



Final

PG&E San Joaquin Valley

Operation & Maintenance Habitat Conservation Plan

(includes updated Chapter 4 and Tables 5-3, 5-4 and 5-5, December 2007)



Prepared for:
Pacific Gas and Electric Company

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**Pacific Gas & Electric Company
San Joaquin Valley
Operations and Maintenance
Habitat Conservation Plan**
*(includes updated Chapter 4 and Tables 5-3, 5-4 and 5-5,
December 2007)*

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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 than 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; the 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. The implementation of 30 avoidance and minimization measures (AMMs) will help avoid or reduce 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, approximately 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.

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.

Contents

Chapter 1	Background and Purpose	1-1
	Overview of PG&E	1-2
	Regulatory Context	1-3
	Development of the HCP	1-10
	Plan Area	1-11
	Land-Cover Mapping and Classification	1-12
	Selection of Covered Species	1-12
	Selection of Covered Activities	1-15
	Consideration of and Relationship to Other Planning Efforts	1-15
	Duration of Permits	1-18
	Assurances Requested	1-19
Chapter 2	Covered Activities	2-1
	Introduction	2-1
	Natural Gas System	2-2
	Description of Transmission and Distribution System	2-2
	Methods and Techniques	2-3
	O&M Activities for the Natural Gas System	2-4
	Minor Construction Activities	2-10
	Electrical System	2-16
	Description of Transmission and Distribution System	2-16
	Methods and Techniques	2-17
	O&M Activities for the Electrical System	2-19
	Minor Construction Activities	2-26
	Other Covered Activities	2-28
	Activities by Third Parties	2-28
	Maintenance on Compensation Lands	2-29
Chapter 3	Analysis of Habitat Disturbance Acreage	3-1
	Description of O&M Activities	3-2
	Estimates of Acreage Disturbed by O&M Activities	3-2
	Disturbance of Land-Cover Types by County	3-3
	Estimation of Habitat Disturbance for Covered Wildlife Species	3-7
	Percent of Land-Cover Types Considered Habitat for Covered Species	3-8
	Summary of Wildlife Habitat Disturbance	3-15
	Estimated Disturbance of Occupied Habitat for Covered Plant Species	3-16

Chapter 4	Conservation Strategy	4-1
	Introduction	4-1
	Biological Goals and Objectives	4-2
	Estimation of Levels of Disturbance	4-2
	Overview of HCP Implementation.....	4-10
	HCP Administrator	4-11
	Operation Managers	4-11
	Field Supervisors	4-11
	Field Crews	4-12
	Environmental Services Field Specialists	4-12
	Biologists	4-12
	Preactivity Surveys to Avoid and Minimize Effects	4-12
	Approach	4-12
	Survey Methods	4-13
	Data Archiving	4-21
	Compensation.....	4-21
	Approach	4-22
	Determination of Compensation Needs	4-23
	Compensation Mechanisms	4-27
	Attributes and Management of Compensation Lands.....	4-32
 Chapter 5	 Effects Determinations and Requested Take	
	Authorization.....	5-1
	Introduction	5-1
	Covered Wildlife Species.....	5-2
	Vernal Pool Fairy Shrimp, Midvalley Fairy Shrimp, and Vernal Pool Tadpole Shrimp	5-2
	Valley Elderberry Longhorn Beetle	5-4
	California Tiger Salamander	5-7
	Limestone Salamander	5-9
	California Red-Legged Frog	5-11
	Blunt-Nosed Leopard Lizard	5-12
	Giant Garter Snake	5-14
	Swainson's Hawk and White-Tailed Kite	5-16
	Bald and Golden Eagles	5-18
	Western Burrowing Owl	5-20
	Bank Swallow	5-22
	Tricolored Blackbird	5-23
	Buena Vista Lake Shrew	5-25
	Riparian (San Joaquin Valley) Woodrat and Riparian Brush Rabbit	5-27
	Tipton and Giant Kangaroo Rats	5-28
	San Joaquin (Nelson's) Antelope Squirrel	5-29
	San Joaquin Kit Fox.....	5-31
	Covered Plant Species	5-32
	Direct Effects	5-32
	Indirect Effects	5-34
	Compensation Efforts	5-34
	Overall Effects	5-34
	Requested Authorization	5-35
	Maintenance on Compensation Lands	5-35

Chapter 6	Monitoring, Reporting, and Adaptive Management Program	6-1
	Introduction	6-1
	Monitoring	6-1
	Monitoring Biological Goals and Objectives	6-1
	Monitoring Avoidance and Minimization Measures	6-2
	Monitoring Effects Requiring Compensation	6-3
	Monitoring Compliance with Compensation Requirements	6-3
	Monitoring Compensation Effectiveness	6-4
	Reporting Requirements	6-6
	Adaptive Management Program	6-7
	Implementation	6-7
	Addressing Uncertainty	6-8
	Evaluating Alternative Strategies	6-8
	Feedback Loops	6-8
	Consistency with Recovery Plans	6-10
	Emergency Management	6-11
	Overview of Changed and Unforeseen Circumstances	6-11
	Revisions and Amendments	6-19
Chapter 7	Implementation Costs and Funding	7-1
	Overview	7-1
	Cost to Implement HCP	7-1
	Implementation and Training	7-1
	Compensation	7-2
	Surveys and Avoidance and Minimization Measures	7-3
	Other Program Costs	7-4
	Summary	7-4
	Funding Sources	7-4
	Determining Practicability	7-5
	Adequacy of Funds	7-5
Chapter 8	Alternatives Analysis	8-1
	Introduction	8-1
	Description of Alternatives	8-1
	Project (Take Permit)	8-1
	No-Action Alternative (No Take Permit—Enhanced Monitoring and Avoidance)	8-2
	Alternatives Considered but Eliminated	8-2
	Changed Practices	8-3
	Activity-by-Activity Permitting	8-4
	Alternative Species Measures	8-4
	Participate in Existing HCPs in the San Joaquin Valley	8-4
	Compensation Only	8-4
	Impacts of Alternatives	8-5
	Project Alternative	8-5
	No Action Alternative	8-5
	Other Alternatives	8-5
	Reduced Number of Covered Species Alternative	8-5

