Insert text here>

DFG Authorization - State

Parcel is acceptable for mitigation: Yes ☐ No ☐

Signature: _____

Name: <Insert text here> Date: <Insert date here>

Title: <Insert text here>

DFG Authorization - Region

Parcel is acceptable for mitigation: Yes ☐ No ☐

Signature: _____

Name: <Insert text here> Date: <Insert date here>

Title: <Insert text here>

PG&E Authorization

Parcel is acceptable for mitigation: Yes ☐ No ☐

Signature: _____

Name: <Insert text here> Date: <Insert date here>

Title: <Insert text here>

Appendix K

Implementing Agreement

IMPLEMENTATION AGREEMENT

For

PACIFIC GAS AND ELECTRIC COMPANY
SAN JOAQUIN VALLEY
OPERATION & MAINTENANCE
HABITAT CONSERVATION PLAN

By And Among

THE UNITED STATES FISH AND WILDLIFE SERVICE

THE CALIFORNIA DEPARTMENT OF FISH AND GAME

And

PACIFIC GAS AND ELECTRIC COMPANY

December 20, 2006

TABLE OF CONTENTS

AGREEMENT

1.0 PARTIES

This agreement ("Agreement") implements the Pacific Gas and Electric Company San Joaquin Valley Operation & Maintenance Habitat Conservation Plan ("PG&E O&M SJV HCP," or "HCP") as of the Effective Date, by and among: the United States Fish and Wildlife Service ("USFWS") of the United States Department of the Interior; the California Department of Fish and Game ("CDFG") of the State of California Resources Agency; and the Pacific Gas and Electric Company, LLC ("PG&E").

These entities may be referred to collectively as the "Parties" and individually as a "Party." USFWS and CDFG may be referred to collectively as the "Wildlife Agencies."

2.0 RECITALS

2.1 Pacific Gas and Electric Company ("PG&E") is the largest investor-owned electric and gas utility in the United States, serving more than 4.8 million electricity customers and 4 million natural gas customers and employing more than 20,000 people. PG&E's service area encompasses approximately 70,000 square miles in 48 of California's 58 counties. Nearly 30% of the total service area lies within nine counties in the San Joaquin Valley.

2.2 The existing transmission and distribution infrastructure requires long-term operation and maintenance and minor construction activities (collectively, "O&M activities") to deliver reliable energy to its customers. PG&E possesses legal rights-of-way to access its transmission and distribution infrastructure. Many of these O&M activities are mandated and/or regulated by other state and federal laws that govern utilities and public health and safety. Over the years, certain at-risk species in the service area have become listed as threatened or endangered, and others have attained other special status designations due to concern over their small or declining populations. These listings and designations have prompted more frequent consultations with the Wildlife Agencies to ensure that PG&E's O&M activities do not jeopardize the listed species.

2.3 The purpose of the PG&E SJV O&M HCP is to enable PG&E to continue to conduct its current and future O&M activities and minor new construction in the San Joaquin Valley, and to enable PG&E or a nonprofit conservation organization to manage habitat on mitigation lands and conduct biological surveys to capture data for purposes of reporting on the implementation of the HCP, while avoiding, minimizing, and compensating for possible direct, indirect, and cumulative adverse effects on threatened and endangered species that could result from such management activities. These "Covered Activities" are described in detail in Chapter 2 of the HCP.

2.4 PG&E's priority is to avoid and minimize effects to special status species and their habitats to the fullest extent practicable. However, because PG&E's O&M

activities are necessary to ensure the safe and reliable transmission and distribution of electrical power and natural gas to millions of Californians, and because PG&E's O&M activities are closely regulated by the California Public Utilities Commission, PG&E often does not have the discretion to abandon or modify its activities so as to avoid impacts to special status species and their habitats.

2.5 PG&E also desires to integrate other conservation strategies that it already implements, or is in the process of designing and implementing, into one comprehensive conservation plan for the San Joaquin Valley. To that end, the HCP integrates PG&E's programmatic federal consultation under Section 7 of the Endangered Species Act for valley elderberry longhorn beetle ("VELB Conservation Program," at Appendix D of the HCP), a statewide Migratory Bird Protection Program, based on a 2002 agreement with USFWS ("Migratory Bird Protection Program," at Appendix E of the HCP), and a Master Streambed Alteration Agreement (at Appendix F of the HCP) with CDFG. The integration of these programs is intended to enhance protection and conservation benefits for species while streamlining the implementation of these various environmental protection strategies within PG&E. It will also enable unified reporting to the Wildlife Agencies.

2.6 As more specifically described in Chapter 1 and Figure 1-1 of the HCP, the "Plan Area" comprises PG&E's gas and electrical transmission and distribution facilities, the lands owned by PG&E and/or subject to PG&E easements for these facilities, private access routes to infrastructure associated with O&M activities, minor facility expansion areas (all collectively "PG&E right-of-way"), and mitigation areas for impacts resulting from Covered Activities, in portions of nine counties in the San Joaquin Valley, including: San Joaquin, Stanislaus, Merced, Fresno, Kings, Kern, Mariposa, Madera, and Tulare. On the east side of the San Joaquin Valley, the boundary in the northern portion of the Plan Area follows the San Joaquin and Stanislaus County lines. The remainder of the eastern boundary follows the perimeter of federal lands or the 3,000-foot elevation contour, whichever is lower, along the western Sierra Nevada foothills. On the west side of the San Joaquin Valley, the boundary follows the western boundary of San Joaquin, Stanislaus, Merced, Fresno, Kings, and Kern Counties. The northern boundary of the Plan Area is the northern San Joaquin County line, and the southern limit of the Plan Area boundary is the 3,000-foot elevation contour north of the Kern County line.

2.7 The Covered Activities within the Plan Area will be implemented according to the HCP. The Plan Area contains land-cover types that serve as suitable habitat for various San Joaquin Valley species classified as either endangered, threatened, fully protected, rare or of special concern by the Wildlife Agencies. Most Covered Activities will result in only small, temporary disturbance or impacts, if any, to these species or their habitat; only a small fraction of the Covered Activities will call permanent impacts.

2.8 The HCP describes the measures that PG&E will implement over the next thirty (30) years to avoid, minimize and mitigate the impact of take of certain special

status species while carrying out the Covered Activities in the Plan Area. These "Covered Species" are listed in Exhibit A**.**

2.9 USFWS has jurisdiction over the conservation, protection, restoration, enhancement and management of fish, wildlife, native plants and their habitats under various federal laws, including the federal Endangered Species Act (16 U.S.C. § 1531 et seq.) ("**ESA**"), the Migratory Bird Treaty Act (16 U.S.C. § 701 et seq.), the Bald and Golden Eagle Protection Act (16 U.S.C. § 668 et seq.), the Fish and Wildlife Coordination Act (16 U.S.C. § 661-666(c)), and the Fish and Wildlife Act of 1956 (16 U.S.C. § 742(a) et seq.).

2.10 CDFG has jurisdiction over the conservation, protection, restoration, enhancement and management of fish, wildlife, native plants and habitat necessary for biologically sustainable populations of those species under various state laws, including the California Endangered Species Act (Fish & G. Code § 2050 et seq.) ("CESA"), the Native Plant Protection Act (Fish & G. Code § 1900 et seq.), and California Fish and Game Code sections 1600 et seq., 1801, 1802, 3511, 4700, 5050 and 5515.

2.11 ESA prohibits the "take" of species listed as endangered or threatened under ESA. Under Section 10(a)(1)(B) of ESA (16 USC § 1539(a)), the Service may issue permits authorizing the incidental "take" of endangered or threatened species during otherwise lawful activities if certain statutory requirements are met by the applicant and such take will not appreciably reduce the likelihood of the survival and recovery of the species in the wild. To obtain a federal incidental take permit, the applicant must submit a habitat conservation plan ("HCP") describing, among other things, the steps the applicant will take to minimize and mitigate to the maximum extent practicable the impact of such take. PG&E submitted its HCP to USFWS, and applied for a federal permit for incidental take of Covered Species within the Plan Area. The incidental issued by USFWS based on the HCP will be issued concurrently with the execution of this Agreement.

2.12 CESA prohibits the "take" of species listed as endangered, threatened or candidate species under CESA. Section 2081 of the California Fish & Game Code allows CDFG to authorize by permit the take of any endangered, threatened or candidate species during otherwise lawful activities, where the impacts of the take are minimized and fully mitigated in a plan approved by CDFG. PG&E submitted its HCP to CDFG, and applied for a permit for take of Covered Species within the Plan Area. The take permit issued by CDFG based on the HCP will be issued concurrently with the execution of this Agreement.

2.13 The HCP was developed through an iterative process of: intensive study of the Covered Species, the Covered Activities, and the Plan Area, discussions between PG&E and the Wildlife Agencies; and environmental review under the National Environmental Policy Act (42 U.S.C. § 4321 et seq.) ("NEPA") and the California Environmental Quality Act (Pub. Resources Code § 21000 et seq.) ("CEQA").

2.14 The purposes of this Agreement are: a) to ensure implementation of each of the terms and conditions of the HCP and the incidental take permits issued by USFWS and CDFG; b) to provide assurances to PG&E that as long as the terms of the HCP are properly implemented, no additional mitigation will be required of PG&E except as provided for in this Agreement or required by law; and c) to describe remedies and recourse should any party fail to perform its obligations as set forth in the HCP and this Agreement.

2.15 Although some Covered Activities may result in direct harm to Covered Species, most Covered Activities will impact Covered Species due to temporary impairment of habitat upon which the Covered Species depend. The HCP provides a conservation strategy that is intended to avoid, minimize, and compensate for all direct and indirect harm resulting from "take" of Covered Species.

2.16 The Agreement defines the Parties' roles and responsibilities and provides a common understanding of action that will be undertaken to minimize and mitigate the effects on the Covered Species caused by the Covered Activities within the Plan Area and to avoid jeopardy to the listed Covered Species.

2.17 Adequate consideration supports this Agreement. PG&E is agreeing to substantial commitments of land, natural resources, financial resources, human resources and other assets to conserve and manage the Covered Species and their habitats, in exchange for the assurances provided by the Wildlife Agencies in this Agreement.

3.0 DEFINITIONS

The following terms as used in this Agreement shall have the meanings set forth below:

"**Adaptive management**" means to use the results of new information gathered through the monitoring program of the HCP to adjust management strategies and practices to achieve the goals and objectives stated in the HCP and to assist in providing for the conservation of Covered Species, as provided in Chapter 6 of the HCP.

"**Agreement**" means this document, which incorporates the HCP and Federal and State Permits by reference.

"**AMM**" means the avoidance and minimization measures listed in Table 4-2 of the HCP.

"**Authorized Take**" or "**Take Authorization**" means the extent of incidental Take of Covered Species authorized by the USFWS in the Federal Permit issued to PG&E pursuant to Section 10(a)(1)(B) of the Federal Endangered Species Act, and the extent of Take of Covered Species authorized by CDFG in the State Permit issued to PG&E pursuant to section 2081 of the California Endangered Species Act.

"**BGEPA**" means the federal Bald and Golden Eagle Protection Act (16 U.S.C. § 668 et seq.), including all regulations promulgated pursuant to that Act.

"**CDFG**" means the California Department of Fish and Game, a subdivision of the California Resources Agency charged with administering the California Endangered Species Act and other provisions of the California Fish and Game Code.

"**CEQA**" means the California Environmental Quality Act (Pub. Resources Code § 21000 et seq.), including all regulations promulgated pursuant to that Act.

"**CESA**" means the California Endangered Species Act (Fish & G. Code § 2050 et seq.), including all regulations promulgated pursuant to that Act.

"**Changed Circumstances**" means, pursuant to 50 CFR 17.3, changes in circumstances affecting a species or geographic area covered by the HCP that can reasonably be anticipated by PG&E, USFWS, and CDFG and that can be planned for. Changed Circumstances and planned responses to Changed Circumstances are identified in Section 11.3 of this Agreement and Chapter 6 of the HCP.

"**Conservation Strategy**" means the conservation and management measures provided in the HCP to minimize and mitigate the impacts of Authorized Take of the Covered Species, as described at Chapters 4 and 6 of the HCP, including those measures described at Chapter 6 of the HCP to respond to Changed Circumstances.

"**Covered Activities**" means those land uses, including O&M and conservation activities identified in detail in Chapter 2 of the HCP, to be carried out by PG&E and its agents in the Plan Area that may result in Authorized Take of Covered Species during the term of the HCP.

"**Covered Species**" means the species, listed and unlisted, that PG&E intends to conserve and protect through the HCP. Covered Species are listed in Exhibit A.

"**Effective Date**" means the date following execution of this Agreement by all Parties, on which the last of the required Federal and State Permits is issued.

"**Federally Listed Species**" means the Covered Species which are listed as threatened or endangered species under ESA as of the Effective Date, and the Covered Species which are listed as threatened or endangered pursuant to ESA during the term of the HCP, as of the date of such listing.

"**Federal Permit**" means the federal incidental Take permit issued by USFWS to PG&E pursuant to Section 10(a)(1)(B) of the Federal Endangered Species Act.

"**ESA**" means the Federal Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 et seq.), including all regulations promulgated pursuant to that Act.

"**Fully Protected Species**" means any Covered Species designated as fully protected in California Fish and Game Code sections 3511, 4700, 5050 and 5515.

"**HCP**" means the Habitat Conservation Plan prepared by PG&E to address the requirements of Section 10(a)(1)(B) of ESA and section 2081 of CESA, which is incorporated by reference in this document.

"**Master Streambed Alteration Agreement**" means the agreement that PG&E and CDFG expect to enter into pursuant to section 1602 and section 1605(g) of the Fish and Game Code to ensure that the Covered Activities comply with those provisions. PG&E and CDFG may enter the MSAA either concurrent with or after the issuance of the State Permit.

"**NEPA**" means the National Environmental Policy Act (42 U.S.C. § 4321 et seq.).

"**PG&E**" means the Pacific Gas and Electric Company.

"**PG&E EIS/EIR**" means the Pacific Gas and Electric Company San Joaquin Valley Operations & Maintenance Habitat Conservation Plan Final Environmental Impact Statement and Environmental Impact Report dated November __ 2006, prepared pursuant to NEPA and CEQA, which analyzed the environmental impacts that may result from Covered Activities with implementation of the HCP under the Federal and State Permits and the Master Streambed Alteration Agreement.

"**PG&E right-of-way**" means those lands within the Plan Area in which PG&E holds a fee or partial interest or right-of-way for operating and maintaining its electrical and gas transmission system, on or after the Effective Date.

"**Party**" or "**Parties**" means any or all of the signatories to this Agreement.

"**Plan Area**" means the land within the boundaries detailed in Section 2.6 of this Agreement.

"**Pre-activity survey**" means the survey that PG&E will conduct prior to each qualifying Covered Activity, as provided in Section 7.3 of this Agreement and Chapter 4 of the HCP.

"**Service**" means the USFWS.

"**State Listed Species**" means the Covered Species which are listed as threatened or endangered species, or a candidate for such status, under CESA, as of the Effective Date, and the Covered Species which are listed as threatened or endangered, or a candidate for such status pursuant to CESA during the term of the HCP, as of the date of such listing.

"**State Permit**" means the state Take permit issued to PG&E pursuant to section 2081 of CESA.

"**Take**" and "**Taking**" have the same meaning provided by ESA and its implementing regulations with regard to activities subject to ESA, and have the same meaning provided in the California Fish and Game Code with regard to activities subject to CESA and other applicable provisions of the California Fish and Game Code.

"**Unforeseen Circumstances**" means changes in circumstances affecting a species or geographic area covered by the HCP that could not reasonably have been anticipated by the plan's developers at the time of the plan's negotiation and development, and that results in a substantial and adverse change in the status of a Covered Species.

"**USFWS**" means the United States Fish and Wildlife Service, an agency of the United States Department of Interior.

"**VELB**" means the valley elderberry longhorn beetle.

"**VELB Conservation Program**" means PG&E's programmatic federal consultation with USFWS, and USFWS's biological opinion issued pursuant to Section 7 of the ESA for VELB.

"**Wetlands**" means generally those areas that are inundated or saturated by surface or ground water at a frequency or duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions.

"**Wildlife Agencies**" means the USFWS and CDFG.

4.0 RELATIONSHIP BETWEEN THE HABITAT CONSERVATION PLAN AND THE IMPLEMENTATION AGREEMENT

The HCP and each of its provisions are intended to be, and by this reference are, incorporated herein. This Agreement is intended to specify, in contract language, the obligations of the Parties under the HCP, recognizing that the HCP describes the components of a habitat conservation plan and was not drafted as a contract. In the event of any direct contradiction, conflict or inconsistency between the HCP and this Agreement, the terms of this Agreement shall control. In all other cases, the provisions of the HCP and this Agreement shall be interpreted to be consistent with and complementary to each other.

5.0 LEGAL OBLIGATIONS OF THE AGENCIES

5.1 USFWS

5.1.1 USFWS Findings

As further described in the Section 10(a)(1)(B) permit issued by the USFWS, the USFWS has found that the HCP satisfies the permit issuance criteria under Section 10(a)(2)(B) of

ESA for each Covered Species that is a Federally Listed Species within the jurisdiction of the USFWS.

For each Covered Species that is not a Federally Listed Species as of the Effective Date, USFWS has found that the HCP satisfies the permit issuance criteria under Section 10(a)(2)(B) of the ESA that would otherwise apply if such Covered Species were a Federally Listed Species.

The Take of Federally Listed Species that are plants is not prohibited under ESA, and therefore, Take Authorization for federally listed plants is not necessary. Plant species included on the list of Covered Species are listed on the Federal Permits in recognition of the conservation measures and benefits provided for those plants under the HCP. As of the Effective Date, any reference in this Agreement or in the HCP to the Authorized Take of Covered Species shall, for the purpose of the Federal Permit refer solely to Federally Listed Species other than plants on the Covered Species list. If at any time during the term of this Agreement and the Federal Permit, any plant listed on the Covered Species becomes subject to the Take prohibition under ESA, the Federal Permit shall automatically become effective as to such species as provided in Section 11.4 of this Agreement and PG&E shall receive incidental Take Authorization for that plant.

5.1.2 USFWS Obligations

Concurrent with the execution of this Agreement by all Parties, and after satisfaction of all other requirements, USFWS agrees to issue PG&E the Federal Permit under Section 10(a)(l)(B) of the ESA, authorizing the incidental Take by PG&E of each Covered Species listed on the Federal Permit resulting from Covered Activities in the Plan Area. The Federal Permit is conditioned on compliance with the terms and conditions of the Federal Permit, the HCP, and this Agreement. USFWS shall monitor PG&E's implementation of the HCP and compliance with the Federal Permit. USFWS shall also provide technical assistance and timely collaboration and consultation to PG&E regarding implementation of the HCP, as provided in the HCP and this Agreement, throughout the duration of the Federal Permit.

5.2 CDFG

5.2.1 CDFG Findings

As further described in the State Permit and the findings issued by CDFG under CESA, CDFG, based on the best scientific and other information that is reasonably available, and the terms and provisions of this Agreement and the HCP, has found that with respect to the Covered Species:

(a) Incidental Take. The Authorized Take of Covered Species will be incidental to an otherwise lawful activity.

(b) Minimize and Fully Mitigate. The impacts of the Authorized take will be minimized and fully mitigated.

(c) Roughly Proportional. The measures required to minimize and fully mitigate the impacts of the authorized take will be roughly proportional in extent to the impact of the Authorized Take of Covered Species.

(d) Applicant's Objectives. The measures required to minimize and fully mitigate the impacts of the Authorized Take will preserve PG&E's objectives to the greatest extent possible, consistent with the obligation to minimize and fully mitigate the impacts of the Authorized Take.

(e) Capable of Successful Implementation. All required measures will be capable of successful implementation.

(f) Adequate Funding. PG&E has ensured adequate funding to implement the required minimization and mitigate measures, and for monitoring compliance with, and effectiveness of any Covered Species.

(g) No Jeopardy. The issuance of the State Permit will not jeopardize the continued existence of any Covered Species.

(h) Unlisted Species. Covered Species that are not currently listed as threatened or endangered under CESA have been treated in the HCP as if they were listed, and the HCP identifies measures to minimize and fully mitigate the impacts of the Authorized Take of such unlisted species. The findings referenced in this Section 5.2.1 apply to all Covered Species, including Covered Species that are not listed.