Chapter 9	References Cited	9-1
	Printed References	9-1
	Personal Communications.....	9-2
Chapter 10	Preparers	10-1
	PG&E.....	10-1
	Jones & Stokes.....	10-1
	PG&E Advisory Group Participants	10-2
Appendix A	Land Cover GIS Metadata	
Appendix B	Species Selection Process	
Appendix C	Covered Species Descriptions	
Appendix D	VELB Conservation Program and Biological Opinion	
Appendix E	Migratory Bird Protection Program	
Appendix F	Rare Plant Analysis	
Appendix G	Environmental Awareness Training Program	
Appendix H	Operations Manual	
Appendix I	Designated Occupied Habitat Maps	
Appendix J	Proposed Mitigation Acquisition Approval Process	
Appendix K	Implementing Agreement	

Tables

Follows Page

1-1	PG&E's San Joaquin Valley O&M HCP Plan Area Estimated Size.....	1-12
1-2	Land Cover Types Used for Analysis in the HCP	1-12
1-3	Covered Wildlife Species for PG&E's San Joaquin Valley Habitat Conservation Plan	1-14
1-4	Covered Plant Species for PG&E's San Joaquin Valley Habitat Conservation Plan	1-14
3-1	Estimated Annual Acreages of Disturbance for PG&E O&M Activities in the San Joaquin Valley HCP Area.....	3-4
3-2	Annual Disturbance Acreages by Facility Type	3-4
3-3	Mapped Linear Miles of Gas Transmission Facilities by County by Land-Cover Type.....	3-4
3-4	Mapped Linear Miles of Electric Transmission Facilities by County by Land-Cover Type.....	3-4
3-5	Mapped Linear Miles of Electric Distribution Facilities by County and Land Cover Type.....	3-4
3-6	Linear Miles of Gas Distribution Facilities by County by Land-Cover Type	3-4
3-7	Disturbance Acreage Per Mile of Facility for the Four Facility Type.....	3-6
3-8	Estimated Annual Land-Cover Type Effects by County (Acres)	3-6
3-9	Estimated Annual Acreage of Vernal Pool Habitat Disturbed	3-6

3-10	Estimate of Percentage of Habitat Considered Suitable for Occupancy.....	3-8
3-11	Estimate of Acres of Habitat for Each Wildlife Species Disturbed and Annually.....	3-8
3-12	Acreage of Critical Habitat Disturbed Annually by O&M Activities.....	3-8
3-13	Distribution of Plant Species Proposed for Coverage and as No Take Species and Likelihood of Effects	3-18
4-1	Covered Species Associated with Each of the Five General Habitat Types that Occur in the Plan Area	4-2
4-2	Avoidance and Minimization Measures to Reduce Impacts on Covered Species	4-4
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	4-4
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	4-4
4-5	Location Criteria Used to Trigger AMMs for Species that are That Are Biologically Susceptible to Activities <0.01 acre ¹	4-6
4-6	O&M Activities Requiring Surveys	4-12
4-7	General Best Management Practices (BMPs) for PG&E Vegetation Management Activities	4-14
4-8	Best Management Practices (BMPs) for Mechanical Clearing of Electric Transmission and Distribution Rights of Way (ROWS).....	4-14
4-9	Survey Strategy for Wildlife Species Covered by the PG&E San Joaquin Valley HCP	4-16
4-10	Timing of Surveys for Covered Plant Species	4-16
4-11	Estimates of Regional Compensation by Land-cover Cover Type (acres) ¹	4-26
4-12	Estimated Acreages Required to Achieve Compensation for Various Suites of Coexisting Species for PG&E's San Joaquin Valley Habitat Conservation Plan (SVJ HCP)	4-26

4-13	Anticipated Compensation for Plant Species During Implementation of PG&E's San Joaquin Valley O&M HCP ^{1,2}	4-28
5-1	Summary of Applicability of Avoidance and Minimization Measures to Covered Wildlife Species	5-2
5-2	Summary of Applicability of Avoidance and Minimization Measures to Plant Species	5-2
5-3	Requested Federal Take Authorizations and Expected Frequencies of Take under the SJV HCP	5-2
5-4	Requested State Take Authorizations and Expected Frequencies of Take under the SJV HCP	5-2
5-5	Requested Take Authorizations and Expected Frequencies of Take for Covered Plants	5-2
7-1	Implementation and Training Costs	7-2
7-2	Compensation Cost Variables	7-2
7-3	PG&E's San Joaquin Valley O&M HCP Compensation Cost Estimate	7-2
7-4	Surveys and AMM Costs	on page 7-4
7-5	PG&E's San Joaquin Valley O&M HCP Total Program Costs (with 2.5% Inflation)	7-4
8-1	Screening Process for Evaluating the Feasibility of Alternative Means of Avoiding and Minimizing Take of PG&E's O&M Activities	8-2

Figures

	Follows Page
1-1 HCP Plan Area and Data Sources for Land-cover Mapping.....	1-12
1-2 Land-Cover Types in Plan Area.....	1-12
2-1 Wire Zone/Border Zone ROW Management Concept.....	on 2-25
2-2 Sample Compliance Agreement.....	2-28
3-1 Example Land-Cover Type Facility Analysis	3-6
4-1 Process Used to Identify Species that Warrant Application of Avoidance and Minimization Measures (AMMs) for Small Disturbance Activities (<0.1 acre).....	4-4
4-2 Decision Process for Identifying Blunt-nosed Leopard Lizard Habitat Protection for PG&E Operations and Maintenance Activities in the San Joaquin Valley	4-6
4-3 HCP Organizational Responsibility Flowchart	4-10
4-4 Key Conceptual HCP Implementation Responsibilities and Relationships	4-12
4-5 Draft Pre-Activity Survey Data Collection Form.....	4-22