5.2.2 CDFG Obligation

Concurrent with the execution of this Agreement by all Parties, and on satisfaction of all other requirements, CDFG agrees to issue PG&E the State Permit, authorizing the Take by PG&E of State Listed Covered Species listed on the State Permit where the Take results from Covered Activities in the Plan Area. The State Permit is conditioned on compliance with the terms and conditions of the State Permit, the HCP, and this Agreement. As required by the State Permit and as otherwise necessary, CDFG shall monitor PG&E's implementation of the HCP and compliance with the State Permit based on the results of monitoring and other information provided to CDFG by PG&E. Throughout the duration of the State Permit, CDFG shall also provide technical assistance and timely collaboration and consultation to PG&E regarding implementation of the HCP, as provided in the HCP and this Agreement. The Parties recognize the importance of the California Natural Diversity Data Base as a tool to implement the conservation strategy in the HCP, and CDFG agrees to maintain the data base to the extent feasible and subject to legislative appropriation.

5.3 Environmental Review

5.3.1 Federal Law – National Environmental Policy Act

Approval of the HCP and issuance of the Federal Permit under Section 10(a)(1)(B) of ESA to PG&E by USFWS are actions subject to review under the NEPA. USFWS is the federal lead agency under NEPA. Prior to the Effective Date, the Service evaluated the HCP pursuant to NEPA in the PG&E EIS/EIR.

5.3.2 State Law – California Environmental Quality Act

Issuance of the State Permit under Section 2081 of CESA to PG&E by CDFG is a discretionary approval of a project subject to review under CEQA. CDFG is the State lead agency for the State Permit and the Master Streambed Alteration Agreement under CEQA. Prior to issuance of the State Permit and the Effective Date of this Agreement, CDFG evaluated in the PG&E EIS/EIR the environmental impacts that may result from Covered Activities authorized by the State Permit and Master Streambed Alteration Agreement and issued findings under CEQA addressing the potential for significant adverse effects to the environment. In so doing, CDFG complied with CEQA, including its lead agency obligations prescribed by Title 14 of the California Code of Regulations, commencing with Section 783.0 et seq.

6.0 RIGHTS AND OBLIGATIONS OF PACIFIC GAS AND ELECTRIC COMPANY

6.1 Implementation of the Conservation Strategy

PG&E will fully and faithfully perform all obligations assigned to it under this Agreement, the HCP, and the Federal and State Permits, including but not limited to the terms of this Section 6.0, Section 7.0 (Implementation of the HCP), 8.0 (Monitoring and Adaptive Management) and 9.0 (Funding).

PG&E will implement all of the conservation, management and monitoring measures, or such measures as they may be modified through adaptive management, as described in this Agreement and the HCP, whether or not such conservation, management and monitoring measures are specifically referenced in this Agreement. For the purposes of this Agreement, all of these measures are collectively referred to as the "Conservation Strategy."

As of the Effective Date, PG&E may Take the Covered Species while carrying out Covered Activities in the Plan Area, as authorized by and subject to the conditions of the Federal and State Permits, this Agreement and the HCP. The Covered Activities include all activities described in Chapter 2 of the HCP.

The authority issued to PG&E hereunder applies to all of PG&E's officers, directors, employees, agents, subsidiaries, contractors, and subcontractors, and their officers, directors, employees and agents who engage in any Covered Activity. PG&E shall conduct an educational program to fully inform all such persons and entities of the terms and conditions of the Federal and State Permits, and PG&E shall be responsible for supervising their compliance with those terms and conditions. All contracts between PG&E and such persons and entities shall require their compliance with the Federal and State Permits, this Agreement and the HCP.

7.0 IMPLEMENTATION OF THE HCP

7.1 Overview of the Conservation Strategy

In accordance with the Conservation Strategy of the HCP, PG&E shall: avoid impacts to Covered Species and their habitat to the maximum extent practicable; minimize unavoidable impacts and compensate for Authorized Take of Covered Species and their habitat by establishing and managing compensation habitat in perpetuity.

7.2 Conservation Strategy Limited to PG&E Right-of-Access

Nothing in this Agreement or the HCP shall be construed to require PG&E to conduct any action on land to which PG&E does not possess legal access, nor shall PG&E be required to obtain permission from any third party for access to any such land.

7.3 Pre-Activity Surveys

7.3.1 When Pre-Activity Surveys Are Required

PG&E shall conduct pre-activity surveys for Covered Activities as described under the heading "Estimation of Levels of Disturbance" in Chapter 4 of the HCP and as reflected in Table 4-6 of the HCP.

7.3.2 How Pre-Activity Surveys Are Conducted

Pre-activity surveys will be conducted according to Chapter 4 of the HCP, or according to any more specific requirements that may be described in the VELB Conservation Program (Appendix D of the HCP), the Migratory Bird Protection Program (Appendix E of the HCP), and the Master Streambed Alteration Agreement (Appendix F of the HCP).

PG&E will engage qualified biologists to carry out the pre-activity surveys in accordance with specific biological standards to ensure consistency in methodology and results, as further specified in: Table 4-9 of the HCP; and the VELB Conservation Program. For plants, PG&E will engage qualified botanists to carry out the pre-activity surveys in accordance with a standard methodology, as further specified for individual species in Table 4-10 of the HCP.

Each pre-activity survey will be sufficient to: document the percentage of the Covered Activity site suitable for Covered Species; identify which avoidance and minimization measures shall be implemented for each Covered Activity; and quantify expected Take of Covered Species and temporary and permanent loss of habitat.

7.3.3 Timing of Pre-Activity Surveys

Pre-activity surveys to assess potential effects on suitable habitat will be conducted prior to the Covered Activity or as further specified in the VELB Conservation Program. Pre-

activity surveys for those Covered Species that are plants species will be conducted at an appropriate time of year for reliable identification, according to Table 4-10 of the HCP, to the extent practicable. Pre-activity surveys may be performed at different intervals preceding the Covered Activity if the Covered Activity is to be carried out without ample warning due to an emergency or unscheduled outage. In the case of plants, if the plant surveys cannot be conducted during the appropriate time of year, PG&E will assume that the effect on covered plant species is proportionate to the percentage of occupied habitat identified in those surveys that are conducted during the appropriate seasonal window. If no other surveys have been conducted for the plan in the appropriate seasonal window, the entire potentially suitable area will be considered occupied and affected.

7.4 Avoidance and Minimization Measures

Table 4-2 of the HCP lists avoidance and minimization measures ("**AMM**") that PG&E will implement as appropriate before and during Covered Activities. PG&E shall avoid and minimize Take of Covered Species where practicable, except that PG&E shall avoid Take of all Fully Protected Species, and shall avoid Take of Migratory Bird Treaty Act listed species unless (a) they are listed under the ESA or (b) the Take is otherwise authorized in a special use permit issued by the USFWS. "Practicable" here means physically possible and not conflicting with other regulatory obligations or safety considerations.

AMM numbers 1 through 10 in Table 4-2 of the HCP will be implemented for all Covered Activities. AMM numbers 11 through 24 will be implemented if indicated in the corresponding pre-activity survey.

7.5 Best Management Practices

Tables 4-7, 4-8 and 4-9 list best management practices that PG&E shall incorporate in all of its vegetation management activities for electric facilities.

7.6 Compensation

In order to fully mitigate the impacts of Authorized Take, PG&E shall implement a compensation program by funding and carrying out the acquisition, enhancement, and maintenance of habitat for the benefit of Covered Species, in accordance with the Federal and State Permits, this Agreement and the HCP.

7.6.1 Requirements for Compensation

The amount of compensation required shall be determined by calculating the disturbed habitat of Covered Activities that were preceded by a pre-activity survey, and by estimating the disturbed habitat of Covered Activities that were not preceded by a pre-activity survey, according to the approach detailed in Chapter 4 of the HCP.

Permanent suitable habitat losses will be compensated at a 3:1 ratio, and temporary suitable habitat losses will be compensated at a 0.5:1 ratio for all Covered Species except VELB. Specific compensation for VELB is provided in the VELB Conservation Program (Appendix D of the HCP).

PG&E may satisfy its compensation obligation by placing conservation easements on existing lands owned by PG&E, by purchasing high-quality natural lands that may support target species, by obtaining credits from existing mitigation banks, and by acquiring conservation easements from willing sellers. With advance approval of the Wildlife Agencies, PG&E may also in certain circumstances be allowed to provide compensation for the impacts of authorized Take by making a financial contribution to a conservation organization or by enhancing habitat, as approved by the Wildlife Agencies, where such contribution or enhancement mitigates impacts of Take of rare plants that are Covered Species that result from Covered Activities under the Federal and State Permits.

Compensation lands shall be considered "acquired" when they are legally encumbered by a conservation easement that is dedicated in perpetuity in favor of CDFG or a Wildlife Agency approved third-party conservation organization, the landowner is obligated to manage the lands in accordance with a long-term management plan that will protect the land's conservation values, and adequate fuding is provided to implement the management plan.

7.6.2 Compensation To Remain Ahead of the Impacts of Authorized Take

PG&E shall ensure that its acquisition of compensation lands and/or credits shall remain ahead of the amount of compensation required as a result of actual Take, subject to the exception in Section 7.6.3 of this Agreement. To stay ahead of compensation required, PG&E shall acquire approximately 217 acres of compensation lands by the Effective Date, following the guidance of the regional and habitat-type objectives listed in Tables 4-12 and 4-13 of the HCP and the VELB Conservation Program (Appendix D of the HCP).

7.6.3 Compensation for Rare Plants

Compensation for Take of rare plants shall be accomplished no later than two years after the time of the disturbance, in order to identify and acquire lands suitable for the particular plant species, as represented in Table 4-14 of the HCP.

8.0 MONITORING, REPORTING, AND ADAPTIVE MANAGEMENT

8.1 General Approach to Monitoring, Reporting and Adaptive Management

PG&E shall implement each of the monitoring, reporting and adaptive management programs described in Chapter 6 of the HCP, the VELB Conservation Program

(Appendix D of the HCP), the Migratory Bird Protection Program (Appendix E of the HCP), and the Master Streambed Alteration Agreement (Appendix F of the HCP), whether or not they are specifically referenced in this Agreement. PG&E's obligation to fund the implementation of the HCP as further specified in Section 9 of this Agreement includes the obligation to fund all monitoring programs described in the HCP and these Appendices.

8.2 Annual Reporting

PG&E will prepare an annual HCP Monitoring Report that will consolidate all of the reporting requirements of the HCP, including the VELB Conservation Program (Appendix D of the HCP), the Migratory Bird Protection Program (Appendix E of the HCP), and the Master Streambed Alteration Agreement (Appendix F of the HCP) in accordance with Chapter 6 of the HCP.

No later than January 31st of each year, PG&E shall provide a single HCP Monitoring Report to the Wildlife Agencies containing all of the reports and other information that are due to the Wildlife Agencies for the prior calendar year. PG&E and the Wildlife Agencies shall cooperate to identify a format for the HCP Monitoring Report, including all information and data contained therein, that is most economical to compile and accessible to use.

8.3 Additional Information

The Wildlife Agencies may request from PG&E information necessary to determine whether PG&E is complying with the Federal and State Permits, the HCP, and this Agreement. The Parties acknowledge the HCP and the Federal and State Permits include compliance and effectiveness monitoring, other reporting obligations, and an adaptive management program that, when taken together, the Parties believe will provide sufficient information for the Wildlife Agencies to monitor, assess, and ensure the effectiveness of and PG&E's compliance with the Federal and State Permits, the HCP, and this Agreement. The Parties also acknowledge that, in unusual circumstances, information in addition to that required by the monitoring and reporting program, and the adaptive management program in the HCP may be necessary for the Wildlife Agencies to evaluate PG&E's compliance with the Federal and State Permits, the HCP, and this Agreement. Where a Wildlife Agency determines such additional information is necessary, any request to PG&E for such information shall have a reasonable basis and be designed by the Wildlife Agencies to generate, obtain, and provide the information in a manner least intrusive to PG&E operations while permitting the Wildlife Agencies to carry out their respective oversight responsibilities.

Subject to 50 C.F.R. §§ 13.27 through 13.29, 17.22, and 17.32, and section 783.7 of Title 14 of the California Code of Regulations, PG&E shall be required only to provide reasonably available information in its current state. Nothing in this Agreement shall compel PG&E to disclose communications that are subject to the attorney-work-product or attorney-client privilege, or any other privilege applicable at the time the information

request is made. PG&E may designate, by notifying the Wildlife Agencies in writing, any trade secrets or commercial, proprietary, or financial information, or data bearing upon national security ("Confidential Information"), that is requested by the Wildlife Agencies as exempt from disclosure by the Wildlife Agencies pursuant to a request made under the federal Freedom of Information Act ("FOIA") and/or the California Public Records Act ("PRA"), because such trade secret and/or information so designated (1) is Confidential Information, (2) has not been disclosed to the public by PG&E, and (3) to PG&E's knowledge is not routinely available to the public from other sources. Should Confidential Information be requested pursuant to FOIA and the PRA, the Wildlife Agencies will contact PG&E sufficiently prior to releasing any such information so as to allow PG&E a reasonable opportunity to protect the Confidential Information from release. This provision is not intended to limit the applicability of FOIA or the PRA.

9.0 FUNDING

9.1 Primary Funding and Demonstration of Availability

PG&E warrants that it has, and will expend, such funds as may be necessary to fulfill its obligations under the HCP and this Agreement. To fulfill this contractual obligation, PG&E will partially rely upon income derived from the transmission and distribution of electricity and gas through the facilities maintained by PG&E's Covered Activities in the Plan Area. By December 1st of each year after the Federal and State Permits are in effect, PG&E shall submit to the Wildlife Agencies a written declaration by PG&E's Habitat and Species Protection Program Manager confirming that all costs for full implementation of the HCP for the following calendar year have been budgeted and authorized for expenditure for that purpose.

9.2 Material Change in Resources

PG&E will promptly notify the Wildlife Agencies of any material change in PG&E's funding resources. A material change in PG&E's funding resources is any change in the financial condition of PG&E, or the availability of its funds, that will impair PG&E's ability to carry out its obligations under this Agreement, the HCP, and the Federal and State permits.

10.0 MODIFICATION AND AMENDMENT

10.1 Modification and Amendment of the State Permit

Any modification or amendment of the State Permit shall be subject to controlling State law, including CDFG regulations implementing Fish and Game Code Sections 2080 and 2081. (See Cal. Code Regs., tit. 14, §783.0 et seq.)

10.2 Exceptions to the Conservation Strategy

Nothing in the Adaptive Management or Changed Circumstances provisions of this Agreement or the HCP, nor any other provision that provides for an exception for the application of any measure included in the Conservation Strategy, authorizes an increase in the amount of Take, or an increase of the impacts of Take, of Covered Species beyond that authorized by the Federal and State Permits. Any modification that would result in such an increase in Take beyond that authorized by the Federal and State permits must be approved as an amendment under Section 10.4 of this Agreement.

10.3 Amendment of this Agreement

This Agreement may be amended only with the written consent of each of the Parties. PG&E may object to any amendment proposed by the Wildlife Agencies upon any reasonable basis.

10.4 Amendment of the HCP

The HCP may be amended only with the written consent of each of the Parties. PG&E may object to any amendment proposed by the Wildlife Agencies upon any reasonable basis. Nothing in this subsection shall be construed as a limitation on or waiver of CDFG's authority to amend the State Permit as required by law regardless of whether PG&E concurs with such amendment. (Cal. Code Regs., tit. 14, §783.6, subd. (c)(2).)

10.4.1 Minor Amendments

10.4.1.1 Scope of Minor Amendments

Minor Amendments to the State Permit, this Agreement and the HCP pursuant to this subsection may include but are not limited to the following:

(a) Corrections of typographical, grammatical, and similar editing errors in the HCP and this Agreement that do not change the intended meaning;
(b) Correction of any maps or exhibits to correct errors in mapping;
(c) Minor changes to survey, monitoring or reporting protocols;
(d) Changing any measure(s) in the Conservation Strategy to respond to a Changed Circumstance identified in Section 11.3 of this Agreement;
(e) Correction of any tables or appendices in the HCP to reflect previously approved amendments to the HCP or the Federal and State Permits; and
(f) Amendments to the State Permit that would not significantly modify the scope or nature of the Covered Activities or the minimization, mitigation or monitoring measures in the State Permit, as determined by CDFG.

10.4.1.2 Processing Minor Amendments

10.4.1.2.1 CDFG Processing Minor Amendments to the State Permit

CDFG shall respond to and process proposed Minor Amendments to the State Permit in accordance with State law, including section 783.6, subdivision (c), of Title 14 of the California Code of Regulations.

10.4.1.2.2 Notice and Response

Any Party may propose a Minor Amendment to the Federal and State Permits, this Agreement and the HCP by providing written notice to all other Parties. Such notice shall include a statement of the reason for the proposed amendment and an analysis of its environmental effects, if any, including any effects on Covered Activities and on Covered Species, and any other information required by law. For proposed new minor construction activities, this information may be included in the Proposal for New Minor Construction required by Section 10.5.2 of this Agreement. The Parties shall respond in writing to the proposed amendment within sixty (60) days of receipt of such notice.

10.4.1.2.3 Objection by a Wildlife Agency

A Wildlife Agency may object to a proposed Minor Amendment only upon a written statement that the Federal and State Permits or the HCP, after giving effect to such amendment, would not meet the requirements of Section 10(a)(2)(B) of ESA or Section 2081 of CESA; provided, however, that the Wildlife Agencies may not propose or approve as a Minor Amendment any revision to the Federal and State Permits, the HCP, or this Agreement if the Wildlife Agencies determine that such amendment would result in: adverse effects on the environment that are new or significantly different from those analyzed in connection with the original HCP; or additional Take not analyzed in connection with the original HCP.

Where possible, before rejecting a proposed Minor Amendment, the Wildlife Agency shall first consult with PG&E and suggest reasonable conditions or alterations to the proposal which, if agreed to by PG&E, would permit the Wildlife Agency to approve the proposed Minor Amendment.

10.4.1.2.4 Objection by PG&E

PG&E may object to a proposed Minor Amendment upon any reasonable basis.

10.4.1.2.5 Unresolved Objections

If the Wildlife Agencies reasonably object to a Minor Amendment proposed under this subsection 10.4.1.2, and the objection is not resolved by any conditions or alterations, the

proposed amendment must be processed, if at all, as a Major Amendment of the Federal and State Permits in accordance with Section 10.4.2 of this Agreement.

10.4.1.2.6 Date that a Minor Amendment Becomes Effective

Minor Amendments of the State Permit shall become effective upon CDFG approval. Minor Amendments of the Federal Permit shall become effective upon USFWS approval.

10.4.2 Major Amendment

All changes to the Federal and State Permits, this Agreement and the HCP that do not qualify under Section 10.4.1 of this Agreement may be processed as a Major Amendment in accordance with all applicable laws and regulations, including but not limited to ESA, NEPA, CESA and CEQA. The Party proposing the Major Amendment shall provide a statement of the reasons and an analysis of its environmental effects, if any, including its effects, if any, on Covered Species and Covered Activities under the HCP. The Wildlife Agencies shall use their best efforts to process the proposed Major Amendment within one hundred eighty (180) days of submission of the application, except where longer times are required by law. PG&E may, in its sole discretion, reject any Major Amendment proposed by the Wildlife Agencies. PG&E's discretion to reject any Major Amendment proposed by CDFG shall not be interpreted as a limitation on or a waiver of CDFG's authority to amend the State Permit as required by law regardless of whether PG&E concurs with such amendment. (Cal. Code Regs., tit. 14, §783.6, subd. (c)(2).)

10.5 New Minor Construction

During the term of the Federal and State Permits, PG&E may need to engage in minor construction activities that are not specifically included as Covered Activities ("New Minor Construction"). These activities may be necessary to respond to population increases that were not reasonably foreseeable at the time of the preparation of the HCP, or to comply with new federal or state regulatory mandates that are enacted during the term of the Federal and State Permits.

Nothing in this Agreement, the HCP, or the Federal and State Permits limits PG&E's right to engage in New Minor Construction in the Plan Area that is not specifically included as a Covered Activity. Nothing in the Federal and State Permits, this Agreement or the HCP requires PG&E to amend the HCP or the Federal and State Permits to include such New Minor Construction, as long as any Take of Covered Species is authorized separately. PG&E acknowledges CDFG would prefer to process and provide take authorization for New Minor Construction through an amendment of the State Permit. CDFG shall respond to and process any proposed amendment of the State Permit for New Minor Construction pursuant to section 783.6, subdivision (c), of Title 14 of the California Code of Regulations. Unless such New Minor Construction is added to the State and Federal Permits through either the Minor or Major Amendment processes

provided in Section 10.4 of this Agreement, however, these activities will be not be covered by the Federal or State Permits.

10.5.1 Adding New Minor Construction to the HCP

Based upon the analysis in the HCP of the impacts of Covered Activities on Covered Species in the Plan Area, it is likely that most New Minor Construction that is substantially similar to Covered Activities will result in similar impacts, and therefore, adding such activities to the HCP and implementing them pursuant to the Conservation Strategy of the HCP will not likely result in adverse effects to the Covered Species that are different from those analyzed in connection with the original HCP.

PG&E may seek take authorization from the Wildlife Agencies for New Minor Construction in the Plan Area pursuant to Section 10.4 and Section 10.5 of this Agreement, the HCP, and controlling law. The Wildlife Agencies may provide take authorization to PG&E for New Minor Construction by amending the Federal and State Permits. Any such activities that the Wildlife Agencies add to the Federal and State Permits shall thereafter be deemed Covered Activities. Subsequently, all references to Covered Activities in the HCP shall be deemed to include reference to such activities. All provisions of this Agreement, the HCP, and the Federal and State Permits that apply to the Plan Area shall apply to those new activities. No modification or other change to any provision of this Agreement, the HCP, and the Federal and State Permits, including levels of Authorized Take, shall be implied, unless such provision is specifically amended in writing during the amendment process pursuant to Section 10.4 of this Agreement.

10.5.2 Proposal for New Minor Construction

PG&E may propose to add specific New Minor Construction to the State and Federal Permits by providing to the Wildlife Agencies a "Proposal for New Minor Construction" that includes:

(a) A map showing that the New Minor Construction is within the Plan Area;
(b) A concise description of the New Minor Construction;
(c) A discussion, based upon the best currently available information, of the land-cover types, the potential habitat, and any known occurrences of Covered Species in the area to be affected by the New Minor Construction;
(d) A statement describing how the New Minor Construction will be implemented by PG&E in accordance with all applicable measures in the Conservation Strategy detailed in the HCP;
(e) An analysis of whether the proposed take authorization for New Minor Construction and related Major or Minor Amendments to the HCP or this Agreement are consistent with the Federal and State Permits;
(f) An analysis of whether the proposed take authorization for New Minor Construction will result in significant impacts not analyzed or mitigated to

less than significant under the HCP, EIS/EIR, or Federal and State Permits; and

(g) Any other information required by law.

The Wildlife Agencies shall provide any reasonable objection in writing to PG&E within sixty (60) days of receipt of a Proposal for New Minor Construction, specifying the reasons why in their judgment the Proposal is incomplete or inadequate.

A Major Amendment shall be required to finally approve the addition of the New Minor Construction to the HCP and Federal and State Permits only if there is substantial evidence to demonstrate that the proposed addition will result in new significant environmental effects or a substantial increase in the severity of previously identified significant effects. The analysis described above in subsection (e) and (f) is intended to provide PG&E with the opportunity to offer substantial evidence to support a conclusion that supplemental environmental review under NEPA or CEQA is not required to approve the Proposal for New Minor Construction, and that a Minor Amendment is appropriate.

If PG&E elects not to provide the analysis described in subsection (e) and (f), the Wildlife Agencies may, in their discretion, treat the Proposal for New Minor Construction as a Major Amendment under Section 10.4.2 of this Agreement.

11.0 MUTUAL ASSURANCES

11.1 Purpose

A primary purpose of the HCP and this Agreement is to formalize and authorize a plan under which PG&E may implement required O&M Activities within the Plan Area in a way that minimizes and mitigates impacts to the Covered Species and their habitat. Based on and in consideration of this Agreement, the HCP, and the Federal and State Permits, the Wildlife Agencies hereby provide assurances pursuant to their respective regulatory authorities to PG&E with regard to the following provisions contained in this Section 11.0.

11.2 No Surprises/Unforeseen Circumstances

11.2.1 Federal "No Surprises" Assurances

Consistent with the No Surprises Rule at 50 C.F.R. Sections 17.3, 17.22(b)(5) and 17.32(b)(5), as the regulations are written as of the Effective Date, and provided that PG&E is properly implementing the HCP, USFWS shall not require PG&E to provide additional land, water or other natural resources, or financial compensation, or additional restrictions on the use of land, water, or other natural resources beyond the level provided for under the HCP, this Agreement and the Federal Permit with respect to Covered Activities without the consent of PG&E. Adaptive Management and Changed

Circumstances are provided for under the HCP and therefore are not subject to the restrictions on additional mitigation contained in the No Surprises Rule.

In the event there are changes to the Federal No Surprises Rule after the Effective Date that materially effect the Federal assurances provided by this Agreement, PG&E may elect to relinquish the Federal Permit and terminate this Agreement pursuant to Section 12.6 of this Agreement.

11.2.2 State Assurances

11.2.2.1 CESA Compliance

CDFG shall consider adherence to the terms of the State Permit and this Agreement to be compliance with the CESA and California Native Plant Protection Act for the impacts of Covered Activities on Covered Species. Take of Fully Protected Species is not authorized by this Agreement or the State Permit.

11.2.2.2 Adequate Mitigation Under CESA

CDFG shall consider adherence to the terms of the State Permit, the HCP, and this Agreement to minimize and fully mitigate the impacts associated with the incidental take of Covered Species as authorized by the State Permit and this Agreement pursuant to CESA.

11.2.2.3 Assurances

Except as otherwise required by law, no further mitigation from PG&E consisting of land, additional land restrictions, or financial compensation beyond that described herein and provided for in the HCP and State permit, will be required by CDFG to address the impacts of Covered Activities on Covered Species or their habitats pursuant to CESA.

11.2.3 Unforeseen Circumstances Finding

In the event that the USFWS or PG&E believes that unforeseen circumstances may exist in accordance with the Federal definitions, it shall immediately notify the other Parties. If the USFWS believes unforeseen circumstances exist, it shall clearly document the basis for a proposed finding regarding the existence of unforeseen circumstances. USFWS shall follow the requirements of 50 C.F.R. Sections 17.22(b)(5)(iii)(C) and 17.32(b)(5)(iii)(C).

Within fifteen (15) days of receiving such notice, the Parties shall meet or confer to consider the proposed finding and any potential changes to the Conservation Strategy, subject to the Federal and State Assurances provided in Sections 11.2.1 and 11.2.2 of this Agreement. The USFWS shall make an unforeseen circumstances finding based on the best scientific evidence available, after considering any responses submitted by PG&E,

and the USFWS shall have the burden of demonstrating that unforeseen circumstances exist.

11.2.4 Effect of Unforeseen Circumstances Finding

In the event USFWS makes a finding of unforeseen circumstances and additional conservation and mitigation measures are deemed necessary to respond to such unforeseen circumstances, the USFWS may require additional conservation measures from PG&E, but only if such measures are limited to modifications that maintain the original terms of the HCP to the maximum extent possible. Additional conservation measures shall not involve the commitment of additional land, water, natural resources or financial compensation, or additional restrictions on the use of land, water or other natural resources, without the consent of PG&E.

11.2.5 Interim Obligations Upon a Finding of Unforeseen Circumstances

If the USFWS makes a finding of unforeseen circumstances, during the period necessary to determine the nature and location of additional or modified mitigation, PG&E will avoid appreciably reducing the likelihood of the survival and recovery of the affected species in the Plan Area, subject to any conflicting regulatory mandate.

11.2.6 Wildlife Agencies' Response to a Finding of Unforeseen Circumstances

The USFWS shall utilize its authorities and resources to protect Covered Species in the event of unforeseen circumstances. The USFWS may utilize land acquisition and exchange, habitat restoration and enhancement, translocation, and other management techniques beyond those provide in the HCP. The Wildlife Agencies may work with other Federal, State, and local agencies, tribes, environmental groups, and private entities to provide for the continued conservation of the Covered Species in the wild in the event of a finding of unforeseen circumstances.

11.3 Changed Circumstances

11.3.1 Federal Definition

As provided in 50 C.F.R. § 17.3, the term "changed circumstances" means changes in circumstances affecting a Covered Species or the geographic area covered by the HCP that can reasonably be anticipated by the Wildlife Agencies and PG&E, and that can be planned for in the HCP.

11.3.2 Existence of Changed Circumstances

Changed circumstances and planned responses to those circumstances, as further described in Chapter 6 of the HCP, include: vandalism or other intentional, destructive

illegal human activities; natural catastrophic events, invasion of specified exotic species or diseases; impacts to compensation lands as a result of PG&E's need to carry out emergency activities; and listing of species in the Plan Area that is not a Covered Species. In the event that any Wildlife Agency or PG&E believes that any of these changed circumstances as further defined in Chapter 6 of the HCP may exist, it shall immediately notify the other Parties. The Parties agree to follow the remedial measures for responding to changed circumstances provided in Chapter 6 of the HCP. The Wildlife Agencies will not require PG&E to carry out any measure not identified in Chapter 6 of the HCP.

The existence of any condition or the occurrence of any event that might fit the Federal definition of changed circumstances that is not specifically identified as a changed circumstance in Chapter 6 of the HCP will be deemed an unforeseen circumstance and subject to Section 11.2 of this Agreement.

11.4 New Listings

The Parties agree that it is the intent of this Agreement that lands acquired for mitigation purposes will be administered so as to enhance their value for all Covered Species.

Provided PG&E is properly implementing the HCP, the Federal Permit shall automatically become effective as to each Covered Species that is not a Federal Listed Species concurrent with the listing of such species under ESA.

Subject to compliance with all other terms of this Agreement and the HCP, the State Permit shall become effective as to each Covered Species that is not a State Listed Species as of the date the species is accepted and designated as a candidate species pursuant to California Fish and Game Code section 2074.2, upon confirmation by CDFG that substantial evidence then available demonstrates that the State Permit meets the standards in California Fish and Game Code section 2081(b) and Title 14 of the California Code of Regulations, section 783.4 with regard to the newly designated candidate species. In the event CDFG determines that such standards will not be met, and the State Permit does not become effective upon the designation of the species as a candidate, threatened, or endangered species under CESA, CDFG shall accept and give due consideration to the minimization and mitigation measures in the HCP and this Agreement in support of an application for a permit amendment or for a separate CESA incidental take permit authorizing incidental take of such newly designated candidate, threatened or endangered species. CDFG shall make reasonable efforts to review and process the application for an amendment to the State Permit or a new CESA incidental take permit to ensure, to the extent consistent with CESA, that an incidental take permit covering the Covered Activities is issued at the time the species is accepted and designated as a candidate species under CESA.

11.4.1 Recommendations Regarding New Listings

To the extent permitted by CESA, CDFG shall consider the HCP and this Agreement in any future determination or recommendation to the Fish and Game Commission by DFG with regard to the listing of one or more of the currently unlisted Covered Species as an endangered species or threatened species pursuant to CESA.

11.5 Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act

The Federal Permit issued by the USFWS shall constitute a Special Purpose Permit under 50 CFR § 21.27 for the Take of ESA-listed species identified at 50 CFR § 10.13 that are Covered Species as of the Effective Date (and for the Take of unlisted Covered Species identified at 50 CFR § 10.13, when the Federal Permit becomes effective as to such species as provided in Section 11.4 of this Agreement) in the amount and/or number and subject to the terms and conditions specified in the Federal Permit; provided, however, that the Federal Permit shall not constitute a Special Purpose Permit for bald eagles *(Haliaeetus leucocephalus)* or golden eagles *(Aquila chrysaetos)*. The Special Purpose Permit shall be valid for a period of three years from its effective date, provided the Federal Permit remains in effect for such period. The Special Purpose Permit shall be automatically renewed provided that PG&E remains in compliance with the terms of the Federal Permit, the HCP and this Agreement. Each such renewal shall be valid for the maximum period allowable under the applicable regulations at the time of the renewal (which, as of the Effective Date, is three years), provided that the Federal Permit remains in effect for such period.

11.6 Federal Consultations

Nothing in this Agreement will limit the right or obligation of any Federal agency to engage in consultation with USFWS as required under Section 7 of ESA (16 U.S.C. section 1536(a)). However, in any consultation with USFWS with regard to Covered Species that may be required pursuant to Section 7, subsequent to the Effective Date in connection with Covered Activities, USFWS shall, to the maximum extent permitted by law and regulation, rely upon, and utilize the Section 7 biological opinions issued during the approval of this HCP, and ensure that any conservation and mitigation for the incidental take of Covered Species in such subsequent Section 7 biological opinion conforms to the conservation and mitigation provided under the HCP and does not impose any new, additional or different conservation or mitigation measures on PG&E beyond the requirements provided for under the HCP and this Agreement. The USFWS agrees that subsequent Section 7 biological opinions shall not conflict with or interfere with the implementation of the Conservation Strategy.

11.7 Critical Habitat

USFWS agrees that it will consider the HCP in the preparation of any proposed determination of new critical habitat or revision of existing critical habitat for any Covered Species. USFWS agrees that if critical habitat is designated for any Covered

species and PG&E is properly implementing the terms of the HCP, USFWS will not require PG&E to commit new, additional or different conservation or mitigation beyond that provided for under the HCP and this Agreement.

12.0 ISSUANCE AND ENFORCEMENT OF INCIDENTAL TAKE AUTHORIZATIONS

12.1 Take Authorization

As of the Effective Date, PG&E may Take the Covered Species while carrying out Covered Activities in the Plan Area, as authorized by and subject to the conditions of the Federal Permit, the State Permit, the HCP and this Agreement.

The authority issued to PG&E hereunder applies to all of PG&E's officers, directors, employees, agents, subsidiaries, contractors, and subcontractors who engage in any Covered Activity. PG&E shall conduct an educational program to inform all such persons and entities of the terms and conditions of the Federal Permit, the State Permit, the HCP and this Agreement. PG&E shall be responsible for ensuring the compliance of those terms and conditions by all such persons and entities. All contracts between PG&E and such persons and entities shall require compliance with the Federal Permit, the State Permit, the HCP and this Agreement.

12.2 Original Term

The State Permit and the Federal Permit will take effect on the Effective Date and be effective for thirty (30) years, unless terminated, suspended or revoked before that time.

12.3 Remedies In General

Except as set forth below, each Party shall have all of the remedies available in equity (including specific performance and injunctive relief) and at law to enforce the terms of this Agreement, the HCP, the Federal Permit and the State Permit, and to seek remedies and compensation for any breach or violation thereof, consistent with and subject to the following:

(a) None of the Parties shall be liable in damages to the other Parties or to any other person or entity for any breach of this Agreement, any performance or failure to perform a mandatory or discretionary obligation imposed by this Agreement, or any other cause of action arising from this Agreement. Notwithstanding the foregoing, each Party shall retain whatever liability it would possess for its present and future acts or failure to act apart from and independent of, this Agreement.

(b) The Parties acknowledge that the Covered Species are unique and that their loss as species would be irreparable and that therefore injunctive and

temporary relief may be appropriate in certain instances involving a breach of this Agreement.

12.4 Suspension And/Or Revocation

USFWS may suspend or revoke the Federal Permit, in whole or in part, for cause in accordance with the laws and regulations in force at the time of such suspension or revocation. As of the Effective Date, these regulations are codified at 50 C.F.R. §§ 13.27 through 13.29, 17.22, and17.32.

Suspension, in whole or in part, or revocation of the State Permit by CDFG under CESA shall be governed by section 783.7 of Title 14 of the California Code of Regulations, and other laws and regulations in force at the time of such suspension or revocation.

Partial suspension or revocation of the Federal or State Permits may include removing only certain species from the list of Covered Species, or only certain activities from the list of Covered Activities, or only certain areas from the Plan Area.

Except where a Wildlife Agency determines that emergency action is necessary to avoid irreparable harm to a Covered Species, it will not suspend or revoke the Federal or State Permit(s) without first (1) requesting PG&E to take appropriate remedial actions and providing adequate time for implementation of such actions, and (2) providing PG&E with written notice of the facts or conduct which may warrant the suspension or revocation and an adequate and reasonable opportunity for PG&E to demonstrate why suspension or revocation is not warranted.

Any specific decision or order suspending the Federal and/or State Permit(s) shall specify either a date or the fulfillment of a condition or conditions on which the suspension will terminate. The Parties agree that in the event of any total or partial suspension of the Federal or State Permit(s), all Parties shall act expeditiously and cooperatively to reinstate the Federal or State Permit(s). In the event a suspension has not terminated within six (6) months of its effective date, at PG&E's request, the USFWS shall within thirty (30) days either terminate the suspension or commence a proceeding to revoke the Federal Permit. PG&E may appeal or otherwise seek reconsideration of a CDFG determination to suspend or revoke the State Permit pursuant to sections 783.7 and 783.8 of Title 14 of the California Code of Regulations, and other relevant laws and regulations in force at the time of such suspension or revocation. Such suspension or revocation may apply to the entire Federal and/or State Permit(s), or may apply only to specified Covered Species or Covered Activities.

12.5 PG&E's Obligation During Suspension and Revocation

During the period of suspension, PG&E shall remain obligated to implement the Conservation Strategy and adhere to this Agreement. The State permit shall remain valid and effective until a final determination regarding permit suspension is made by CDFG.

Notwithstanding revocation, PG&E shall remain obligated to compensate, as determined pursuant to Section 12.8 of this Agreement, for the impacts of all Take that occurred under the Federal and/or State Permit(s) prior to revocation in accordance with the State and Federal Permits, this Agreement and the HCP. Upon compensating for such Take, PG&E shall have no further obligations under the Federal and/or State Permits.

12.6 Relinquishment

PG&E may relinquish the Federal and State Permits. Such relinquishment shall be in accordance with the regulations of the applicable Wildlife Agency in force, if any, on the date of such relinquishment. If no such regulations exist, PG&E shall provide ninety (90) days written notice to the Wildlife Agencies of its intent to relinquish the Federal or State Permits. Notwithstanding its relinquishment of the Federal or State Permits, PG&E shall remain obligated to compensate, as determined pursuant to Section 12.8 of this Agreement, for the impacts of all Take that occurred under the Federal and/or State Permit(s) prior to relinquishment in accordance with the Federal and State Permits, this Agreement and the HCP. Upon compensating for such Take, PG&E shall have no further obligations under the Federal or State Permits.

12.7 Dispute and Issue Resolution

The Parties recognize that disputes concerning implementation or interpretation of this Agreement, the HCP, and the Permits may arise from time to time. The Parties agree to work together in good faith to resolve such disputes using the informal dispute resolution procedure set forth in this section or such other procedures upon which the Parties may later agree. Any Party may seek any available remedy without regard to this Section 12.7 if the Party concludes that circumstances so warrant. However, unless the Parties agree upon another dispute resolution process, or unless a Party has initiated administrative proceedings or litigation related to the subject of the dispute in federal or state court, the Parties agree to use the following procedures to attempt to resolve disputes.

12.7.1 Meet and Confer

If the USFWS or CDFG objects to any action or inaction by the PG&E on the basis that the action or inaction is inconsistent with the HCP, the Permits, or this Agreement, it shall so notify PG&E in writing, explaining the basis of such objection. PG&E shall respond to the notice within thirty (30) days of receiving it, stating what actions the PG&E proposes to take to resolve the objection or, alternatively, explaining why PG&E believes the objection is unfounded. If the response resolves the objection to the satisfaction of the objecting agency, the agency shall so notify PG&E, and PG&E shall implement the actions, if any, proposed in the response to the agency. If the response does not resolve the objection to the agency's satisfaction, the agency shall notify PG&E accordingly, and the agency and PG&E shall meet and confer to attempt to resolve the dispute. The meeting shall occur within 30 (days) after PG&E receives the objecting agency's response, or at such later time as PG&E and the agency may agree. PG&E shall

take notes at the meeting, summarize the outcome, and distribute meeting notes to each Party in attendance for its review.

PG&E shall use the same procedure to resolve objections to any action or inaction of the USFWS or CDFG, and the USFWS and CDFG shall respond in the same manner to notices delivered by PG&E.

12.7.2 Elevation of Dispute

If the Parties do not resolve a dispute after completing the dispute resolution procedure in Section 12.7.1, any one of the Parties may elevate the dispute to a meeting of the chief executives of the involved Parties. For purposes of this provision, "chief executive" shall mean the CDFG Regional Manager, the USFWS Field Supervisor, and PG&E's Director of Environmental Policy. Each Party shall be represented in person by its chief executive at the meeting, and the meeting shall occur within forty-five (45) days of a request by any Party following completion of the dispute resolution procedure.

12.8 Obligation to Compensate for Actual Impacts

Upon any early termination of the Federal and/or State Permits, whether through revocation or relinquishment, PG&E shall have no further obligations under this Agreement, the HCP or the Federal and/or State Permits, unless the applicable Wildlife Agency determines in writing that the impacts of Take of Covered Species that occurred under the Federal and State Permits have not been compensated for. If any Wildlife Agency determines that additional compensation is required, that agency shall bear the burden of proving the extent of impacts of Take that occurred had not been compensated for at the time of termination to the extent required by ESA or CESA. PG&E and the Wildlife Agencies shall work together to assess and determine whether and to what extent impacts of Take of Covered Species that occurred under the Federal and State Permits have not been compensated for. The Wildlife Agencies may request additional information pertinent to the assessment and determination in accordance with Section 8.3; provided, however, that any such request for additional information shall be made within 30 (thirty) days of the early termination.