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 [NWP] 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 counterpart 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, possess, 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 1947, 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:

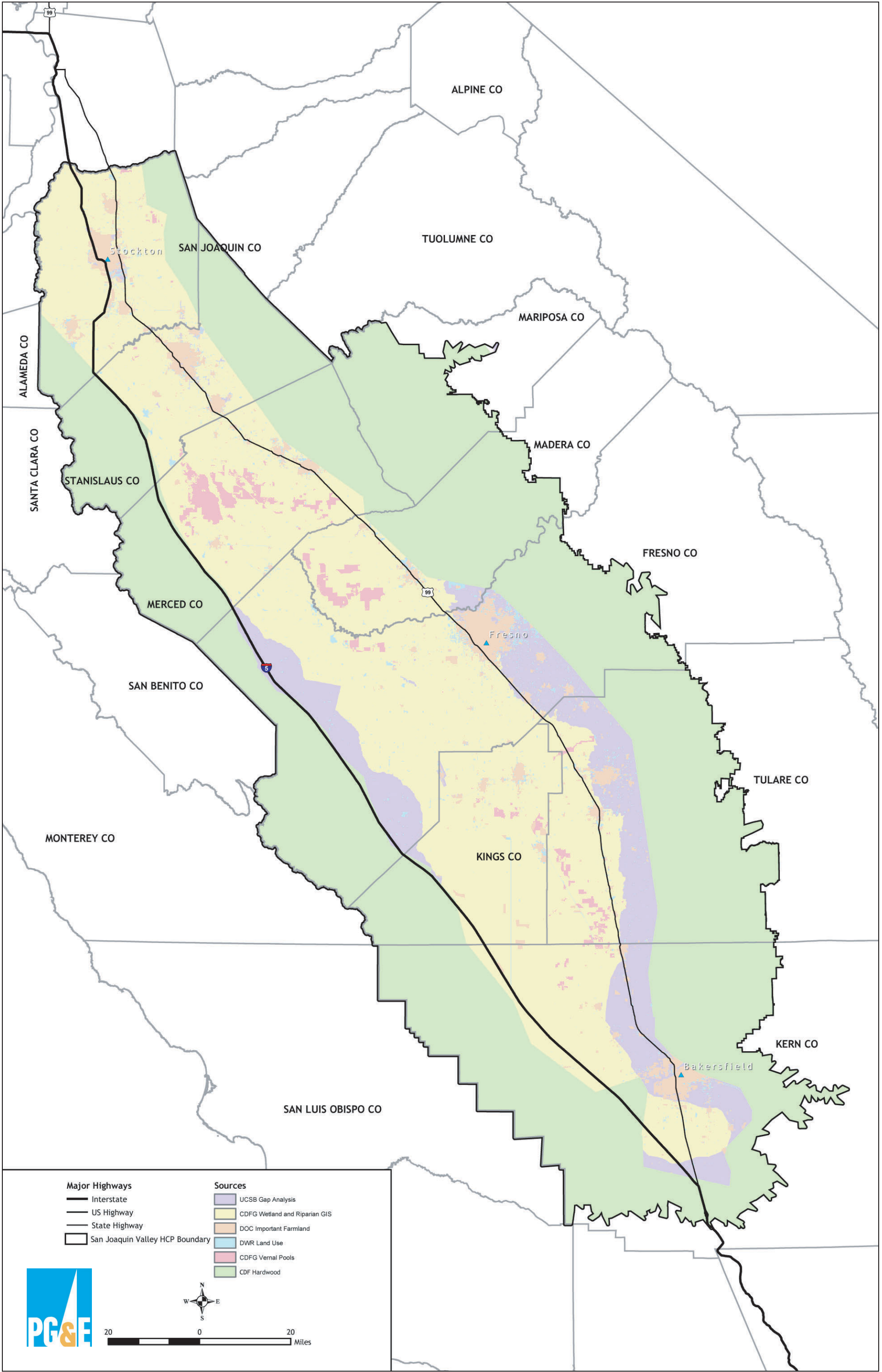
¹ ROW access and minor new construction were not mapped., The amount of natural land cover present where these activities take place was estimated to be 10% of the total land cover for all other existing facility types.

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



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Figure I-1
HCP Plan Area and Data Sources
for Land-cover Mapping