To determine "compensation," the Wildlife Agency shall compare the amount and impact of authorized Take of the Covered Species that occurred prior to termination with the amount and effect of compensation provided up to that time. This analysis will take into consideration, among other things, the duration the permit has been in effect, and the location, quantity and quality of compensation lands that have been acquired and/or enhanced.

Any determination by the Wildlife Agency that compensation has not been achieved at the time of revocation or relinquishment shall have a reasonable, factual basis and be issued in writing within 60 (sixty) days after termination or, if a Wildlife Agency has requested additional information as described above, within 30 (thirty) days of receiving the requested information. The determination shall specify which measures of the

Conservation Strategy that PG&E will be obligated to continue to apply, and for how long. If the Wildlife Agency determines that PG&E must provide additional compensation, the Wildlife Agency and PG&E shall identify the amount of compensation required, and it shall set a practicable schedule with which the PG&E must comply to achieve compensation, including what habitat types the compensation shall conserve. If the Wildlife Agency fails to inform PG&E that additional compensation is required in writing within sixty (60) days after termination, PG&E shall be deemed to have provided compensation for any impacts of Take under the Federal and/or State Permits and shall be relieved of any further obligation to provide compensation under the Federal and/or State Permits, the HCP, and this Agreement.

In no case shall PG&E be obligated to provide compensation for authorized Take in excess of the actions that would have been required of PG&E had the Federal and/or State Permit(s) not been terminated.

13.0 MISCELLANEOUS

13.1 Force Majeure

In the event that PG&E is wholly or partially prevented from performing obligations under this Agreement because of unforeseeable causes beyond the reasonable control of and without the fault or negligence of PG&E ("force majeure"), including but not limited to acts of God, third party actions, sudden actions of the elements, or actions of federal or state agencies or other local jurisdictions, PG&E shall be excused from whatever performance is affected by such unforeseeable cause to the extent so affected, and such failure to perform shall not be considered a material violation or breach of this Agreement, provided that nothing in this section shall be deemed to authorize any Party to violate ESA or CESA, and provided further that:

(a) The suspension of performance is of no greater scope and no longer duration than is required by the force majeure;
(b) Within two weeks after the occurrence of the force majeure PG&E gives the Wildlife Agencies written notice describing the particulars of the occurrence;
(c) PG&E uses its best efforts to remedy its inability to perform (however, this paragraph shall not require the settlement of any legal action on terms which in the sole judgment of PG&E are contrary to its interest); and
(d) When PG&E is able to resume performance of its obligations, PG&E shall give the Wildlife Agencies written notice to that effect.

13.2 Notices

All notices, demands, or communications from one Party to another may be personally delivered, sent by U.S. Mail, or sent by a recognized overnight delivery service to the names and addresses provided in this section. The notice shall be effective at the time of receipt of the personal or overnight delivery, or five days after deposit in the U.S. Mail.

PG&E: [Names & Addresses]

USFWS: [Names & Addresses]

CDFG: [Names & Addresses]

Any Party may change the address to which such notices, demands, or other communications may be sent by giving the other Parties written notice of such change.

When signed documents are necessary, the Parties agree to accept signed documents transmitted by facsimile, portable document format (e.g., "document.pdf"), or other similar reprographic technology, and to rely upon such documents as if they bore original signatures. The Parties agree to provide, within seventy-two (72) hours after transmission of such documents, the original signed documents to each of the other Parties.

13.3 Severability

If any provision of this Agreement or the HCP is found invalid or unenforceable, such provision shall be enforced to the maximum extent possible and all other provisions shall remain in effect to the extent they can be reasonably applied in the absence of such invalid or unenforceable provision, subject to relinquishment per Section 12.6.

13.4 Entire Agreement

This Agreement supersedes any and all prior agreements, either oral or in writing, among the Parties with respect to the subject matter hereof and contains all of the covenants and agreements among them with respect to said matters; and each Party acknowledges that no representation, inducement, promise or agreement, oral or otherwise, has been made by the other Party or anyone acting on behalf of the other party that is not embodied herein.

13.5 Attorneys' Fees

If any action at law or equity, including any action for declaratory relief, is brought by a Party to this Agreement to enforce or interpret the provisions of this Agreement, each Party to the litigation shall bear its own attorneys' fees and costs. If any action at law or equity, including any action for declaratory relief, is brought by a third party to enforce or interpret the provisions of this Agreement, the Parties shall negotiate a joint defense agreement, as appropriate, at the time the litigation is filed. The Parties may also execute a cost sharing agreement to address the costs associated with the defense against the third party action or proceeding.

13.6 Duplicate Originals

This Agreement may be executed in any number of duplicate originals. A complete original of this Agreement shall be maintained in the official records of each of the Parties.

13.7 Federal and State Appropriations

The duty of the USFWS to carry out its obligations under this Agreement, the HCP, and the State Permit shall be subject to the federal Anti-Deficiency Act and the availability of appropriated funds. Nothing in this Agreement shall be construed by the Parties to require the obligation, appropriation, or expenditure of any money from the U.S. Treasury. The Parties acknowledge that USFWS will not be required under this Agreement to expend any federal agency's appropriated funds unless and until an authorized officer of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

The duty of CDFG to carry out its obligations under this Agreement, the HCP, and the State Permit shall be subject to the availability of appropriated funds. Nothing in this Agreement shall be construed by the Parties to require the obligation, appropriation, or expenditure of any money from the Treasury of the State of California. The Parties acknowledge that CDFG will not be required under this Agreement to expend any State of California agency's appropriated funds unless and until an authorized officer of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

13.8 Elected Officials

No member of Congress shall be entitled to any share or part of this Agreement, or to any benefit that may arise from it.

13.9 Governing Law

This Agreement shall be governed by and construed in a manner consistent with the statutory and regulatory authority of the USFWS under the ESA, its implementing regulations and other applicable federal laws, and of the CDFG under the CESA, its implementing regulations, and other applicable state laws. Nothing in this Agreement is intended to nor shall be construed to limit or compromise the authority of the USFWS to fulfill its responsibilities under the ESA, nor CDFG under CESA.

13.10 No Third-Party Beneficiaries

This Agreement is solely for the benefit of the State of California by and through CDFG, the people of the United States of America by and through USFWS, and PG&E. Notwithstanding existing federal and state law, this Agreement shall not create any right or interest in any member of the public as a third-party beneficiary, nor shall it authorize

anyone not a Party to this Agreement to maintain a lawsuit or claim for personal or other injuries or damages pursuant to the provisions of this Agreement.

13.11 Counterparts

This Agreement may be executed in counterparts. This Agreement shall become operative as soon as one counterpart has been executed by each Party. The counterparts so executed shall constitute one Agreement notwithstanding that the signatures of all Parties do not appear on the same page.

13.12 References to Regulations

Unless otherwise specified, any reference in this Agreement, the HCP or the Federal and State Permits to any regulation or rule of USFWS or CDFG shall be deemed to be a reference to such regulation or rule in existence at the time an action is taken.

13.13 Due Authorization

Each Party warrants that the signatory is authorized to execute this Agreement on behalf of that Party.

EXHIBITS

A. List of Covered Species

Exhibit A

Covered Species Lists for PG&E's San Joaquin Valley Habitat Conservation Plan

Table 1-3. Covered Wildlife Species for PG&E's San Joaquin Valley Habitat Conservation Plan

Common and Scientific Name	Legal Status [a]	
	Federal	State
Vernal pool fairy shrimp *Branchinecta lynchi*	T	–
Midvalley fairy shrimp *Branchinecta mesovallensis*	SC	–
Vernal pool tadpole shrimp *Lepidurus packardi*	E	–
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T	–
California tiger salamander *Ambystoma californiense* (*A. tigrinum c*.)	T	SSC
Limestone salamander *Hydromantes brunus*	SC	T, FP
California red-legged frog *Rana aurora draytoni*	T	SSC
Blunt-nosed leopard lizard *Gambelia (Crotaphytus) silus*	E	E, FP
Giant garter snake *Thamnophis gigas*	T	T
Swainson's hawk *Buteo swainsoni*	–	T
White-tailed kite *Elanus caeruleus*	–	FP
Golden eagle *Aquila chrysaetos*	–	FP
Bald eagle *Haliaeetus leucocephalus*	FPD, T	E, FP
Western burrowing owl *Athene cunicularia hypugea*	SC	SSC
Bank swallow *Riparia riparia*	–	T
Tricolored blackbird *Agelaius tricolor*	SC	SSC
Buena Vista Lake shrew *Sorex ornatus relictus*	E	SSC
Riparian brush rabbit *Sylvilagus bachmani riparius*	E	E
Riparian (San Joaquin Valley) woodrat *Neotoma fuscipes riparia*	E	SSC

Common and Scientific Name	Legal Status [a]	
	Federal	State
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	E	E
Giant kangaroo rat *Dipodomys ingens*	E	E
San Joaquin (Nelson's) antelope squirrel *Ammospermophilus nelsoni*	SC	T
San Joaquin kit fox *Vulpes macrotis mutica*	E	T

[a] Status Explanations:

Federal

E = listed as endangered under the federal Endangered Species Act (ESA).

T = listed as threatened under the federal ESA.

PE = proposed for federal listing as endangered under the federal ESA.

PT = proposed for federal listing as threatened under the federal ESA.

C = species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded.

P = petitioned for listing as threatened or endangered under the federal Endangered Species Act.

SC = species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.

FDP = federally proposed for delisting

– = no listing.

State

E = listed as endangered under the California ESA.

T = listed as threatened under the California ESA.

FP = fully protected under the California Fish and Game Code.

SSC = species of special concern in California.

– = no listing.

Table 1-4. Covered Plant Species for PG&E's San Joaquin Valley Habitat Conservation Plan

Common and Scientific Name	Legal Status [a]		
	Federal	State	CNPS
Large-flowered fiddleneck *Amsinckia grandiflora*	E	E	1B
Lesser saltscale *Atriplex minuscula*	–	–	1B
Bakersfield smallscale *Atriplex tularensis*	SC	E	1B
Big tarplant *Blepharizonia plumosa* ssp. *Plumosa*	–	–	1B
Mariposa pussypaws *Calyptridium pulchellum*	T	–	1B
Tree-anemone *Carpenteria californica*	SC	T	1B
Succulent owl's-clover *Castilleja campestris* ssp. *succulenta*	T	E	1B
California jewelflower *Caulanthus californicus*	E	E	1B
Hoover's spurge *Chamaesyce hooveri*	T	–	1B
Slough thistle *Cirsium crassicaule*	SC	–	1B
Mariposa clarkia *Clarkia biloba* ssp. *australis*	–	–	1B
Merced clarkia *Clarkia lingulata*	SC	E	1B
Springville clarkia *Clarkia springvillensis*	T	E	1B
Vasek's clarkia *Clarkia tembloriensis* ssp. *Calientensis*	SC	–	1B
Hispid bird's-beak *Cordylanthus mollis* ssp. *Hispidus*	SC	–	1B
Palmate-bracted bird's-beak *Cordylanthus palmatus*	E	E	1B
Kern mallow *Eremalche parryi* ssp. *kernensis*	E	–	1B
Congdon's woolly sunflower *Eriophyllum congdonii*	–	R	1B
Delta button-celery *Eryngium racemosum*	SC	E	1B

Table 1-4. Continued

Common and Scientific Name	Legal Status [a]		
	Federal	State	CNPS
Striped adobe-lily *Fritillaria striata*	SC	T	1B
Boggs Lake hedge-hyssop *Gratiola heterosepala*	–	E	1B
Pale-yellow layia *Layia heterotricha*	SC	–	1B
Comanche Point layia *Layia leucopappa*	SC	–	1B
Legenere *Legenere limosa*	SC	–	1B
Panoche pepper-grass *Lepidium jaredii* ssp. *album*	SC	–	1B
Congdon's lewisia *Lewisia congdonii*	–	R	1B
Mason's lilaeopsis *Lilaeopsis masonii*	SC	R	1B
Mariposa lupine *Lupinus citrinus* var. *deflexus*	SC	T	1B
Showy madia *Madia radiata*	–	–	1B
Hall's bush mallow *Malacothamnus hallii*	–	–	1B
San Joaquin woollythreads *Monolopia (Lembertia) congdonii*	E	–	1B
Pincushion navarretia *Navarretia myersii* (a.k.a. *N.m.*ssp. *m.*)	–	–	1B
Colusa grass *Neostapfia colusana*	T	E	1B
Bakersfield cactus *Opuntia basilaris* var. *treleasei*	E	E	1B
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	T	E	1B
Hairy Orcutt grass *Orcuttia pilosa*	E	E	1B
Hartweg's golden sunburst *Pseudobahia bahiifolia*	E	E	1B
San Joaquin adobe sunburst *Pseudobahia peirsonii*	T	E	1B
Keck's checkerbloom *Sidalcea keckii*	E	–	1B

Table 1-4. Continued

Common and Scientific Name	Legal Status [a]		
	Federal	State	CNPS
Oil neststraw *Stylocline citroleum*	–	–	1B
Greene's tuctoria *Tuctoria greenei*	E	R	1B
Kings gold *Twisselmannia californica*	-	-	1B

[a] Status Explanations:

Federal

E = listed as endangered under the federal Endangered Species Act (ESA).

T = listed as threatened under the federal ESA.

SC = species of concern; species for which existing information indicates it may warrant listing but for which substantial biological information to support a proposed rule is lacking.

– = no listing.

State

E = listed as endangered under the California ESA.

R = listed as rare under the California Native Plant Protection Act. This category is no longer used for newly listed plants, but some plants previously listed as rare retain the designation.

– = no listing.

CNPS = California Native Plant Society

1B = List 1B species: rare, threatened, or endangered in California and elsewhere.

4 = List 4 species: plants of limited distribution

Appendix C

Acronyms and Abbreviations

Acronyms and Abbreviations

AB	Assembly Bill
AC	alternating current
AMM	avoidance and minimization measure
ARB	California Air Resources Board
ATSDR	Agency for Toxic Substances and Disease Registry
ATV	all-terrain vehicle
Basin Plan	water quality control plan
BAT	best available technology
Bay-Delta System	Sacramento–San Joaquin River Delta and San Francisco Bay estuary
BMP	best management practice
B.P.	before present
CAAQS	California Ambient Air Quality Standards
Cal-EPA	California Environmental Protection Agency
Cal-OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CBSC	California Building Standards Code
CCR	California Code of Regulations
CDF	California Department of Forestry and Fire Protection
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CFR	Code of Federal Regulations
CNDDB	California Native Plant society
CNEL	Community Noise Equivalent Level
CNPS	California Natural Diversity Database
CO	carbon monoxide
CPRR	Central Pacific Railroad
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CTR	California Toxics Rule
CUP	Conditional Use Permit
CWA	federal Clean Water Act
dB	decibel
dBA	A-weighted decibel
DBCP	dibromochloropropane
DCE	dichloroethylene
Delta	Sacramento–San Joaquin Delta
DFG	California Department of Fish and Game
DHS	California Department of Health Services' Division of Drinking Water and Environmental Management
DOC	California Department of Conservation
DOF	California Department of Finance
DPR	California Department of Parks and Recreation
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	federal Endangered Species Act
ETS	electric test system
Farmland	Farmland of Statewide Importance
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FIRMs	Flood Insurance Rate Maps
FHWA	Federal Highway Administration
FMMP	Farmland Mapping and Monitoring Program
FPPA	Farmland Protection Policy Act
g	1g = acceleration of 9.8 meters per second per second
General Construction Permit	NPDES General Permit for Construction Activities
HAZWOPER	Hazardous Waste Operations and Emergency Response Standard
HCP	Habitat Conservation Plan

HSWA	federal Hazardous and Solid Waste Amendments
ISO	California Independent System Operator
IVM	Integrated Vegetation Management
kV	kilovolt
Ldn	day-night level
Leq	equivalent sound level
LESA	Land Evaluation and Site Assessment
LOS	level of service
LRU	land resource unit
MBTA	Migratory Bird Treaty Act
MCAB	Mountain Counties Air Basin
MCAPCD	Mariposa County Air Pollution Control District
MCE	maximum credible earthquake
MCL	maximum contaminant level
MLRA	major land resource area
mph	miles per hour
MRDL	maximum residual disinfectant level
MSCS	Multi-Species Conservation Strategy
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCCP	Natural Community Conservation Plan (In bio, referenced as natural communities conservation plan)
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NMFS	National Marine Fisheries Service
NNL	National Natural Landmarks Program)
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOC	Notice of Completion
NOI	Notice of Intent
NOP	Notice of Preparation
NO_x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRNL	National Registry of Natural Landmarks
O&M	operations and maintenance
OES	California Office of Emergency Services
OPR	Governor’s Office of Planning and Research
Pb	lead
PG	professional biologist
PG&E	Pacific Gas and Electric Company
PLS	pressure limiting station
PM10	particulate matter 10 microns in diameter or less
PM2.5	particulate matter 2.5 microns in diameter or less
Policy	California’s Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California
ppv	peak particle velocity
PRBO	Point Reyes Bird Observatory
PRPA	federal Paleontological Resources Preservation Act of 2002
psi	pounds per square inch
PVC	polyvinyl chloride
QAC	Qualified Applicator Certificate Holder from the California Department of Pesticide Regulation
QAL	qualified applicator licensee from the California Department of Pesticide Regulation
RCRA	Resource Conservation and Recovery Act
ROG	reactive organic gases
ROW	right-of-way
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SCADA	Supervisory Control and Data Acquisition
SCS	Soil Conservation Service
SHPO	California State Historic Preservation Officer
SIP	state implementation plan
SJVAB	San Joaquin Valley Air Basin
SJVUAPCD	San Joaquin Valley Unified Air Pollution Control District
Small LUP	Small Linear Underground/Overhead Project
SO_2	sulfur dioxide
SSURGO	National Soil Survey Geographic Database
STATSGO	State Soil Geographic database
SVOC	semivolatile organic compound
SVP	Society of Vertebrate Paleontology
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TCE	trichloroethylene
TCM	transportation control measures
TMDL	total maximum daily load
TT	treatment technique
UBC	Uniform Building Code
USACE	U.S. Army Corps of Engineers
USC	U.S. Government Code

USFS	U.S. Department of Agriculture Forest Service
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
v/c	volume-to-capacity
VELB	Valley elderberry longhorn beetle
VOC	volatile organic compounds
WDR	waste discharge requirement
WHR	Wildlife Habitat Relationships system
Williamson Act	California Land Conservation Act
Williamson Act lands	agricultural preserves

Appendix D

Public and Agency Comments and Lead Agency Responses

Appendix D
Public and Agency Comments and Lead Agency Responses

Public disclosure and dialogue are priorities under both NEPA and CEQA. Once a draft EIS or EIR is complete, the lead agency is required to notify agencies and the public that it is available for review. During the review period, the lead agency receives and collates public and agency comments on the proposed action and the document. Before the lead agency can approve a proposed action, it must prepare a final EIS/EIR that addresses all comments received on the draft document. The final EIS/EIR is required to include a list of all individuals, organizations, and agencies that provided comments, and must contain copies of all comments received during the public review period, along with the lead agency's responses.

USFWS and DFG circulated the draft EIS/EIR for a 90-day public review period, which ended September 28, 2006. Two public meetings were held during the review period, the first in Stockton on August 1, 2006, and the second in Fresno on August 2, 2006. A total of seven comment letters were received. No additional comments were received at the public meetings.

The following agencies and individuals commented on the draft EIS/EIR.

- U.S. Army Corps of Engineers, Sacramento District (Kathy Norton, Chief, San Joaquin Valley Office).
- U.S. Environmental Protection Agency, Region IX (Duane James, Manager, Environmental Review Office, Communities and Ecosystems Division).
- San Joaquin Valley Air Pollution Control District (Jessica R. Willis, Air Quality Specialist, Central Region).
- Modesto Irrigation District (Celia Aceves, Risk & Property Analyst.)
- Arthur Unger.
- Shauna McDonald.
- California Department of Water Resources (Mike Mirmazaheri, Chief, Floodway Protection Section).

Copies of all comment letters are provided on the following pages. Note that individual comments have been numbered and keyed to the agency responses presented in Table D-1, which follows the individual letters.

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

August 10, 2006

Regulatory Branch (200600592)

Lori Rinek
US Fish and Wildlife Service
2800 Cottage Way, W-2605
Sacramento, California 95825

Scott Flint
California Department of Fish and Game
1416 9th Street, 12th Floor
Sacramento, California 95814

Dear Ms. Rinek and Mr. Flint:

We are responding to your June 27, 2006 request for comments on the Pacific Gas and Electric Company San Joaquin Valley Operations and Maintenance Program Habitat Conservation Plan (HCP). This plan covers nine counties (San Joaquin, Stanislaus, Merced, Fresno, Kings, Kern, Mariposa, Madera, and Tulare) in California. Your identification number is 1-1-06-CP-1329.

The Corps of Engineers' jurisdiction within the study area is under the authority of Section 404 of the Clean Water Act for the discharge of dredged or fill material into waters of the United States and under Section 10 of the Rivers and Harbors Act of 1899. Waters of the United States include, but are not limited to, rivers, perennial or intermittent streams, lakes, ponds, wetlands, vernal pools, marshes, wet meadows, and seeps. Project features that result in the discharge of dredged or fill material into waters of the United States will require Department of the Army authorization prior to starting work.

Specific planned projects may need to ascertain the extent of waters on the project site. In these cases, the applicant should prepare a wetland delineation, in accordance with the "Minimum Standards for Acceptance of Preliminary Wetland Delineations," under "Jurisdiction" on our website at the address below, and submit it to this office for verification. A list of consultants that prepare wetland delineations and permit application documents is also available on our website at the same location.

The range of alternatives considered for these projects should include alternatives that avoid impacts to wetlands or other waters of the United States. Every effort should be made to avoid project features which require the discharge of dredged or fill material

1-1

into waters of the United States. In the event it can be clearly demonstrated there are no practicable alternatives to filling waters of the United States, mitigation plans should be developed to compensate for the unavoidable losses resulting from project implementation.

If waters of the United States are going to be impacted, cultural resources sites within the defined federal permit area will need to be evaluated according to the standards of the National Environmental Policy Act. All eligible or potentially eligible cultural resource sites to the National Register of Historic Places within the permit area will be subject of Section 106 of the National Historic Preservation Act, 1966, as amended. The Corps of Engineers must also comply with the terms and conditions of the Fish and Wildlife Coordination Act, as well as, the Federal Endangered Species Act with regards to our permitting process. You may need to supply a recent biological assessment of the project sites for us to comply with the Federal Endangered Species Act.

1-1 (cont.)

1-2

We look forward to coordinating with you on issues related to this project and will await the hard copy of the EIS which I requested from Ms. Rinek. Please refer to identification number 200600592 in any correspondence concerning this project. If you have any questions, please contact me at our San Joaquin Valley Office, 1325 J Street, Room 1480, Sacramento, California 95814-2922, email *Kathy.Norton@usace.army.mil*, or telephone 916-557-5260. You may also use our website: *www.spk.usace.army.mil/regulatory.html*.

Sincerely,

Kathy Norton
Chief, San Joaquin Valley Office

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

September 18, 2006

Lori Rinek, Chief
Conservation Planning and Recovery Division
U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
2800 Cottage Way W-2605
Sacramento, CA 95825

Subject: Draft Environmental Impact Statement/Environmental Impact Report (DEIS/EIR), Pacific Gas and Electric Company, San Joaquin Valley Operations and Maintenance Program Habitat Conservation Program, California (CEQ # 20060262)

Dear Ms. Rinek:

The U.S. Environmental Protection Agency (EPA) has reviewed the above-referenced document pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act. Our detailed comments are enclosed.

The Draft EIS/EIR analyzes the environmental impacts of issuing permits under federal and state endangered species laws. These "incidental take permits" would enable PG&E to continue routine minor construction, operations, and maintenance on its gas and electrical distribution facilities within nine San Joaquin Valley counties for a period of 30 years. As part of its permit application, PG&E prepared a Habitat Conservation Plan (HCP) which includes measures to minimize and mitigate effects of its activities on 65 native plants, animals, and their habitats in portions of San Joaquin, Stanislaus, Merced, Fresno, Kings, Kern, Mariposa, Madera, and Tulare counties.

Based on our review, we have rated the DEIS as Environmental Concerns – Insufficient Information (EC-2) (see enclosed "Summary of Rating Definitions"). Our concerns regard temporary disturbances and their impacts on covered species. The proposed compensation ratio of 0.5 acres for every acre disturbed assumes that lands will fully recover in several years with the ability to continue supporting covered species. It is unclear that populations will not be significantly impacted by these temporary disturbances lasting several years. The DEIS does not discuss the possibility that land may not fully recover or could convert to permanently disturbed land through the spread of invasive species. The proposed action also does not provide compensation for temporary disturbances on agricultural lands despite the ability of some grazing lands to support covered species.

2-1

We commend PG&E for a substantial commitment of land, natural resources, financial and human resources, and other assets to conserve and manage species. This commitment is in exchange for assurances to take covered species for the next 30 years. There will undoubtedly be impacts during this timeframe that cannot be predicted, along with the continued growth in the Central Valley that PG&E will accommodate. To provide greater assurances that covered species will receive adequate protection, we recommend enhanced compensation ratios for the proposed action, especially for temporary disturbances. The impact analysis clearly shows that impacts to several resources are directly correlated to the amount of compensation lands that will be acquired under the alternative. A greater compensation ratio will benefit not only covered species, but also water resources, air quality, and soil resources. 2-2

EPA appreciates the opportunity to review this DEIS. When the Final EIS is released for public review, please send one copy to the address above (mail code: CED-2). If you have any questions, please contact me at (415) 972-3988 or Karen Vitulano, the lead reviewer for this project, at 415-947-4178 or vitulano.karen@epa.gov.

Sincerely,

Duane James, Manager
Environmental Review Office
Communities and Ecosystems Division

Enclosures: EPA's Detailed Comments
Summary of EPA Rating Definitions

cc: Scott Flint, California Department of Fish and Game, Habitat Conservation Planning Branch

Compensation Lands

Temporary disturbances on agricultural and disturbed lands. Under the proposed action, compensation will not take place for temporary disturbances on agricultural lands because these areas are regularly disturbed and the effects of Operations and Maintenance (O&M) are expected to be consistent with existing conditions (p. 2-45). Grazing lands are included in the agricultural lands category (Table 3.1). The DEIS notes that some types of grazing are compatible with the presence of covered species and that grazing is likely to continue as a management tool on many of the grasslands to be acquired for compensation (p. 3-8). In some cases grazing may be beneficial to covered species. If this is the case, temporary disturbances on grazing lands that could contain suitable habitat should receive compensation. 2-3

Temporary disturbances on disturbed land will also not receive compensation. The DEIS notes that most rights-of-way (ROWs) have already experienced some degree of ground disturbance (9-13). The DEIS does not clearly define disturbed lands or indicate if covered species could be present on disturbed lands. 2-4

Temporary disturbances can introduce or spread invasive species, despite the use of Best Management Practices (BMPs) to prevent them. The HCP states that temporary loss of land cover occurs primarily through temporary conversion to disturbed land cover (HCP Table 3-7). The DEIS states that temporary disturbance takes several years to recover (p. S-16) but does not discuss the possibility of permanent conversion to disturbed land cover due to invasive species or other factors. In addition, we have concerns that this provision may act as an incentive to allow lands to fall into a "disturbed" category so future compensation will not be required. 2-5

Recommendation:

In the FEIS, indicate whether grazing lands are included in the agricultural lands category. If grazing lands are included in this category, temporary disturbances on grazing lands should be compensated if the potential for suitable habitat for covered species exists. 2-6

Include a definition of disturbed lands in the FEIS. Discuss invasive species and their role in land cover conversion to disturbed lands. Include the history of invasive species spread and eradication on PG&E ROWs in the project area. Provide information regarding the potential for covered species to inhabit disturbed lands. If habitat has converted to disturbed lands as a result of PG&E O&M activities, including invasive species spread, we recommend this disturbance be subject to compensation. If disturbed lands can support covered species, we recommend compensation for temporary disturbances on these lands. 2-7

Compensation ratios. Alternative 2 differs from the proposed action in that it includes higher compensation ratios for habitat disturbed or lost. The alternatives analysis shows that impacts to several resources relate directly to the amount of compensation lands. Thus, the DEIS notes that impacts to water resources, biological resources, air quality and aesthetics for Alternative 2 will be less than under the proposed action (Table 21-1). Alternative 2 also offers a slight advantage to environmental sustainability by providing a more coordinated/integrative approach to conservation planning (Table S-9). We also believe it is likely that Alternative 2 would benefit soil resources more than the proposed action for reasons similar to those for water resources, because its enhanced compensation ratios would preserve the greatest area from recontouring, cultivation, development, and other types of ground disturbance. Had Alternative 2 been designated the environmentally superior alternative instead of Alternative 1 and compared with the proposed action, the analysis likely would have favored Alternative 2, which is not as difficult to implement as Alternative 1 (p. S-39). 2-8

Temporary disturbance is defined as recoverable over time without human intervention. The DEIS states that temporary disturbance takes several years to recover (p. S-16). It is not clear that populations of covered species will not experience significant impacts from temporary disturbances that last several years. The DEIS does not indicate whether populations of covered species are necessarily recoverable over time without human intervention. 2-9

Recommendation:
We recommend that U.S. Fish and Wildlife Service (USFWS) select compensation ratios closer to those of Alternative 2. At a minimum, the compensation ratios for temporary disturbances should be raised, and compensation granted for grazing and disturbed lands if these lands can support covered species, as mentioned above. 2-10

Higher compensation ratios would also provide protections against unforeseen circumstances. The Implementation Agreement indicates that if USFWS determines additional conservation measures are necessary to protect species, these measures shall not involve the commitment of additional land, water, natural resources or financial compensation or additional restrictions on the use of land, water or other natural resources unless PG&E agrees (p. 27). Since this provision may not allow for full protection of species due to unforeseen circumstances, it is appropriate to include the additional protection that higher compensation ratios can provide. 2-11

Small Disturbances. Under the proposed action, activities that disturb less than 0.1 acre of natural vegetation will not receive pre-activity surveys. The DEIS states that pre-activity surveys will occur on areas less than 0.1 acre disturbance when they occur in wetlands, vernal pools, or areas where covered species are *known* to be present (p. 2-43). For other areas of 0.1 acre or less, an estimate of the portion of disturbed area representing suitable habitat for a particular species will be made by multiplying the percentage of habitat identified as suitable at other locations in the area that have received pre-activity surveys. The required compensation acreage will then be calculated based on the estimated habitat loss (p. S-16). 2-12

We are concerned that pre-activity survey results from other sites may not match conditions on nearby sites, especially for species that tend to congregate in very small areas such as the bank swallow and tricolored blackbird (p. 2-42). In addition, cumulative impacts from numerous small disturbances should be taken into consideration, especially since invasive species can result in larger areas of habitat disruption than what is directly disturbed. The proposed action also does not compensate for disturbance from off-road travel. A more conservative approach would ensure habitat from small disturbances is appropriately compensated.

Recommendation:
We recommend that activities that disturb less than 0.1 acre of natural vegetation and do not receive pre-activity surveys presume the presence of sensitive species and receive compensation for the full area of disturbance. This would act as an additional incentive to minimize the disturbed area as well as help mitigate impacts from the use of access roads, which could disturb species and are not included in the impact analysis.

2-12 (cont.)

Use of PG&E lands for compensation. Several approaches are available for providing the compensation required under the HCP. One includes the use of lands currently in PG&E ownership. The DEIS mentions that five of PG&E's holdings in the San Joaquin Valley offer potential habitat for covered species and conservation easements could be established on these lands. No information is provided on the current status or use of these lands. We understand PG&E currently has a partnership with the Pacific Forest and Watershed Lands Stewardship Council to permanently protect and enhance company-owned watershed lands, including some in counties in the project area.

Recommendation:
In the FEIS, indicate the current status and use of the five PG&E-owned lands being considered for use in compensation. EPA strongly recommends that conservation lands acquired under HCP compensation include only lands that would otherwise not be protected.

2-13

Determining Minor Construction

In addition to O&M activities, the HCP covers minor construction activities. Minor construction activities are limited to installation of 1 mile or less or new electric or gas pipeline (per project) or new facilities with an average maximum footprint of 5 acres (per project) (p. S-11). Minor construction activities also include extending transmission lines 1 mile or less, and extending distribution lines 1 mile or less (p. 2-16).

The DEIS does not indicate if these measurements would be additive for each kind of extension; for example, does a project with 0.75 mile of transmission line and 0.75 mile of distribution line fall under minor construction? Also, it is not clear how the average maximum footprint for new facilities will be measured.

2-14

Recommendation:
In the FEIS, clarify minor construction determination as mentioned above. EPA recommends that the measurements that determine a minor construction project include the total of all pipeline, transmission line and distribution line extensions so that projects are not segmented in order to fall under the HCP. In the FEIS, describe how the average maximum footprint for new facilities will be measured. 2-14 (cont.)

Herbicides

The DEIS states that "all herbicides are used in strict accordance with FIFRA label requirements and, as appropriate, *with the US EPA's regulations for application of herbicides in endangered species habitat*" (p. 2-38). We recommend changing this statement to read that, in addition to following all the label requirements, all herbicides will be used in strict accordance with any applicable geographically-specific pesticide use limitations as identified in EPA's Endangered Species Protection Bulletin (Bulletin). Bulletins contain enforceable use limitations for the pesticide and are referenced on the pesticide product label and available on the web at www.epa.gov/espp or by calling 1-800-447-3813. Currently there are no bulletins applicable to California; however, the California Department of Pesticide Regulation has developed interim measures to protect listed species. 2-15

We support Avoidance and Minimization Measure (AMM) number 29 which states that no herbicide will be applied within 100 feet of exclusion zones (Table 2-9). Since AMM 29 only applies to sites which have received pre-activity surveys, small disturbance sites are not included. It is not clear if grazing lands or disturbed sites are included. 2-16

Recommendation:
In the FEIS, clarify the reference to EPA's regulations as specified above. State whether any AMMs or herbicide use restrictions will occur on areas not receiving pre-activity surveys such as small disturbance areas and on agricultural land or disturbed land. 2-17

We recommend the use of measures identified in PRESCRIBE, the California Department of Pesticide Regulation's on-line search engine that provides customized, location-specific measures to protect endangered species from pesticides, available at http://www.cdpr.ca.gov/docs/es/prescint.htm. In general, EPA recommends the use of the least toxic combination of herbicide/application method in any areas with potential suitable habitat for covered species. 2-18

Sustainable Timber

The DEIS states that moderate use of sustainably harvested timber would be recoverable over the long term (p. S-36). The DEIS does not indicate whether PG&E uses only sustainable harvested timber in its O&M activities or is committing to do so in this HCP. 2-19

Recommendation:
In the FEIS, clarify whether PG&E is committing to the use of only sustainably harvested timber for its O&M activities.

2-19 (cont.)

Miscellaneous

- In the DEIS, EPA is listed as a cooperating agency under NEPA (p. S-5, 1-8). While EPA may have jurisdiction and/or expertise regarding potential environmental effects, we are not aware of USFWS extending an invitation to EPA to serve as a cooperating agency. EPA's policy and procedures require a written agreement outlining roles and responsibilities for all projects where EPA's agrees to serve as a cooperating agency. Since we are unable to locate such an agreement, we respectfully request EPA to be removed from the list of cooperating agencies under NEPA.

2-20

- PG&E's website indicates that the company operates an Environmental Management System (EMS) (http://www.pge.com/about_us/environment/features/responsibility.html). The goals of the HCP, including the adaptive management component, could be integrated into the EMS. If this will occur, the FEIS should indicate this.

2-21

SUMMARY OF EPA RATING DEFINITIONS

This rating system was developed as a means to summarize EPA's level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the EIS.

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

ADEQUACY OF THE IMPACT STATEMENT

Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

September 21, 2006

Reference No. C200601517

Lori Rinek, Chief
Conservation Planning & Recovery Division
U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
2800 Cottage Way, W-2605
Sacramento, CA 95825

Subject: PG&E San Joaquin Valley Operations and Maintenance Program Habitat Conservation Plan (HCP)

Dear Ms. Rinek:

The San Joaquin Valley Unified Air Pollution Control District (District) has reviewed the Plan referenced above and offers the following comments:

The entire San Joaquin Valley Air Basin is designated non-attainment for ozone and particulate matter (PM10 and PM2.5). The implementation of the HCP would contribute to the overall decline in air quality due to construction activities, ongoing traffic and other operational emissions. 3-1

Based on the information provided, the District expects that individual operations, maintenance and minor construction activities would not exceed the District's thresholds of significance (10 tons per year of ROG or NOx). The District concurs that compliance with Regulation VIII will constitute sufficient mitigation to reduce fugitive dust related PM10 impacts to a level considered less than significant. However, compliance with Regulation VIII does not mitigate the PM10 impact from equipment exhaust. Maintenance and construction activities, although considered minor, may need further analysis on a project-by-project basis. 3-2

District staff is available to meet with you and/or the applicant to further discuss the regulatory requirements that are associated with this project. If you have any questions or require further information, please call me at (559) 230-5818 and provide the reference number at the top of this letter. 3-3

Sincerely,

Jessica R. Willis

Jessica R. Willis
Air Quality Specialist
Central Region

C: Scott Flint, CDFG
File

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
Tel: (209) 557-6400 FAX: (209) 557-6475

Central Region (Main Office)
1990 E. Gettysburg Avenue
Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061
www.valleyair.org

Southern Region
2700 M Street, Suite 275
Bakersfield, CA 93301-2373
Tel: (661) 326-6900 FAX: (661) 326-6985

MID Modesto Irrigation District
Water and Power

1231 Eleventh St.
P.O. Box 4060
Modesto, CA 95352
(209) 526-7373

August 1, 2006

U.S. Fish & Wildlife Service
Chief, Conservation Planning & Recovery Division
Sacramento Fish & Wildlife Office
Att: Lori Rinek
2800 Cottage Way, W-2605
Sacramento, CA 95825

California Dept of Fish & Game
Program Mgr., Environment Rev & Planning
Habitat Conservation Planning Branch
Att: Scott Flint
1416 9th Street
Sacramento, CA 95814

RE: Draft Environmental Impact Statement/Environmental Impact Report For PG&E's San Joaquin Valley O&M 1-1-06-CP-1329

Thank you for allowing the District to comment on this referral. Following are the recommendations from our Electrical, Irrigation and Domestic Water Divisions:

Irrigation

- No Comments at this time.

Domestic Water

- No comments at this time.

Environmental

- No comments at this time.

Electrical

- The Electrical T&D Division has no comments or requirements at this time.

4-1

The Modesto Irrigation District reserves its future rights to utilize its property, including its canal and electrical easements and rights-of-way, in a manner it deems necessary for the installation and maintenance of electric, irrigation, agricultural and urban drainage, domestic water and telecommunication facilities. These needs, which have not yet been determined, may consist of poles, crossarms, wires, cables, braces, insulators, transformers, service lines, open channels, pipelines, control structures and any necessary appurtenances, as may, in District's opinion, be necessary or desirable.

If you have any questions, please contact me at 526-7433.

Sincerely,

Celia Aceves
Risk & Property Analyst

Copy: File

Lori Rinek
Division Chief, Conservation Planning and Recovery
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825

July 9, 2006

Re: Pacific Gas & Electric Company
Operations and Maintenance Habitat Conservation Plan
San Joaquin Valley, CA

Dear Chief Lori Rinek,

All compensation should occur inside existing banks in order that large contiguous land areas are created. Large contiguous land areas are thought more likely to allow a species to survive in perpetuity than areas connected by corridors and much more likely to allow a species to survive in perpetuity than small isolated habitat areas. 5-1

Blunt-nosed leopard lizard (Gambelia sila) is a fully protected species and can not be taken even with mitigation. 5-2

Is Tipton kangaroo rat (Dipodomys nitratoides nitratoides) the only Dipodomys nitratoides in this area? The *"Recovery Plan for Upland Species of the San Joaquin Valley, California"* lists Dipodomys nitratoides brevinasus and Dipodomys nitratoides exilis. 5-3

Because of the large population increase the San Joaquin Valley has and will have, Alternative 1 plus Enhanced Compensation is necessary to have even a small chance to preserve the wildlife we have now for our posterity. 5-4

We are glad that all permanent losses of habitat suitable, for one or more of the Covered Species, will be compensated at a 3:1 ratio (3 acres created, restored, or conserved for every acre lost). Creation and restoration of habitat is usually difficult if not impossible unless the habitat is within a large contiguous area of habitat. The emphasis should be on conservation. 5-5

The fee for buying habitat to compensate for habitat taken needs to be high and will be higher. Several years ago the Metropolitan Bakersfield Habitat Conservation Plan paid $300 an acre for habitat; they now pay $1500 an acre for habitat in the same areas. 5-6

Thank you for the opportunity to comment,

Arthur Unger

2815 La Cresta Drive
Bakersfield, CA 93305-1719
(661) 323 5569 alunger@juno.com preferred

MEMORANDUM

DATE: 9/28/2006

TO: LORI RINEK, DIVISION CHIEF, CONSERVATION PLANNING AND RECOVERY, SACRAMENTO FISH & WILDLIFE OFFICE, 2800 COTTAGE WAY, ROOM W-2605, SACRAMENTO, CA 95825

FROM: SHAUNA MCDONALD

RE: COMMENTS ON PG&E SAN JOAQUIN VALLEY OPERATIONS & MAINTENANCE DRAFT HCP EIS/EIR

The Proposed Action combines a good combination of avoidance and compensation and I hope it's implemented. It doesn't appear that the draft EIS addresses Section 106 of the National Historic Preservation Act. Section 106 of the National Historic Preservation Act requires federal agencies to evaluate the effects of the federal undertakings on historical, archeological and cultural sites that are listed or proposed to be listed. It should be specifically addressed within cultural resources (a good job was done of that on the draft EIR/EIS for the East Contra Costa HCP. O-1

Thank you for the opportunity to comment.