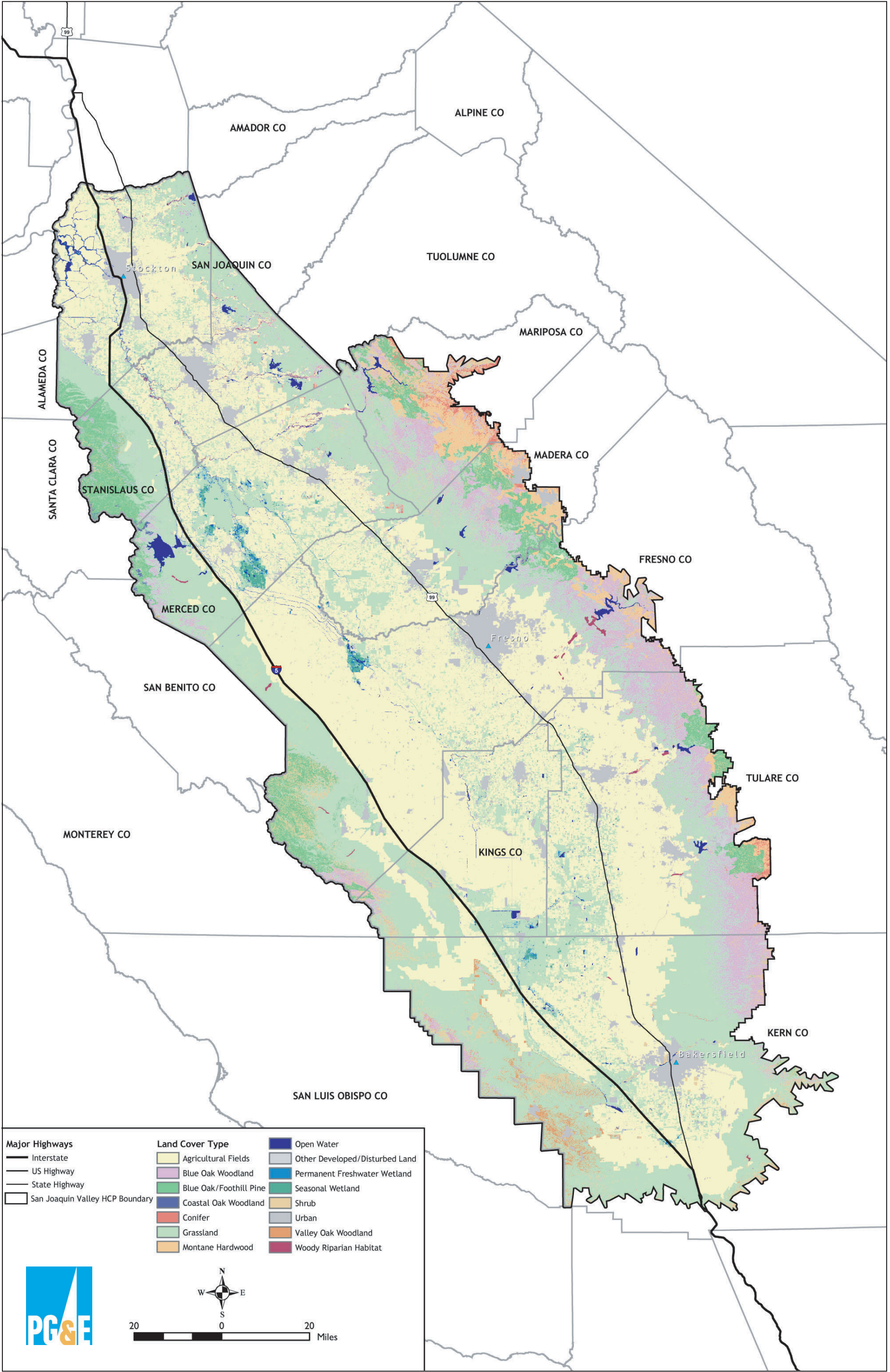


Figure I-2
Land-Cover Types
in Plan Area

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 (CNDDDB) 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

Page 1 of 2

Common and Scientific Name	Legal Status ^a	
	Federal	State
Vernal pool fairy shrimp <i>Branchinecta lynchi</i>	T	–
Midvalley fairy shrimp <i>Branchinecta mesoallensis</i>	SC	–
Vernal pool tadpole shrimp <i>Lepidurus packardii</i>	E	–
Valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	T	–
California tiger salamander <i>Ambystoma californiense</i> (<i>A. tigrinum c.</i>)	T	SSC
Limestone salamander <i>Hydromantes brunus</i>	SC	T, FP
California red-legged frog <i>Rana aurora draytoni</i>	T	SSC
Blunt-nosed leopard lizard <i>Gambelia (Crotaphytus) silus</i>	E	E, FP
Giant garter snake <i>Thamnophis gigas</i>	T	T
Swainson's hawk <i>Buteo swainsoni</i>	–	T
White-tailed kite <i>Elanus caeruleus</i>	–	FP
Golden eagle <i>Aquila chrysaetos</i>	–	FP
Bald eagle <i>Haliaeetus leucocephalus</i>	FPD, T	E, FP
Western burrowing owl <i>Athene cunicularia hypugae</i>	SC	SSC
Bank swallow <i>Riparia riparia</i>	–	T
Tricolored blackbird <i>Agelaius tricolor</i>	SC	SSC
Buena Vista Lake shrew <i>Sorex ornatus relictus</i>	E	SSC
Riparian brush rabbit <i>Sylvilagus bachmani riparius</i>	E	E
Riparian (San Joaquin Valley) woodrat <i>Neotoma fuscipes riparia</i>	E	SSC

Table 1-3. Continued

Common and Scientific Name	Legal Status ^a	
	Federal	State
Tipton kangaroo rat <i>Dipodomys nitratoide nitratoide</i>	E	E
Giant kangaroo rat <i>Dipodomys ingens</i>	E	E
San Joaquin (Nelson's) antelope squirrel <i>Ammodon nelsoni</i>	SC	T
San Joaquin kit fox <i>Vulpes macrotis mutica</i>	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 <i>Amsinckia grandiflora</i>	E	E	1B
Lesser saltscare <i>Atriplex minuscule</i>	–	–	1B
Bakersfield smallscale <i>Atriplex tularensis</i>	SC	E	1B
Big tarplant <i>Blepharizonia plumosa</i> ssp. <i>Plumosa</i>	–	–	1B
Mariposa pussypaws <i>Calyptidium pulchellum</i>	T	–	1B
Tree-anemone <i>Carpenteria californica</i>	SC	T	1B
Succulent owl's-clover <i>Castilleja campestris</i> ssp. <i>succulenta</i>	T	E	1B
California jewelflower <i>Caulanthus californicus</i>	E	E	1B
Hoover's spurge <i>Chamaesyce hooveri</i>	T	–	1B
Slough thistle <i>Cirsium crassicaule</i>	SC	–	1B
Mariposa clarkia <i>Clarkia biloba</i> ssp. <i>australis</i>	–	–	1B
Merced clarkia <i>Clarkia lingulata</i>	SC	E	1B
Springville clarkia <i>Clarkia springvillensis</i>	T	E	1B
Vasek's clarkia <i>Clarkia tembloriensis</i> ssp. <i>Calientensis</i>	SC	–	1B
Hispid bird's-beak <i>Cordylanthus mollis</i> ssp. <i>Hispidus</i>	SC	–	1B
Palmate-bracted bird's-beak <i>Cordylanthus palmatus</i>	E	E	1B
Kern mallow <i>Eremalche parryi</i> ssp. <i>kernensis</i>	E	–	1B
Congdon's woolly sunflower <i>Eriophyllum congdonii</i>	–	R	1B
Delta button-celery <i>Eryngium racemosum</i>	SC	E	1B