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse and Planning Unit

Arnold Schwarzenegger
Governor

Sean Walsh
Director

September 28, 2006

Scott Flint
Fish & Game Commission
1416 Ninth Street, Room 1280
Sacramento, CA 95814

Subject: PG&E's San Joaquin Valley Operation and Maintenance Habitat Conservation Plan
SCH#: 2004042009

Dear Scott Flint:

The enclosed comment (s) on your Draft EIR was (were) received by the State Clearinghouse after the end of the state review period, which closed on August 10, 2006. We are forwarding these comments to you because they provide information or raise issues that should be addressed in your final environmental document.

The California Environmental Quality Act does not require Lead Agencies to respond to late comments. However, we encourage you to incorporate these additional comments into your final environmental document and to consider them prior to taking final action on the proposed project.

Please contact the State Clearinghouse at (916) 445-0613 if you have any questions concerning the environmental review process. If you have a question regarding the above-named project, please refer to the ten-digit State Clearinghouse number (2004042009) when contacting this office.

Sincerely,

Terry Roberts

Terry Roberts
Director, State Clearinghouse

Enclosures
cc: Resources Agency

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
TEL (916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

STATE OF CALIFORNIA – THE RESOURCES AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 942360001
(916) 653-5791

clear
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September 20, 2006

Scott Flint
California Department of Fish and Game
1416 Ninth Street, 12th Floor
Sacramento, California 95814

Draft EIS/EIR for PG&E's San Joaquin Valley Operation and Maintenance Program Habitat Conservation Plan
State Clearinghouse (SCH) Number: 2004042009

The project corresponding to the subject SCH identification number has come to our attention. The limited project description suggests a potential encroachment on an Adopted Plan of Flood Control. If indeed your project encroaches on an adopted food control plan, you will need to obtain an encroachment permit from the Reclamation Board prior to initiating any activities. The attached Fact Sheet explains the permitting process. Please note that the permitting process may take as much as 45 to 60 days to process. Also note that a condition of the permit requires the securing all of the appropriate additional permits before initiating work. This information is provided so that you may plan accordingly. 7-1

If after careful evaluation, it is your assessment that your project is not within the authority of the Reclamation Board, you may disregard this notice. For further information, please contact Sam Brandon of my staff at (916) 574-0651.

Sincerely,

Mike Mirmazaheri, Chief
Floodway Protection Section

cc: Governor's Office of Planning and Research
State Clearinghouse
1400 Tenth Street, Room 121
Sacramento, CA 95814

Table D-1. Public and Agency Comments on Draft EIS/EIR and Lead Agency Responses

Comment Number	Comment Text	Response to Comment
U.S. Army Corps of Engineers (Letter 1)		
1-1	The Corps of Engineers' jurisdiction within the study area is under the authority of Section 404 of the Clean Water Act for the discharge of dredged or fill material into waters of the United States and under Section 10 of the Rivers and Harbors Act of 1899. Waters of the United States include, but are not limited to, rivers, perennial or intermittent streams, lakes, ponds, wetlands, vernal pools, marshes, wet meadows, and seeps. Project features that result in the discharge of dredged or fill material into waters of the United States will require Department of the Army authorization prior to starting work. Specific planned projects may need to ascertain the extent of waters on the project site. In these cases, the applicant should prepare a wetland delineation, in accordance with the "Minimum Standards for Acceptance of Preliminary Wetland Delineations," under "Jurisdiction" on our website at the address below, and submit it to this office for verification. A list of consultants that prepare wetland delineations and permit application documents is also available on our website at the same location. The range of alternatives considered for these projects should include alternatives that avoid impacts to wetlands or other waters of the United States. Every effort should be made to avoid project features which require the discharge of dredged or fill material into waters of the United States. In the event it can be clearly demonstrated there are no practicable alternatives to filling waters of the United States, mitigation plans should be developed to compensate for the unavoidable losses resulting from project implementation.	As discussed in Chapter 8 of the EIS/EIR (see Impact WR8 in both Draft and Final versions), the majority of the activities covered under the proposed HCP would not discharge dredged or fill material into U.S. jurisdictional waters or wetlands and thus would not require USACE permitting. However, as the commenter notes, a small percentage of future O&M activities may require permits under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act. Most of these activities are expected to obtain permit authorization under USACE's Nationwide Permit (NWP) program; only a few, if any, would require individual permits. If USACE jurisdiction is triggered, PG&E would typically prepare a wetland delineation that outlines the extent of USACE jurisdiction on the particular project site and a preconstruction notification package that would be submitted to the USACE for its approval. Triggering USACE jurisdiction also necessarily triggers the need for USACE to comply with Section 7 of the ESA. As discussed on page 1-6 of the HCP and in Impact WR8, it may be possible for USACE to utilize elements of the proposed HCP to streamline the USFWS consultation process under ESA Section 7. At the time a proposed activity is submitted for USACE permit review, PG&E would be required to conduct an alternatives analysis and develop a wetland mitigation plan. Wetland mitigation plans may rely on mitigation provided through the HCP, but if additional mitigation is needed, it will be developed on an activity-specific basis for USACE review. Impact WR8 has been revised to reflect this clarification.
1-2	If waters of the United States are going to be impacted, cultural resources sites within the defined federal permit area will need to be evaluated according to the standards of the National Environmental Policy Act. All eligible or potentially eligible cultural resource sites to the National Register of Historic Places within the permit area will be subject of Section 106 of the National Historic Preservation Act, 1966, as amended. The Corps of Engineers must also comply with the terms and conditions of the Fish and Wildlife Coordination Act, as well as, the Federal Endangered Species Act with regards to our permitting process. You may need to supply a recent biological assessment of the project sites for us to comply with the Federal Endangered Species Act.	As the commenter states, if federal permitting is required under CWA Section 404 for any future activities, compliance with Section 106 of the National Historic Preservation Act (NHPA) will be necessary, and compliance with the National Environmental Policy Act (NEPA) may also be required (see discussions in DEIS/DEIR Chapters 5, 8 and 9, and Appendix B). Separate activity-specific NEPA compliance is not needed for activities that fall under the USACE's NWP program (see response to Comment 1-1 above), because NEPA compliance has already been achieved for the entire NWP program. However, if an individual Section 404 permit is required, separate EA- or EIS-level NEPA compliance may be necessary. In this case, PG&E will be responsible for assisting the USACE in preparing the documents necessary

Comment Number	Comment Text	Response to Comment
		for NEPA compliance. It is also PG&E's practice to comply fully with all record search, site evaluation, and reporting/documentation requirements of NHPA Section 106 when federal permitting is required, and this practice is expected to continue throughout the lifetime of the proposed HCP. Coordination under the Federal Wildlife Control Act (FWCA) is not expected to be necessary, because FWCA applies to actions of federal agencies, and PG&E (not USFWS) will continue to be responsible for any CWA Section 404 permitting needed in the future, as is currently the case. No further analysis is required.
U.S. Environmental Protection Agency (Letter 2)		
2-1	Based on our review, we have rated the DEIS as Environmental Concerns – Insufficient Information (EC-2) (see enclosed "Summary of Rating Definitions"). Our concerns regard temporary disturbances and their impacts on covered species. The proposed compensation ratio of 0.5 acres for every acre disturbed assumes that lands will fully recover in several years with the ability to continue supporting covered species. It is unclear that populations will not be significantly impacted by these temporary disturbances lasting several years. The DEIS does not discuss the possibility that land may not fully recover or could convert to permanently disturbed land through the spread of invasive species. The proposed action also does not provide compensation for temporary disturbances on agricultural lands despite the ability of some grazing lands to support covered species.	This comment raises several issues that bear on the adequacy of the 0.5:1 ratio proposed for mitigation of temporary habitat disturbance: the duration of temporary impacts (i.e., habitat recovery time), the potential for habitat type conversions as a result of disturbance and introduction of invasive nonnative species, and compensation for effects to agricultural and grazing land. These issues are summarized below and are addressed further in responses to subsequent comments. **<u>Duration of Temporary Impacts</u>** As discussed on pages 3-2 and 4-15 of the Draft HCP, *temporary effects* refers to effects that are expected to be recoverable within a period of several years, based on their extent and severity; the habitat type affected; and condition of the habitat prior to disturbance. The level of effect on HCP-covered species as a result of temporary habitat disturbance would depend on the extent and severity of disturbance, the type of habitat and its recovery rate, the proximity of the effect to covered species, and the life history and habitat requirements of any species potentially affected. As discussed in more detail below, the proposed HCP mitigation strategy was developed to provide appropriate compensation, taking into consideration the particular habitats and covered species affected. **<u>Spread of Invasive Plant Species and Potential for Habitat Conversion</u>** The agencies acknowledge EPA's concern regarding the potential for O&M activities to spread invasive nonnative plant species, potentially degrading habitat and/or contributing to the conversion of grassland to ruderal habitat. The potential to spread invasive nonnative plant species is discussed in the DEIS/DEIR on page 5-27, under Impact BIO9. It is also identified on page

Comment Number	Comment Text	Response to Comment
		5-19, under Impact BIO3. Both discussions acknowledge the potential for significant impacts if invasive weeds are not controlled. However, as identified on pages 5-19 and 5-27 of the DEIS/DEIR, and discussed in more detail on pages 2-26 and 2-39, PG&E's existing biological resources protection program includes measures to control invasive nonnative species, such as requiring appropriate footwear, ensuring that seeds are removed from clothing, and inspecting and cleaning vehicles. These practices would continue in force under the proposed HCP, and, as the DEIS/DEIR identifies (see pages 5-19 and 5-27), additional protection would be afforded by AMMs required by the HCP, including the stipulations aimed at minimizing ground disturbance, as well as the requirement that any reseeding of disturbed areas use certified weed-free seed mixes (see DEIS/DEIR Table 2-9). In addition to nonnative species control measures, PG&E's existing programs include extensive vegetation management activities, which would continue under the proposed HCP. These programs would provide for the identification and removal of invasive plants on PG&E rights-of-way. More specifically, as described on DEIS/DEIR pages 2-8 and 2-18, vegetation management for PG&E's natural gas system includes removal of brushy vegetation that prevents personnel from conducting safety inspections of existing infrastructure and abatement of ruderal vegetation and annual grasses when local fire districts identify that a fire hazard exists. PG&E also has an Integrated Vegetation Management program in place for its electrical system; as discussed on DEIS/DEIR pages 2-12 to 2-14, the IVM program comprises activities to control incompatible vegetation along transmission ROWs; to provide firebreaks to protect the transmission system in the event of a fire; and to prevent fires related to vegetation growing too close to electrical infrastructure. Because cutting or mowing can stimulate regrowth, electrical system rights-of-way are monitored for reinvasion by incompatible vegetation. Regular patrols of natural gas rights-of-way provide similar oversight of invasive vegetation along these facilities. With PG&E's existing invasive species and vegetation management programs in place, the agencies believe that O&M activities are unlikely to result in permanent habitat conversions related to spread of invasive species, and that the proposed action, including approval of the proposed HCP, would provide improved assurances against habitat conversion by comparison with existing conditions. Impacts related to the potential to spread invasive weed species would be less than significant, as identified in Impact BIO9 (note that clarification has been added to discussion of Impact BIO9 in the FEIS/FEIR). No further analysis is considered necessary.

Comment Number	Comment Text	Response to Comment
		Compensation for Temporary Effects on Agricultural vs. Grazing Lands The Draft HCP and the biological resources analyses in the DEIS/DEIR differentiate between effects on cultivated agricultural lands (e.g., croplands and orchards) and effects on grassland (including grazed grassland and irrigated pasture, as discussed on pages 5-7 ff. of the DEIS/DEIR). The proposed HCP requires compensation for temporary disturbances on grazing lands that support covered species (see Draft HCP Chapter 3). On cultivated agricultural lands, direct take of covered species as a result of PG&E's activities is considered unlikely, but it was taken into account in developing the HCP mitigation approach and would be compensated. Compensation for temporary disturbance of agricultural fields and developed lands is not required. The nature and extent of disturbance anticipated with the O&M activities that would be covered under the proposed HCP is expected to be consistent with the existing level of disturbance on cultivated agricultural lands—additional disturbance related to PG&E's O&M activities is therefore not expected to represent a substantial adverse change from existing conditions and would not constitute a significant impact (see DEIR/DEIS Chapter 5). No further analysis is required. **Mitigation Ratio** As discussed above and on page 4-15 of the HCP, the level of effect on HCP-covered species as a result of temporary habitat disturbance would depend on the extent and severity of disturbance, the type of habitat affected and its recovery rate, the proximity of the effect to covered species, and the life history and habitat requirements of any species affected. The 0.5:1 mitigation ratio identified in the proposed HCP for temporary disturbance was developed on the basis of the habitat types present in the project action area and the specific needs of the covered wildlife and plant species that use these habitats. As identified on page 2-45 of the DEIS/DEIR and discussed in more detail on pages 4-15 and 4-16 of the draft HCP, permanent habitat impacts would be compensated at a ratio of 3:1. PG&E replaced and expanded on the text of the HCP on page 4-15 as follows. > This HCP is unique in that it primarily addresses small-scale temporary effects that are dispersed over a large geographic area. PG&E is proposing a compensation ratio of 0.5:1 for temporary effects. AMMs will be consistently applied to temporary disturbance activities. As discussed in Chapter 3, the vast majority (greater than 95%) of activities result in very small disturbances (<0.1 acres) and are considered to have a very low potential for species effects. Potential effects of small disturbances have

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		been conservatively estimated because small disturbances are assumed to support covered species habitat in the same proportion as activities that have pre-activity surveys. Because of the small size of the majority of the activities, the habitat will continue to be usable by most species immediately after the activity is completed (i.e., the habitat will still support most breeding, foraging, sheltering, dispersal, and colonization opportunities). Some species with large home ranges (e.g., raptors and kit fox) would not be affected by the disturbance of very small amounts of habitat within their home ranges; for the kit fox for example, O&M activities would result in the temporary disturbance of 73 acres of habitat dispersed throughout the Plan Area out of 2.8 million acres of suitable habitat. In addition, PG&E activities causing temporary effects are of short duration (several hours to several days). PG&E activities result in disturbance that recovers rapidly (1 to 3 years) because the vast majority of these temporary disturbances will occur in areas that were previously disturbed or are habitats that recover relatively quickly (i.e., annual grassland). PG&E is also providing permanent habitat protection to offset temporary effects, including making compensation purchases in advance of project effects. Perpetual protection and management of habitats on conservation lands will ensure that there is a net increase in the habitat value of those lands. Over time, this increase in habitat value will greatly exceed the effects of temporary habitat losses, even at the proposed 0.5:1 ratio for temporary effects. The purchase of compensation lands in advance of project effects also serves to ensure that benefits accrue to the species before the effects occur. In summary, the effects of the project on species habitat are minimal compared to total available habitat in the Plan Area, direct species mortality effects of the activities are very minimal and are further reduced by the implementation of AMMs, unavoidable project effects are expected to be fully compensated by the mitigation proposed, and the effects estimated in the HCP will be verified with annual reporting on the number of activities and size of activities and periodic audits of project effects during the first three years of the program (see Chapter 6, "Monitoring, Reporting, and Adaptive Management Program"). In addition, the requirement that PG&E track habitat disturbance associated with its activities and monitor and report the results of their activities will help to ensure that the magnitude of effects as a result of all O&M activities is documented, not just in the immediate aftermath of the activity, but over the long term. As described in Chapter 6 of the Draft HCP (*Monitoring, Reporting, and Adaptive Management Program*) and Chapter 2 (*Proposed Action and*

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		Alternatives) of the DEIS/DEIR, the proposed HCP would also provide for monitoring outcomes to be used in modifying and improving management techniques—including, if appropriate, compensation ratios—so conservation efforts are expected to become more effective over time. Please see responses to Comments 2-4, 2-8, 2-10, and 2-11 below for additional discussion of the HCP mitigation ratios.
2-2	To provide greater assurances that covered species will receive adequate protection, we recommend enhanced compensation ratios for the proposed action, especially for temporary disturbances. The impact analysis clearly shows that impacts to several resources are directly correlated to the amount of compensation lands that will be acquired under the alternative. A greater compensation ratio will benefit not only covered species, but also water resources, air quality, and soil resources.	EPA's comment that benefits to water resources, air quality, and soil resources would increase with increased compensation ratios is correct; see discussion on DEIS/DEIR pages 21-2 through 21-5, Tables 21-1 and 21-2, conclusions on page 21-5 and 21-6, and summary on pages S-37 ff. and Tables S-9 and S-10.
2-3	Grazing lands are included in the agricultural lands category (Table 3.1). The DEIS notes that some types of grazing are compatible with the presence of covered species and that grazing is likely to continue as a management tool on many of the grasslands to be acquired for compensation (p. 3-8). In some cases grazing may be beneficial to covered species. If this is the case, temporary disturbances on grazing lands that could contain suitable habitat should receive compensation.	Because grazing is an important activity in much of the nine-county area covered by the proposed conservation program, the DEIS/DEIR includes grazing as an agricultural land use in evaluating effects of the proposed conservation program on agricultural resources (Chapter 4) and on land uses and land use planning (Chapter 3). However, because of differences in habitat value for the covered species, the Draft HCP (see Chapter 3 [*Analysis of Habitat Disturbance for Covered Species*] and summary in Table 3-8) distinguishes between cultivated agricultural lands (e.g., croplands and orchards) and grasslands (including grazed grasslands and irrigated pasture) in analyzing acreages of habitat disturbance and loss and effects on covered species. The same approach was used in Chapter 5 (*Biological Resources*) of the DEIS/DEIR. As discussed in the response to Comment 2-1 above, the proposed HCP would require compensation for temporary disturbance of grassland where suitable habitat for HCP-covered species is present (see HCP page 3-15 and DEIS/DEIR Impact BIO1). On cultivated agricultural lands, direct take of covered species as a result of PG&E's activities is considered unlikely, and take is particularly unlikely to occur at a level that would lead to adverse effects at the population or species level; but direct take of individuals on agricultural lands was nonetheless accounted for in the HCP mitigation approach and would be compensated. The HCP does not require compensation for temporary disturbance of agricultural fields and developed lands, because the nature and extent of disturbance anticipated with the covered O&M activities is expected to be consistent with the existing level of disturbance on cultivated agricultural lands. Additional disturbance related to PG&E's O&M activities is therefore not expected to represent a substantial adverse change from existing conditions under NEPA and