Table 1-4. Continued

Common and Scientific Name	Legal Status ^a		
	Federal	State	CNPS
Striped adobe-lily <i>Fritillaria striata</i>	SC	T	1B
Boggs Lake hedge-hyssop <i>Gratiola heterosepala</i>	–	E	1B
Pale-yellow layia <i>Layia heterotricha</i>	SC	–	1B
Comanche Point layia <i>Layia leucopappa</i>	SC	–	1B
Legenere <i>Legenere limosa</i>	SC	–	1B
Panoche pepper-grass <i>Lepidium jaredii</i> ssp. <i>album</i>	SC	–	1B
Congdon's lewisia <i>Lewisia congdonii</i>	–	R	1B
Mason's lilaeopsis <i>Lilaeopsis masonii</i>	SC	R	1B
Mariposa lupine <i>Lupinus citrinus</i> var. <i>deflexus</i>	SC	T	1B
Showy madia <i>Madia radiata</i>	–	–	1B
Hall's bush mallow <i>Malacothamnus hallii</i>	–	–	1B
San Joaquin woollythreads <i>Monolopia (Lembertia) congdonii</i>	E	–	1B
Pincushion navarretia <i>Navarretia myersii</i> (a.k.a. <i>N.m.ssp. m.</i>)	–	–	1B
Colusa grass <i>Neostapfia colusana</i>	T	E	1B
Bakersfield cactus <i>Opuntia basilaris</i> var. <i>treleasei</i>	E	E	1B
San Joaquin Valley Orcutt grass <i>Orcuttia inaequalis</i>	T	E	1B
Hairy Orcutt grass <i>Orcuttia pilosa</i>	E	E	1B
Hartweg's golden sunburst <i>Pseudobahia bahiifolia</i>	E	E	1B
San Joaquin adobe sunburst <i>Pseudobahia peirsonii</i>	T	E	1B
Keck's checkerbloom <i>Sidalcea keckii</i>	E	–	1B

Table 1-4. Continued

Common and Scientific Name	Legal Status ^a		
	Federal	State	CNPS
Oil neststraw <i>Stylocline citroleum</i>	–	–	1B
Greene's tuctoria <i>Tuctoria greenei</i>	E	R	1B
Kings gold <i>Twisselmannia californica</i>	-	-	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 is expected to be completed by fall 2008.

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&E's 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 (ETs) 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.

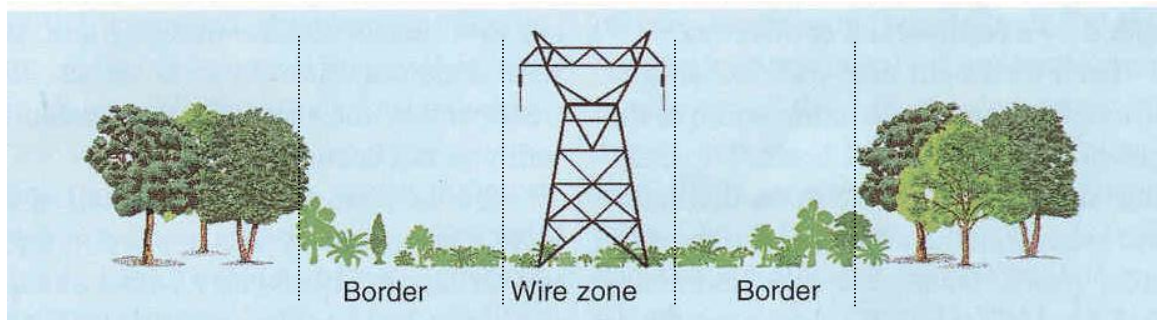


Figure 2-1
Wire Zone/Border Zone ROW Management Concept

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 AMMs¹. 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 Area¹

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	<i>Other Disturbance</i> 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	<i>Other Disturbance</i> 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. <i>Other Disturbance</i> 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). <i>Other Disturbance</i> 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. <i>Other Disturbance</i> 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. <i>Other Disturbance</i> 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. <i>Other Disturbance</i> 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. <i>Other Disturbance</i> 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. <i>Other Disturbance</i> 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. <i>Other Disturbance</i> is the same as for activity G9.

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	
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	<i>Other Disturbance</i> 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	<i>Other Disturbance</i> 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.

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	
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. <i>Other Disturbance</i> 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. <i>Other Disturbance</i> 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. <i>Other Disturbance</i> 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. <i>Other Disturbance</i> 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. <i>Other Disturbance</i> 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.

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	
E10. Vegetation Management								
E10a. Routine Maintenance	373	—	—	1.65	—	—	616	<i>Other Disturbance</i> 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	<i>Other Disturbance</i> 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.

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	
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. <i>Other Disturbance</i> 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. <i>Other Disturbance</i> 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). <i>Other Disturbance</i> 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. <i>Other Disturbance</i> 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. <i>Other Disturbance</i> is the same as for activity G9.

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	
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. <i>Other Disturbance</i> 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). <i>Other Disturbance</i> 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 Type¹

	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

Activity	Total Acreage Affected (acres) ²			Percentage Transmission (%) ³	Percentage Distribution (%) ³	Acreage Affected by Transmission O&M (acres)			Acreage Affected by Distribution O&M (acres)		
	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance			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

Activity	Total Acreage Affected (acres) ²			Percentage Transmission (%) ³	Percentage Distribution (%) ³	Acreage Affected by Transmission O&M (acres)			Acreage Affected by Distribution O&M (acres)		
	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance			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

Activity	Total Acreage Affected (acres) ²			Percentage Transmission (%) ³	Percentage Distribution (%) ³	Acreage Affected by Transmission O&M (acres)			Acreage Affected by Distribution O&M (acres)		
	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance			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

Table 3-2. Continued

Activity	Total Acreage Affected (acres) ²			Percentage Transmission (%) ³	Percentage Distribution (%) ³	Acreage Affected by Transmission O&M (acres)			Acreage Affected by Distribution O&M (acres)		
	Permanent Loss (PL)	Temporary Loss (TL)	Other Disturbance			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

Land Cover	County										Percent of Total
	Fresno	Kern	Kings	Madera	Mariposa	Merced	San Joaquin	Stanislaus	Tulare	Grand 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

Land Cover	County									Total	Percent Total
	Fresno	Kern	Kings	Madera	Mariposa ^b	Merced	San Joaquin	Stanislaus	Tulare ^b		
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

Table 3-8. Continued

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.

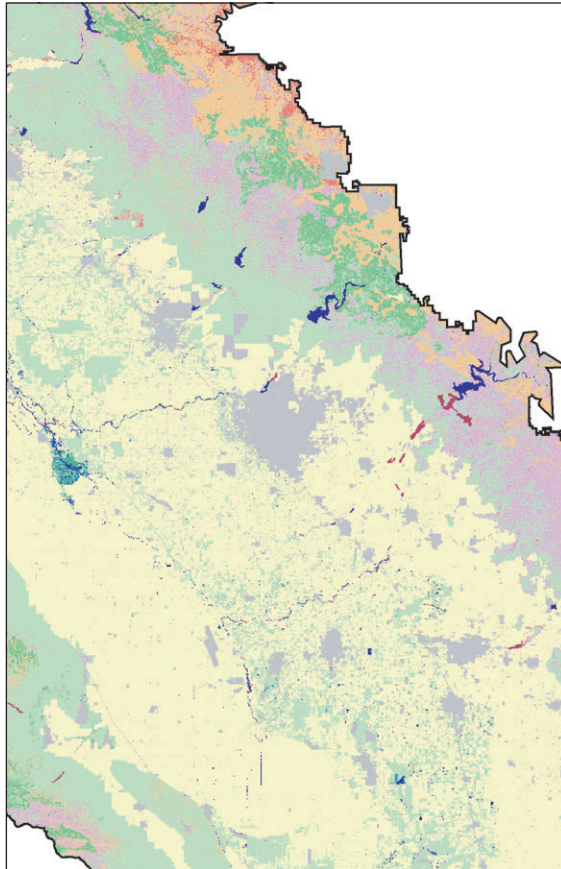
Table 3-9. Estimated Annual Acreage of Vernal Pool Habitat Disturbed^{1,2}

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

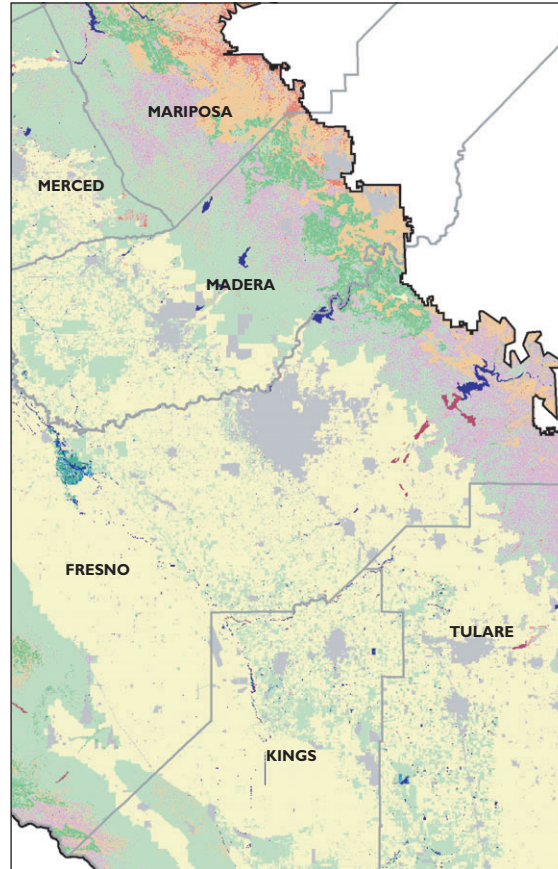
Notes:

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.

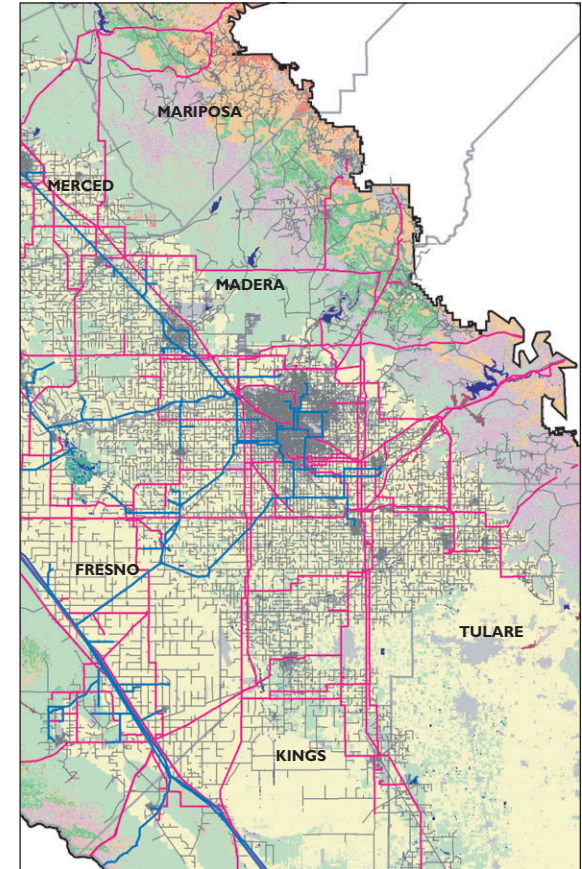
GIS Overlays



Land-Cover Layer



Land-Cover Layer + County Layer



Land-Cover Layer + County Layer + Facility Layer

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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}