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		would not constitute a significant impact under CEQA (see DEIR/DEIS Chapter 5). Text has been added to the FEIS/FEIR to clarify this reasoning (see discussion on FEIS/FEIR page 2-46). The definitions of grassland and agricultural land habitat types in Chapter 5 of the FEIS/FEIR have also been revised for greater clarity in response to this comment. No further analysis is necessary.
2-4	Temporary disturbances on disturbed land will also not receive compensation. The DEIS notes that most rights-of-way (ROWs) have already experienced some degree of ground disturbance (9-13). The DEIS does not clearly define disturbed lands or indicate if covered species could be present on disturbed lands.	As summarized on DEIS/DEIR page 5-11, "other developed and disturbed lands" category was used to map habitat dominated by nonnative species and/or lands with urban infrastructure where such cover types occur in residential, commercial, industrial, mined, barren, and other developed lands (e.g., freeway corridors) located outside urban areas. As shown in Draft HCP Table 3-10, three covered wildlife species (Valley elderberry longhorn beetle, California tiger salamander, and western burrowing owl) could be present on "other developed and disturbed lands." Most of the other HCP-covered species are considered very unlikely to occur in these types of settings, and because of these areas' highly disturbed nature and the marginal habitat value they offer, except where covered species or suitable habitat is present, compensation for disturbance or loss is generally not merited. However, it should be noted that pre-activity surveys required for activities that disturb more than 0.1 acre would identify the presence of natural vegetation and habitat suitable for covered species (Valley elderberry longhorn beetle, California tiger salamander, and western burrowing owl) should it occur on "other developed and disturbed lands." Therefore, where a large disturbance of this type of habitat is expected and inclusions of natural/native vegetation and/or habitat suitable for covered species are present, potential impacts will be assessed in advance and compensation may be required, based on habitat suitability. No further analysis is required.
2-5	Temporary disturbances can introduce or spread invasive species, despite the use of Best Management Practices (BMPs) to prevent them. The HCP states that temporary loss of land cover occurs primarily through temporary conversion to disturbed land cover (HCP Table 3-7). The DEIS states that temporary disturbance takes several years to recover (p. S-16) but does not discuss the possibility of permanent conversion to disturbed land cover due to invasive species or other factors. In addition, we have concerns that this provision may act as an incentive to allow lands to fall into a "disturbed" category so future compensation will not be required.	Please see discussion of potential for long-term habitat type conversion under **Spread of Invasive Plant Species and Potential for Habitat Conversion** in response to Comment 2-1 above. Note also that PG&E's O&M activities occur primarily within rights-of-way on privately owned land. PG&E's practices require that private lands be returned to their predisturbance condition, subject to landowner approval (see *PG&E's Existing Environmental Programs and Practices* section in DEIS/DEIR Chapter 2). Thus, there is a direct incentive for staff to ensure that work areas are appropriately restored. Because the HCP further systematizes PG&E's environmental program and would add AMMs expected to further reduce the potential for spread of invasive vegetation, the proposed HCP is expected to reduce the potential for long-term habitat

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		conversion over the permit term. The lead agencies have concluded that no further analysis is required, as identified above.
2-6	In the FEIS, indicate whether grazing lands are included in the agricultural lands category. If grazing lands are included in this category, temporary disturbances on grazing lands should be compensated if the potential for suitable habitat for covered species exists.	As discussed in more detail in the response to Comment 2-1 above, the DEIS/DEIR treats grazing as an agricultural land use in evaluating effects on agricultural resources (Chapter 4) and on land uses and land use planning (Chapter 3). This is because grazing is an important activity in much of the nine-county area covered by the proposed conservation program. However, because of the difference in habitat value between cultivated agricultural fields (croplands and orchards) and grassland (including grazed grassland and irrigated pasture), the Draft HCP distinguishes between cultivated agricultural lands and grasslands, as do the analyses in Chapter 5 (*Biological Resources*) of the DEIS/DEIR. Additional text has been provided in Chapters 3, 4, and 5 of the FEIS/FEIR to clarify this distinction.
2-7	Include a definition of disturbed lands in the FEIS. Discuss invasive species and their role in land cover conversion to disturbed lands. Include the history of invasive species spread and eradication on PG&E ROWs in the project area. Provide information regarding the potential for covered species to inhabit disturbed lands. If habitat has converted to disturbed lands as a result of PG&E O&M activities, including invasive species spread, we recommend this disturbance be subject to compensation. If disturbed lands can support covered species, we recommend compensation for temporary disturbance on these lands.	Please see definition of disturbed lands habitat types in response to Comment 2-4. In addition, as discussed throughout the DEIS/DEIR, most of the O&M activities covered under the proposed HCP would take place on previously disturbed lands, many of which already support invasive nonnative plant species. To date, no data have been collected on invasive species spread and eradication on PG&E's rights-of-way, because the majority of these areas are privately owned. However, more information would be available over the long term, as the HCP data-gathering effort proceeds. Revisions to page 3-2 of the HCP and page 5-6 of the FEIS/FEIR will reflect this information.
2-8	***Compensation ratios:*** Alternative 2 differs from the proposed action in that it includes higher compensation ratios for habitat disturbed or lost. The alternatives analysis shows that impacts to several resources relate directly to the amount of compensation lands. Thus, the DEIS notes that impacts to water resources, biological resources, air quality and aesthetics for Alternative 2 will be less than under the proposed action (Table 21-1). Alternative 2 also offers a slight advantage to environmental sustainability by providing a more coordinated/integrative approach to conservation planning (Table S-9). We also believe it is likely that Alternative 2 would benefit soil resources more than the proposed action for reasons similar to those for water resources, because its enhanced compensation ratios would preserve the greatest area from recontouring, cultivation, development, and other types of ground disturbance. Had Alternative 2 been designated the environmentally superior alternative instead of Alternative 1 and compared with the proposed action, the analysis likely would have favored Alternative 2, which is not as difficult to implement as Alternative 1 (p. S-39).	The commenter is correct that benefits to water resources, air quality, and soil resources would increase with increased compensation ratios is correct; see discussion on DEIS/DEIR pages 21-2 through 21-5, in Tables 21-1 and 21-2 (which compare environmental outcomes under the proposed action and alternatives), and conclusions on pages 21-5 and 21-6. Summaries are provided on DEIS/DEIR pages S-37 ff., including Tables S-9 and S-10. The commenter is also correct that the lead agencies have identified Alternative 1 as offering potential benefits to environmental sustainability. As DEIS/DEIR Tables 21-1 and S-9 state, "Environmental sustainability would be very similar for all of the action alternatives to that described for the proposed action. However, Alternatives 1 and 2 would offer a slight advantage by providing a more coordinated/integrative approach to conservation planning." The intended meaning of this text was that the proposed action and all action alternatives would have similar benefits for environmental sustainability, but that ***of the alternatives***, Alternatives 1 and 2 would be preferable to Alternative 3 because, like the proposed action, they would provide a more

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		integrated approach to conservation planning (the Alternative 3 HCP would cover fewer species than the proposed HCP, the Alternative 1 HCP, or the Alternative 2 HCP). Clarification has been added to Tables 21-1 and S-9 in the FEIS/FEIR. As discussed on page 21-6 of the DEIS/DEIR, both Alternative 1 and Alternative 2 would offer some level of environmental benefit by comparison with the proposed action, but Alternative 1 would offer clear benefits for slightly more resources than Alternative 2. Moreover, Alternative 1, which stresses enhanced avoidance, would better achieve the Endangered Species Act mandate to "first avoid, then mitigate, then compensate" effects on listed species than Alternative 2, which stresses enhanced compensation. Thus, the lead agencies believe that Alternative 1 would satisfy the proposed action's purpose, need, goals, and objectives better than Alternative 2. For these reasons, Alternative 1 was selected as the environmentally preferable/superior alternative, as discussed in Chapter 21 and summarized on page S-39 of the DEIS/DEIR. However, as identified on DEIS/DEIR page 21-6, Alternative 1 would require pre-activity surveys for a wide variety of fairly minor activities and thus is expected to restrict the seasons during which some O&M activities could be performed, potentially impeding the timely performance of O&M, interfering with emergency repair activities, conflicting with CPUC safety regulations, and/or compromising PG&E's ability to deliver reliable service. It could also be prohibitively costly to implement. Thus, although potentially feasible, Alternative 1 has been evaluated as difficult to implement in practice. Similarly, Alternative 2, although potentially feasible, would likely be prohibitively expensive to implement. As summarized in DEIS/DEIR Tables 21-1 and 21-2, benefits under the proposed action would be very similar to those under Alternative 2, and the lead agencies believe that the comparatively small increase in environmental benefits under Alternative 2 would not justify incurring the prohibitively large cost increase required to implement this approach. Based on current information, the lead agencies believe that the proposed action provides appropriate measures to avoid, mitigate, and compensate for O&M effects, consistent with the extent and nature of impacts anticipated, the types of habitat potentially affected, and the life cycle requirements of the covered species that use them. Implementation of the proposed HCP would appropriately direct PG&E's efforts and resources toward impact avoidance, minimization, and compensation, and would assure that impacts are reduced to a less than significant level. No further analysis is necessary.

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2-9	Temporary disturbance is defined as recoverable over time without human intervention. The DEIS states that temporary disturbance takes several years to recover (p. S-16). It is not clear that populations of covered species will not experience significant impacts from temporary disturbances that last several years. The DEIS does not indicate whether populations of covered species are necessarily recoverable over time without human intervention.	Please see revised definition of *temporary disturbance* on page 3-2 of the HCP. The level of effect on covered species as a result of temporary habitat disturbance would depend on the extent of disturbance, the type of habitat and its recovery rate, the proximity of the effect to covered species, and the life history and habitat requirements of any species affected. The mitigation ratios identified in the proposed HCP were developed on the basis of the habitat types involved present in the project action area, and the specific needs of the covered wildlife and plant species that use them. Impact analyses in Chapter 5 of the DEIS/DEIR (*Biological Resources*) address short- and long-term outcomes of both temporary habitat disturbance and permanent habitat loss; as identified in these discussions, the lead agencies anticipate that temporary disturbances will be small enough and the habitat land-cover types will recover quickly enough that significant adverse population-level impacts are not expected. As discussed in these analyses, the proposed HCP will require compensation in advance of habitat disturbance, with the intent of offsetting impacts before they occur. The anticipated outcome of the proposed HCP is a net long-term benefit to habitat quality and availability for both covered and common species. Moreover, as identified in the response to Comment 2-2 above, the proposed HCP stipulates follow-up monitoring of large temporary disturbance sites and provides for monitoring outcomes to be used in modifying and improving management techniques (see Draft HCP Chapter 6 [*Monitoring, Reporting, and Adaptive Management Program*]). HCP Conservation efforts are thus expected to become more effective over time. The term *human intervention* has been removed from the FEIS/FEIR to be consistent with text in the HCP. Small disturbances are expected to recover naturally. Recovery of larger disturbances would be accelerated through PG&E's existing biological resources BMPs as well as AMMs implemented under the proposed HCP (see DEIS/DEIR Table 2-9).
2-10	We recommend that U.S. Fish and Wildlife Service (USFWS) select compensation ratios closer to those of Alternative 2. At a minimum, the compensation ratios for temporary disturbances should be raised, and compensation granted for grazing and disturbed lands if these lands can support covered species, as mentioned above.	Please see responses to Comments 2-1, 2-4, and 2-8 above.
2-11	Higher compensation ratios would also provide protections against unforeseen circumstances. The Implementation Agreement indicates that if USFWS determines additional conservation measures are necessary to protect species, these measures shall not involve the commitment of additional land, water, natural resources or financial compensation or additional restrictions on the use	As discussed in Chapter 6 of the draft HCP, Endangered Species Act Section 10 regulations require all HCPs to specify the procedures that would be used to deal with changed and unforeseen circumstances that may arise during the life of the permit. *Unforeseen circumstances* are defined in 50 CFR 17.3 as changes in circumstances affecting a species or geographic area covered by a conservation

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	of land, water or other natural resources unless PG&E agrees (p. 27). Since this provision may not allow for full protection of species due to unforeseen circumstances, it is appropriate to include the additional protection that higher compensation ratios can provide.	plan that could not reasonably have been anticipated by plan developers and USFWS at the time of the HCP's negotiation and development, and that result in a substantial adverse change in the status of a covered species. The HCP has proposed remedial measures that must be taken by PG&E in the event of a changed circumstance. The HCP is intended to reduce the potential for adverse changed or unforeseen circumstances on the covered species and their habitats. Remedial measures for changed circumstances of fire, vandalism, floods, landslides, wind/water erosion, drought, invasive species, emergency maintenance, multiple changed circumstances, and new species listings are included in the proposed HCP. The proposed HCP's Adaptive Management Program has also identified uncertainties, how to address and resolve uncertainties, and includes feedback loops that link implementation and monitoring to a decision-making process. The proposed HCP was developed to provide the level of compensation identified as appropriate based on currently available information. The proposed budget and financial assurances provided in the HCP also include a provision for adaptive management in response to new information and to address changed circumstances (Draft HCP page 7-3) associated with compensation lands. The documentation/reporting requirements and adaptive management strategy in the HCP were developed specifically to ensure that conservation will become more effective over time as additional information is gained. By law, PG&E as an ESA Section 10(a) permittee, would not be responsible to bear the cost to implement any additional mitigation that my be needed to address effects of an unforeseen circumstance, if PG&E has fully implemented all requirements of the approved HCP, including adaptive management and reporting requirements. PG&E will attempt, within the financial limits of the approved HCP, to adjust the HCP conservation strategy as needed to address unforeseen circumstances. However, the USFWS, not PG&E, would be required to pay for any additional conservation measures required to achieve conservation or enhancement of a species that is being adversely affected by an unforeseen circumstance. Under Section 10 of the ESA, species will be protected in the event of a changed or unforeseen circumstance. No change in the HCP or EIS/EIR is proposed.
2-12	***Small Disturbances.*** Under the proposed action, activities that disturb less than 0.1 acre of natural vegetation will not receive pre-activity surveys. The DEIS states that pre-activity surveys will occur on areas less than 0.1 acre disturbance when they occur in wetlands, vernal pools, or areas where covered species are *known* to be present (p. 2-43). For other areas of 0.1 acre or less, an estimate of	As described page 7-3 of the Draft HCP, it would be cost-prohibitive to conduct pre-activity surveys at all sites subject to small disturbances (disturbances of less than 0.1 acre). Instead, as EPA's comment identifies, suitable habitat on sites affected by small-disturbance activities would be estimated based on the assumption that small-disturbance sites support a habitat mosaic similar to that

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	the portion of disturbed area representing suitable habitat for a particular species will be made by multiplying the percentage of habitat identified as suitable at other locations in the area that have received pre-activity surveys. The required compensation acreage will then be calculated based on the estimated habitat loss (p. S-16). We are concerned that pre-activity survey results from other sites may not match conditions on nearby sites, especially for species that tend to congregate in very small areas such as the bank swallow and tricolored blackbird (p. 2-42). In addition, cumulative impacts from numerous small disturbances should be taken into consideration, especially since invasive species can result in larger areas of habitat disruption than what is directly disturbed. The proposed action also does not compensate for disturbance from off-road travel. A more conservative approach would ensure habitat from small disturbances is appropriately compensated. *Recommendation:* We recommend that activities that disturb less than 0.1 acre of natural vegetation and do not receive pre-activity surveys presume the presence of sensitive species and receive compensation for the full area of disturbance. This would act as an additional incentive to minimize the disturbed area as well as help mitigate impacts from the use of access roads, which could disturb species and are not included in the impact analysis.	on nearby larger-disturbance sites for which preactivity surveys have been conducted. Additional information from PG&E's biological resources database (which will be expanded to include information collected through the HCP monitoring process in the future; see DEIS/DEIR page 2-26) would be used as appropriate. This data would include the known presence or absence of covered species or particularly sensitive habitats such as vernal pools and other wetlands. If covered species or particularly sensitive habitats are present, preactivity surveys and/or species-specific AMMs would be required (see DEIS/DEIR Table 2-9; see also Draft HCP page 4-5, Table 4-5, and Figure 4-1). The probability is very low that the restricted disturbance footprint of a small-disturbance activity (<0.1 acre) would impinge on the typically small footprint of a highly sensitive or "unique" habitat. Moreover, the activity screening process shown in Draft HCP Figure 4-1 was developed to identify and appropriately avoid or compensate such co-occurrences to the extent practicable. Consequently, the lead agencies believe that the potential for unique habitat to be significantly affected as a result of individual small-disturbance activities is very low (less than significant). Effects to unique habitats from small-disturbance activities over the 30-year term of the permit would be dispersed in both space and time, and would be compensated as discussed in DEIS/DEIR Chapter 2 and Draft HCP Chapters 4 and 5; therefore, cumulative impacts are also expected to be less than significant. Based on current information, the lead agencies believe that the proposed HCP compensation strategy is biologically adequate. Mitigation ratios were based on fairly conservative assumptions about the extent and severity of impacts associated with O&M and minor construction activities (see Draft HCP page 4-15), and the HCP would require monitoring and adaptive management to verify and correct these impact assumptions over time. Advance mitigation for project effects, perpetual management of mitigation for temporary effects, and regular reporting of the effects of PG&E's activities to USFWS and DFG will also help to ensure that small disturbances will be appropriately compensated. No changes are proposed to the HCP process for estimating effects to species habitat in small disturbances, or to the EIS/EIR. As discussed on HCP page 3-2, off-road travel by rubber-tired vehicles during patrols and inspection does not result in habitat loss. Off-road travel is identified as an activity resulting in "other disturbance," and was not analyzed as a small-disturbance activity in the HCP and the DEIS/DEIR. Additional text discussing "other disturbances" has been added to pages 3-2 and 3-7 of the HCP and page 2-46 ff. of the FEIS/FEIR.

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2-13	***Use of PG&E lands for compensation.*** Several approaches are available for providing the compensation required under the HCP. One includes the use of lands currently in PG&E ownership. The DEIS mentions that five of PG&E's holdings in the San Joaquin Valley offer potential habitat for covered species and conservation easements could be established on these lands. No information is provided on the current status or use of these lands. We understand PG&E currently has a partnership with the Pacific Forest and Watershed Lands Stewardship Council to permanently protect and enhance company-owned watershed lands, including some in counties in the project area. *Recommendation:* In the FEIS, indicate the current status and use of the five PG&E-owned lands being considered for use in compensation. EPA strongly recommends that conservation lands acquired under HCP compensation include only lands that would otherwise not be protected.	As discussed on Draft HCP page 4-19 (*Conservation Strategy*) and page 2-47 of the DEIS/DEIR (*Proposed Action and Alternatives*), PG&E is initially seeking to fulfill its mitigation obligation through land purchases, mitigation banks, and use of PG&E-owned lands; however, the first two mechanisms are the techniques that are most likely to be used. The five PG&E-owned parcels tentatively identified for potential mitigation use are undeveloped grassland and riparian lands that have limited utility infrastructure and could support or be enhanced to support endangered species. Additional information was not provided on the five parcels because it is uncertain whether they will ever be used. If PG&E proposes to use these or other parcels they own during the 30-year permit term, such use would be subject to review and approval by USFWS and DFG for suitability and extent. PG&E does not propose to use lands that are already protected or associated with the Pacific Forest and Watershed Lands Stewardship Council. No change in the HCP or EIS/EIR is proposed.
2-14	**Determining Minor Construction** In addition to O&M activities, the HCP covers minor construction activities. Minor construction activities are limited to installation of 1 mile or less or [sic] new electric or gas pipeline (per project) or new facilities with an average maximum footprint of 5 acres (per project) (p. S-11). Minor construction activities also include extending transmission lines 1 mile or less, and extending distribution lines 1 mile or less (p. 2-16). The DEIS does not indicate if these measurements would be additive for each kind of extension; for example, does a project with 0.75 mile of transmission line and 0.75 mile of distribution line fall under minor construction? Also, it is not clear how the average maximum footprint for new facilities will be measured. *Recommendation:* In the FEIS, clarify minor construction determination as mentioned above. EPA recommends that the measurements that determine a minor construction project include the total of all pipeline, transmission line and distribution line extensions so that projects are not segmented in order to fall under the HCP. In the FEIS, describe how the average maximum footprint for new facilities will be measured.	Page 2-3 of the EIS/EIR is amended by adding a footnote to the third bullet (*Minor construction activities*) under the heading *Ongoing Operations, Maintenance, and Minor Construction Activities*, with the following text. The length of service extension allowed under minor new construction is understood as a total length of 1 mile from the current terminus of an existing line, regardless of the nature of the facilities involved. Multiple consecutive (end-to-end) extensions with a total length exceeding 1 mile would not be covered under the proposed HCP. Multiple 1-mile extensions in different geographic areas would be covered, but each would be treated as a separate activity. The size of a minor construction project would be estimated as the total footprint, expressed in acres. Both linear and acreage estimates will be required to address the entirety of a proposed project; consistent with the requirements of federal and state environmental review, the HCP will not allow segmentation of proposed construction to obtain coverage under the HCP. Page 2-14, at the end of the paragraph beginning "Minor Construction Activities" add footnote: As identified above, these activities are limited to a linear mile or less for new electric or gas facilities; larger projects will not be segmented or piecemealed to achieve HCP coverage. Although

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		an existing line may have several extensions they would serve different geographic areas and would be subject to CPUC regulations.
2-15	**Herbicides** The DEIS states that "all herbicides are used in strict accordance with FIFRA label requirements and, as appropriate, [sic] *with the US EPA's regulations for application of herbicides in endangered species habitat"* (p. 2-38). We recommend changing this statement to read that, in addition to following all the label requirements, all herbicides will be used in strict accordance with any applicable geographically-specific pesticide use limitations as identified in EPA's Endangered Species Protection Bulletin (Bulletin). Bulletins contain enforceable use limitations for the pesticide and are referenced on the pesticide product label and available on the web at www.epa.gov/espp or by calling 1-800-447-3813. Currently there are no bulletins applicable to California; however, the California Department of Pesticide Regulation has developed interim measures to protect listed species.	As identified on page 2-38 of the DEIS/DEIR, use of herbicides in PG&E's O&M activities complies with all FIFRA label requirements and with the U.S. Environmental Protection Agency's regulations for application of herbicides in endangered species habitat. Please note that USFWS cannot issue take authorization for herbicide use, so herbicide use is not covered under the proposed HCP. However, PG&E will continue to implement its existing program to minimize the potential for herbicides to have an adverse effect on the covered species. Because herbicide use is not a covered activity, no change is proposed in the HCP or the EIS/EIR.
2-16	We support Avoidance and Minimization Measure (AMM) number 29 which states that no herbicide will be applied within 100 feet of exclusion zones (Table 2-9). Since AMM 29 only applies to sites which have received pre-activity surveys, small disturbance sites are not included. It is not clear if grazing lands or disturbed sites are included.	AMM 29 would apply only to areas of natural vegetation (including grazing lands and other grassland land-cover types) where pre-activity surveys have identified that covered species may be present. It would not apply to agricultural lands (cultivated croplands, orchards) or to disturbed areas. PG&E has committed to continue their existing best management practices in areas where no pre-activity surveys are conducted, but herbicide use is not covered in the HCP (AMM 29 imposes further restrictions on herbicide use, but does not provide for altered or expanded use as a covered activity). No change is proposed in the HCP or the EIS/EIR.
2-17	*Recommendation:* In the FEIS, clarify the reference to EPA's regulations as specified above. State whether any AMMs or herbicide use restrictions will occur on areas not receiving pre-activity surveys such as small disturbance areas and on agricultural land or disturbed land.	Please see responses to Comment 2-15 and 2-16 above.
2-18	*Recommendation* [continued from Comment 2-17 above]*:* We recommend the use of measures identified in PRESCRIBE, the California Department of Pesticide Regulations on-line search engine that provides customized, location-specific measures to protect endangered species from pesticides, available at http://www.cdpr.ca.gov/docs/es/prescint.htm. In general, EPA recommends the use of the least toxic combination of herbicide/application	PG&E has contacted the California Department of Pesticide Regulation to discuss the potential use of data from PRESCRIBE to develop customized, location-specific measures. PG&E is still in the process of evaluating the potential to use this information in its everyday herbicide application activities, but cannot commit to its use at this time. PG&E will continue to train its herbicide applicators to be aware of species habitat and minimize off-site effects associated with slope and wind. Please note that, as discussed in the preceding

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	method in any areas with potential suitable habitat for covered species.	responses, herbicide use would not be covered in the proposed HCP, because USFWS does not authorize herbicide-related take under any circumstances. Consequently, no changes are proposed in the HCP or the EIS/EIR.
2-19	**Sustainable Timber** The DEIS states that moderate use of sustainably harvested timber would be recoverable over the long term (p. S-36). The DEIS does not indicate whether PG&E uses only sustainable harvested timber in its O&M activities or is committing to do so in this HCP. *Recommendation:* In the FEIS, clarify whether PG&E is committing to the use of only sustainably harvested timber for its O&M activities.	PG&E uses sustainably harvested timber and recycled plastic lumber in some of its O&M activities, as appropriate and feasible. However, the use of sustainably harvested timber is not a commitment of the HCP. This information has been added to the *Use of Natural Resources* section in Chapter 20 (*Environmental Sustainability*) of the FEIS/FEIR.
2-20	In the DEIS, EPA is listed as a cooperating agency under NEPA (p. S-5, 1-8). While EPA may have jurisdiction and/or expertise regarding potential environmental effects, we are not aware of USFWS extending an invitation to EPA to serve as a cooperating agency. EPA's policy and procedures require a written agreement outlining roles and responsibilities for all projects where EPA's [sic] agrees to serve as a cooperating agency. Since we are unable to locate such an agreement, we respectfully request EPA to be removed from the list of cooperating agencies under NEPA.	The commenter is correct that no written agreement was prepared for EPA to serve as a cooperating agency, and the EIS/EIR is amended as follows. On page 1-8, second paragraph under heading *Lead, Cooperating, and Responsible Agencies*: The following agencies have been identified as cooperating agencies under NEPA—that is, additional federal agencies with legal jurisdiction over the project and/or expertise regarding its potential environmental effects. ■ Bureau of Land Management. ■ Department of Housing and Urban Development. ■ ~~Environmental Protection Agency.~~ ■ NMFS. ■ U.S. Army Corps of Engineers.
2-21	PG&E's website indicates that the company operates an Environmental Management System (EMS) (http://www.pge.com/about_us/environment/features/responsibility.html). The goals of the HCP, including the adaptive management component, could be integrated into the EMS. If this will occur, the FEIS should indicate this.	As described on page 2-26 of the DEIS/DEIR, PG&E maintains CNDDB records and other biological and environmental information as part of its companywide Map Guide GIS database, which is available through the company's intranet to all company personnel. The company is also developing a new enterprise-level database to track O&M activities, AMM implementation, and HCP-mandated compensation. At this time, PG&E is working to identify the best way to integrate these commitments with its existing and other future programs, and the company's Environmental Management System (EMS) is part of this (see related mention on page 2-26 of the DEIS/DEIR). The new database

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		will be subject to USFWS and DFG review and approval, but because the nexus between existing programs and the HCP tracking system is still in development, it cannot be described in detail at this time, and no changes are proposed to the HCP or EIS/EIR.
San Joaquin Valley Air Pollution Control District (Letter 3)		
3-1	The entire San Joaquin Valley Air Basin is designated non-attainment for ozone and particulate matter (PM10 and PM2.5). The implementation of the HCP would contribute to the overall decline in air quality due to construction activities, ongoing traffic and other operational emissions.	As discussed in Chapter 2 of the DEIS/DEIR (*Proposed Action and Alternatives*), the O&M and minor construction activities proposed for coverage under the HCP are currently being conducted by PG&E and thus represent part of the existing air quality baseline in the San Joaquin Valley Air Basin. The HCP would not change the extent or frequency of PG&E's O&M and minor construction activities with the potential to affect air quality, specifically ozone and particulate matter generation. Rather, the HCP would enhance and further systematize PG&E's regional conservation efforts required to avoid and compensate for impacts of O&M and minor constriction activities on particular special-status species. To this end, some new activities (AMMs, including preactivity surveys and habitat preservation activities) would be required under the HCP. As discussed in Chapter 13 (Impacts AIR1 and AIR2), it is expected that any contributions to air quality impacts from such activities would be consistent with those that currently result from PG&E's current activity-by-activity approach to ESA compliance, which is considered as part of the baseline within the existing conditions described in the DEIS/DEIR. No further analysis is required.
3-2	Based on the information provided, the District expects that individual operations, maintenance and minor construction activities would not exceed the District's thresholds of significance (10 tons per year of ROG or NOx). The District concurs that compliance with Regulation VIII will constitute sufficient mitigation to reduce fugitive dust related PM10 impacts to a level considered less than significant. However, compliance with Regulation VIII does not mitigate the PM10 impact from equipment exhaust. Maintenance and construction activities, although considered minor, may need further analysis on a project-by-project basis.	PG&E's current practice, which would not change under the proposed HCP, is to consult with SJVAPCD on a project-by-project basis for O&M and minor new construction jobs that are large enough to result in potentially significant particulate matter impacts associated with tailpipe emissions and for activities that take place in close proximity to sensitive receptors, such as schools, hospitals, and day care centers. Current air quality in the San Joaquin Valley includes emissions generated by PG&E's existing O&M program, which has been in existence for a number of years. Thus, the existing air quality baseline described in the *Affected Environment* section of DEIS/DEIR Chapter 13 (*Air Quality*) and used in DEIS/DEIR analysis of air quality impacts reflects pollutant output from PG&E's current O&M program. This program would continue unchanged under the proposed action, and future air quality effects of ongoing O&M activities are discussed under Impacts AIR1 and AIR2 in Chapter 13 of the DEIS/DEIR. As identified in the *Methodology for Impact Analysis* section of Chapter 13, O&M and minor construction activities would be the principal

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		source of pollutant emissions associated with the proposed action. No further analysis is required, and no changes are proposed for the EIS/EIR.
3-3	District staff is available to meet with you and/or the applicant to further discuss the regulatory requirements that are associated with this project. If you have any questions or require further information, please call me at (559) 230-5818 and provide the reference number at the top of this letter.	PG&E will continue to coordinate with District staff to ensure that regulatory requirements for air quality are satisfied. No change is proposed in the HCP or the EIS/EIR.
Modesto Irrigation District (Letter 4)		
4-1	Irrigation ▪ No Comments at this time. Domestic Water ▪ No comments at this time. Environmental ▪ No comments at this time. Electrical ▪ The Electrical T&D Division has no comments or requirements at this time.	Receipt of letter and completion of review noted. No change is needed in the HCP or the EIS/EIR.
Arthur Unger (Letter 5)		
5-1	All compensation should occur inside existing banks in order that large contiguous land areas are created. Large contiguous land areas are thought more likely to allow a species to survive in perpetuity than areas connected by corridors and much more likely to allow a species to survive in perpetuity than small isolated habitat areas.	Comment noted. As discussed on Draft HCP page 4-1 and DEIS/DEIR page 2-40, the proposed HCP conservation strategy was developed in keeping with eight guiding principles, which include a proviso that "Compensation should be coordinated with and incorporate into other regional conservation efforts," and identification that "Preserving a small number of large, contiguous habitat areas is preferable to preserving a greater number of small, discrete areas." Consistent with this policy, USFWS and DFG will encourage the use of mitigation banks, but recognizes that in some cases, other mitigation options may be appropriate, reasonable, and/or preferable. No change is proposed in the HCP or the EIS/EIR.
5-2	Blunt-nosed leopard lizard (Gambelia sila) is a fully-protected species and can not be taken even with mitigation.	The commenter is correct. Under current law DFG will not (and cannot) authorize the take of blunt-nosed leopard lizard, and the proposed HCP conservation strategy addresses the measures and methods that will be used to ensure that take does not occur. The applicant is providing mitigation for this species as part of the application's overall compensation package and mitigation for terrestrial grassland species in the south San Joaquin Valley. No change is proposed in the HCP or the EIS/EIR.

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5-3	Is Tipton kangaroo rat (Dipodomys nitratoides nitratoides) the only Dipodomys nitratoides in the area? The "Recovery Plan for Upland Species of the San Joaquin Valley, California" lists Dipodomys nitratoides brevinasus and Dipodomys nitratoides exilis.	Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*) is the only kangaroo rat species for which PG&E is seeking take coverage. *Dipodomys nitratoides exilis* is the Fresno kangaroo rat and is federally and state listed as endangered. Its current range is believed to be restricted to the Kerman and Alkali Sink Ecological Reserves, east of Fresno. The last recorded observation of Fresno kangaroo rat was on the Alkali Sink Ecological Reserve in 1992. It is unknown at this time whether this subspecies is extinct or if there is an extant population. Because of its extreme rarity and restricted distribution, USFWS and DFG would not grant take authorization for this species. *Dipodomys nitratoides brevinasus* is the short-nosed kangaroo rat and is a California species of special concern. The range of this subspecies is generally west of the California aqueduct from the Panoche region of Fresno and San Benito Counties, south to Lokern/Elk Hills in southern Kern County. It also occurs on the Carrizo Plain and northern Cuyama Valley, San Luis Obispo County. This species is not currently listed and is expected to benefit by AMMs and habitat compensation under the proposed HCP. Thus, take coverage was not requested for this species, and the plan would have to be amended to cover it. No change is proposed in the HCP or EIS/EIR.
5-4	Because of the large population increase the San Joaquin Valley has and will have, Alternative 1 plus Enhanced Compensation is necessary to have even a small chance to preserve the wildlife we have now for our posterity.	Please see responses to Comments 2-2 and 2-8 above.
5-5	We are glad that all permanent losses of habitat suitable, for one or more of the Covered Species, will be compensated at a 3:1 ration (3 acres created, restored, or conserved for every acre lost). Creation and restoration of habitat is usually difficult if not impossible unless the habitat is within a large contiguous area of habitat. The emphasis should be on conservation.	Comment noted; as discussed in the Draft HCP's conservation land selection criteria (page 6-4), the compensation strategy would focus on conservation of existing, high-quality habitat precisely because it offers greater surety of success. Use of habitat creation or restoration is expected to be limited under the proposed HCP, and to pertain mostly to rare plants, if used. No change is proposed in the HCP or EIS/EIR.
5-6	The fee for buying habitat to compensate for habitat taken needs to be high and will be higher. Several years ago the Metropolitan Bakersfield Habitat Conservation Plan paid $300 an acre for habitat; they now pay $1500 an acre for habitat in the same areas.	As discussed in Draft HCP Chapter 7 (*Implementation Costs and Funding*), the HCP assumed that the per-acre cost to purchase fee title grassland (i.e., grazing land) in the north, central, and south San Joaquin Valley would be $2,000, $1,500, and $1,000, respectively. These estimates were based on information available from the California Chapter of the American Association of Farm Managers and Rural Appraisers (2002, updated in 2005; see http://www.aglandtrends.com/2005). The HCP also assumes an inflation rate of 2.5% per year. No change is proposed in the HCP or EIS/EIR.

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Shauna McDonald (Letter 6)		
6-1	The Proposed Action combines a good combination of avoidance and compensation and I hope it's implemented. It doesn't appear that the draft EIS addresses Section 106 of the National Historic Preservation Act. Section 106 of the National Historic Preservation Act requires federal agencies to evaluate the effect of the federal undertakings on historical, archeological and cultural sites that are listed or proposed to be listed. It should be specifically addressed within cultural resources (a good job was done of that on the draft EIR/EIS for the East Contra Costa HCP.	Impacts on cultural resources are analyzed in Chapter 9 of the DEIS/DEIR. As discussed in this analysis, PG&E's continued implementation of the company's cultural resources program (described on pages 2-31 through 2-33 of the DEIS/DEIR) will serve to ensure that ongoing Section 106 compliance is achieved on an activity by activity basis, when it is required. Moreover, to the extent that HCP habitat compensation can make use of USFWS-approved mitigation banks, mitigation sites will be "pre-cleared" for Section 106 compliance, because Section 106 compliance must be completed in order for USFWS to approve/establish a mitigation bank. As detailed in DEIS/DEIR Chapter 9, tribal authorities in the San Joaquin Valley area were contacted through the state as part of the DEIS/DEIR and Section 106 compliance process (page 9-12); but because of the size of the area, the number of activities included, and the long duration of the proposed program, additional site-specific analysis will continue to occur under PG&E's current practices. The East Contra Costa County HCP was developed to address the effects of planned development in this rapidly urbanizing area. In that context, cultural resources compliance can appropriately be addressed through the general plan process that guides and established policies for growth, and mitigation can be identified at the policy/program level for implementation by all developers. This strategy, while effective, is not appropriate for the proposed HCP because PG&E's O&M and minor construction program is not subject to local jurisdiction oversight and cannot be regulated through the general plan process. No change in the HCP or EIS/EIR is needed.
California Department of Water Resources, Floodway Protection Section (Letter 7)		
7-1	The project corresponding to the subject SCH identification number has come to our attention. The limited project description suggests a potential encroachment on an Adopted Plan of Flood Control. If indeed your project encroaches on adopted food [sic] control plan, you will need to obtain an encroachment permit from the Reclamation Board prior to initiating any activities. The attached Fact Sheet explains the permitting process. Please not that the permitting process may take as much as 45 to 60 days to process. Also note that a condition of the permit requires the securing all of the appropriate additional permits before initiating work. This information is provided so that you may plan accordingly.	The majority of the activities that would be covered under the proposed HCP would have no potential to encroach on any Adopted Plan of Flood Control. For those activities that may require an encroachment permit, PG&E's practice is to comply fully with all portions of the permit process, and this practice would continue under the proposed HCP. No further analysis is required.

TO: ☒ Office of Planning and Research

For U.S. Mail:
P.O. Box 3044
Sacramento, CA 95812-3044

Street Address:
1400 Tenth Street, Suite 212
Sacramento, CA 95814

FROM: Department of Fish and Game
Habitat Conservation Planning
1416 9th Street
Sacramento, CA 95814
Contact: Scott Flint, Acting Branch Chief
Phone: (916) 653-9719

LEAD AGENCY (if different from above):

SUBJECT: ***Filing of Notice of Determination in compliance with § 21108 of the Public Resources Code***

State Clearinghouse Number (if submitted to State Clearinghouse): 2004042009

Project Title: Pacific Gas & Electric Company San Joaquin Valley Operations and Maintenance Habitat Conservation Plan (Incidental Take Permit # 2081-2008-001-00, Master Streambed Alteration Agreement # 1600-2008-0001-0000-HQ).

Project Location: Within all or parts of the following nine San Joaquin Valley counties: San Joaquin, Stanislaus, Merced, Fresno, Kings, Kern, Mariposa, Madera and Tulare.

Project Description: Analyzed impacts of issuing state and federal incidental take permits and entering into master streambed alteration agreement with Pacific Gas and Electric Company to allow continued operation and maintenance program in conformity with the requirements of federal and state endangered species laws and the California Fish and Game Code.

This is to advise that the Department of Fish and Game (DFG), acting as ☒ **the lead agency** / ☐ **a responsible agency** approved the above-described project on May / 5 / 2008 and has made the following determinations regarding the above described project:

1. The project ☐ **will** / ☒ **will not** have a significant effect on the environment. (This determination is limited to effects within DFG's jurisdiction when DFG acts as a responsible agency.)
2. ☒ **An environmental impact report** / ☐ **A negative declaration** was prepared for this project pursuant to CEQA.
3. Mitigation measures ☒ **were** / ☐ **were not** made a condition of DFG's approval of the project.
4. A mitigation reporting or monitoring plan ☒ **was** / ☐ **was not** adopted by DFG for this project.
5. A Statement of Overriding Considerations ☐ **was** / ☒ **was not** adopted by DFG for this project.
6. Findings ☒ **were** / ☐ **were not** made by DFG pursuant to Public Resources Code § 21081(a). The Department did, however, adopt findings to document its compliance with CEQA.
7. Compliance with the environmental filing fee requirement at Fish and Game Code § 711.4 (check one):
   - ☐ Payment is submitted with this notice.
   - ☐ A copy of a receipt showing prior payment is attached to this notice.
   - ☐ A copy of DFG's No Effect Finding is attached to this notice.
   - ☒ Filing fee paid as part of separate contract/agreement.

☒ Lead Agency certification: DFG, as Lead Agency, has made the final EIR with comments and responses and record of project approval, or the Negative Declaration, available to the General Public at the DFG office identified above.

☐ Responsible Agency statement: The final EIR or Negative Declaration that was prepared by the Lead Agency for this project is available to the General Public at the office location listed above for the Lead Agency. DFG's record of decision is available at the DFG office identified above.

Signature *Date:* 5 MAY 2008

Kevin Hunting, Deputy Director Regional Operations

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Date Received for filing at OPR:

DFG Rev. 2/2005

State of California
Department of Fish and Game

Flex your POWER

Memorandum

Date: May 5, 2008

To: Office of Planning and Research
1400 Tenth Street, Suite 212
Sacramento CA 95812-3044

From: Scott Flint, Acting Branch Chief SAF
Department of Fish and Game
Habitat Conservation Planning
1416 9th Street, Suite 1260
Sacramento, CA 95814

Subject: Payment of CEQA Filing Fees for the PG&E San Joaquin Valley O&M HCP EIS/EIR (SCH# 2004042009)

The Department of Fish and Game (DFG) and the Pacific Gas and Electric Company (PG&E) have entered into a contract to fund the environmental review and permitting of the Pacific Gas & Electric San Joaquin Valley Operations and Maintenance Habitat Conservation Plan including the preparation and circulation of the project Environmental Impact Statement/ Environmental Impact Report (EIS/EIR). PG&E has paid the required filing fee of $2,500 (F&G Code 711.4(c)(1)] for this EIS/EIR directly to the Department. This memorandum is being filed by DFG along with the project Notice of Determination (NOD) to document that the CEQA filing fee has been paid and to serve as an official receipt of fee payment for the project.

Thank you for your attention to this matter. If you have any questions, please contact me at (916) 653-9719 or at the letterhead address above.

cc:
Jeff Single
Department of Fish and Game
Central Region

Kent Smith
Department of Fish and Game
North Central Region