[illegible]

Table 3–10. Continued

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 <i>Dipodomys nitratoides nitratoides</i>	E	E	–	–	–	–	–	10%	–	–	–	–	–	–	–	10%
Giant kangaroo rat <i>Dipodomys ingens</i>	E	E	–	–	–	–	–	10%	–	–	–	–	–	–	–	10%
San Joaquin (Nelson’s) antelope squirrel <i>Ammospermophilus nelsoni</i>	SC	T	–	–	–	–	–	50%	–	–	–	–	–	10%	–	–
San Joaquin kit fox <i>Vulpes macrotis mutica</i>	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									Grand Total
		Fresno	Kern	Kings	Madera	Mariposa	Merced	San Joaquin	Stanislaus	Tulare	
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									Grand Total
		Fresno	Kern	Kings	Madera	Mariposa	Merced	San Joaquin	Stanislaus	Tulare	
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									Grand Total
		Fresno	Kern	Kings	Madera	Mariposa	Merced	San Joaquin	Stanislaus	Tulare	
	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*

minuscule, *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 <i>Amsinckia grandiflora</i>	E	R	1B	3	–	Moderate
Lesser saltscale <i>Atriplex minuscule</i>	–	E	1B	7	–	Moderate
Bakersfield smallscale <i>Atriplex tularensis</i>	SC	T	1B	1	–	Moderate
Big tarplant <i>Blepharizonia plumosa</i> ssp. <i>plumosa</i>	–	E	1B	17	4	Moderate
Mariposa pussypaws <i>Calyptridium pulchellum</i>	T	–	1B	6	3	Moderate
Tree-anemone <i>Carpenteria californica</i>	SC	–	1B	4	1	Moderate
Succulent owl's-clover <i>Castilleja campestris</i> ssp. <i>succulenta</i>	T	–	1B	62	9	High
California jewelflower <i>Caulanthus californicus</i>	E	–	1B	20	–	Low
Hoover's spurge <i>Chamaesyce hooveri</i>	T	R	1B	8	2	Moderate
Slough thistle <i>Cirsium crassicaule</i>	SC	R	1B	17	4	Moderate
Mariposa clarkia <i>Clarkia biloba</i> ssp. <i>australis</i>	–	T	1B	13	6	Moderate
Merced clarkia <i>Clarkia lingulata</i>	SC	–	1B	2	2	Moderate
Springville clarkia <i>Clarkia springvillensis</i>	T	–	1B	10	1	Moderate
Vasek's clarkia <i>Clarkia tembloriensis</i> ssp. <i>calientensis</i>	SC	–	1B	3	–	Low
Hispid bird's-beak <i>Cordylanthus mollis</i> ssp. <i>hispidus</i>	SC	–	1B	23	–	Moderate
Palmate-bracted bird's-beak <i>Cordylanthus palmatus</i>	E	E	1B	8	3	Moderate
Kern mallow <i>Eremalche parryi</i> ssp. <i>kernensis</i>	E	E	1B	13	2	Moderate
Congdon's woolly sunflower <i>Eriophyllum congdonii</i>	–	E	1B	2	–	Moderate

Table 3-13. Continued

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 <i>Eryngium racemosum</i>	SC	E	1B	19	1	Moderate
Striped adobe-lily <i>Fritillaria striata</i>	SC	E	1B	18	2	Moderate
Bogg's Lake hedge-hyssop <i>Gratiola heterosepala</i>	–	E	1B	11	–	Low
Pale-yellow layia <i>Layia heterotricha</i>	SC	–	1B	7	2	Moderate
Comanche Point layia <i>Layia leucopappa</i>	SC	–	1B	8	–	Moderate
Legenere <i>Legenere limosa</i>	SC	R	1B	1	–	Moderate
Panoche pepper-grass <i>Lepidium jaredii</i> ssp. <i>album</i>	SC	–	1B	3	–	Low
Congdon's lewisia <i>Lewisia congdonii</i>	–	R	1B	2	–	Low
Mason's lilaeopsis <i>Lilaeopsis masonii</i>	SC	R	1B	44	15	High
Mariposa lupine <i>Lupinus citrinus</i> var. <i>deflexus</i>	SC	T	1B	6	–	Moderate
Showy madia <i>Madia radiata</i>	–	–	1B	12	–	Moderate
Hall's bush mallow <i>Malacothamnus hallii</i>	–	–	1B	4	–	Low
San Joaquin woollythreads <i>Monolopia (Lembertia) congdonii</i>	E	–	1B	46	6	Moderate
Pincushion navarretia <i>Navarretia myersii</i> (a.k.a. <i>N.m.ssp. m.</i>)	–	–	1B	3	–	Low
Colusa grass <i>Neostapfia colusana</i>	T	E	1B	44	1	Moderate
Bakersfield cactus <i>Opuntia basilaris</i> var. <i>treleasei</i>	E	E	1B	34	10	High
San Joaquin Valley Orcutt grass <i>Orcuttia inaequalis</i>	T	E	1B	28	2	Moderate
Hairy Orcutt grass <i>Orcuttia pilosa</i>	E	E	1B	8	–	Low
Hartweg's golden sunburst <i>Pseudobahia bahiifolia</i>	E	E	1B	15	1	Moderate
San Joaquin adobe sunburst <i>Pseudobahia peirsonii</i>	T	E	1B	32	4	Moderate

Table 3-13. Continued

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 <i>Sidalcea keckii</i>	E	—	1B	2	1	Moderate
Oil neststraw <i>Stylocline citroleum</i>	—	—	1B	8	—	Low
Greene's tuctoria <i>Tuctoria greenei</i>	E	R	1B	9	—	Low
Kings gold <i>Twisselmannia californica</i>	-	-	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. 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 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 avoid, minimize, 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:

Objective 1: 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	Hispid's bird's-beak
Midvalley fairy shrimp	Palmate-bracted bird's-beak
Vernal pool tadpole shrimp	Bogg's Lake hedge-hyssop
California tiger salamander	Legenere
California red-legged frog	[Mason's lileopsis]
Giant garter snake	Succulent owl's clover
Bald eagle	Pincussion navarretia
Tricolored blackbird	Colusa grass
[Buena Vista Lake Shrew]	San Joaquin Valley Orcutt grass
[Tipton kangaroo rat]	Hairy Orcutt grass
	Greene's tuctoria

Woodland

Limestone Salamander	[Mariposa pussypaws]
[White-tailed kite]	[Tree-anemone]
Golden eagle	[Merced clarkia]
[Swainson's hawk]	[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	Large-flowered fiddleneck
White-tailed kite	[Lesser saltscale]
[Golden eagle]	Big tarplant
Swainson's hawk	[Springville clarkia]
Western burrowing owl	Vasek's clarkia
Tipton kangaroo rat	[Hispid's bird's-beak]
Giant kangaroo rat	[Kern mallow]
San Joaquin (Nelson's) antelope squirrel	[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
	Bakersfield 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). Surveys for these numerous small activities are relatively ineffective at reducing take, and they are cost-prohibitive. A Map-Book Process (discussed below) will help to avoid or minimize effects when occupied habitat is known to occur at a small activity site. Compensation will be provided based on an estimate of wildlife effects and the actual plant effects associated with these activities.
- **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 based on the 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 based on 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, 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 small ground-disturbing activities (activities G5, G6, E6, E7, E8) and small vegetation management (activities E10a, E10b), respectively.

Criterion 1. Potential for Take from the Activities. All covered species were first evaluated for the potential of take during small 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 or narrowly endemic plant species), 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 1–11 will 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 fire "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 grassland, 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 grasslands will be certified weed-free. PG&E shall not broadcast-seed (or apply in other manner) any commercial seed or seed-mix to disturbance sites within other natural land-cover types, within any vernal pool community, or within occupied habitat for any plant covered-species.

Code	Avoidance and Minimization Measure
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.
AMM 12	If a covered plant species is present, a qualified biologist will stake and flag exclusion zones of 100 feet around plant occupied habitat (both the standing individuals and the seed bank 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. (This measure will be used as an AMM for narrow endemic plants only after approval by USFWS and DFG during the <i>Confer Process</i> .)
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 250 feet . * 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 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 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 disrupt nesting, a buffer and limited operation period

Code	Avoidance and Minimization Measure
	(LOP) during the nesting season (March 15–June 30) will be implemented. Evaluations will be performed in consultation with the local DFG representative.
AMM 20	PG&E staff shall avoid occupied or potentially occupied burrows identified by a qualified biologist within two core-areas for San Joaquin antelope squirrel and giant kangaroo rat identified by DFG. If occupied or potentially occupied burrows in the core areas cannot be avoided, a qualified PG&E biologist shall stake and flag a work-exclusion zone of at least 30 feet* and remain on-sight as a biological monitor, or the biologist shall stake and flag a work exclusion zone of 50 feet around active burrows prior to covered activities at the job site. If work must proceed in the exclusion zone, PG&E will pursue techniques to minimize direct mortality including using approved biologists to trap and hold the species in captivity, and excavating and closing burrows. The approved biologist will hold an ESA Section 10(a)(1)(A) permit for the species. The approved biologist will release the mammals as soon as possible when the work is complete. If active (occupied or potentially occupied) burrows for San Joaquin antelope squirrel or giant or Tipton kangaroo rat are present outside the two core areas identified by DFG, a qualified biologist will stake and flag an exclusion zone of 30 feet and remain on-site as a biological monitor, or the biologist shall stake and flag a work exclusion zone of 50 feet around the burrows prior to O&M activities on the job site.
AMM 21	If San Joaquin kit fox dens are present, their disturbance and destruction will be avoided where possible. However, if 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 current data from DFG and CNDDB and professional judgment 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 and other adverse effects to these species, 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 medium or large disturbance covered activities take place within 0.5 miles of an active breeding colony of tricolored blackbirds or bank swallows or a small disturbance covered activities take place within 350 feet of an active breeding colony of these species 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 could be disrupted by the covered activity, the biologist will stake and flag an exclusion zone of at least 350 feet around the colony prior to O&M activities at the site. This exclusion zone will be established in the field based on site conditions, the covered activity, and professional judgment by a qualified PG&E biologist and will be greater than the minimum distance. Work will not occur in this exclusion zone during April 1–July 31.*

Code	Avoidance and Minimization Measure
AMM 24	If activities take place in blunt-nosed leopard lizard within the range of the species and outside the road shoulder, 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 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 100 feet* around all suitable habitat, 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 100 feet* around all suitable habitat, 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 all suitable 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 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 all suitable 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.

¹ Designated occupied habitat is defined in the HCP as all land within 2 miles of a CNDDDB occurrence polygon, and suitable habitat within 5 miles of a CNDDDB occurrence polygon. The boundaries of each designated occupied habitat is defined in the HCP and mapped in HCP Appendix I.

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

Table 4-3. Continued

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	
Other covered plant species	Y	N	N	N	N	–	–	–	N	
Narrow endemic 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	
Other covered plant species	N	–	–	–	–	–	–	–	N	
Narrow endemic plant species	Y	Y	Y	Y	Y	N	Y	Y	Y	AMM 12, AMM 13, Confer Process

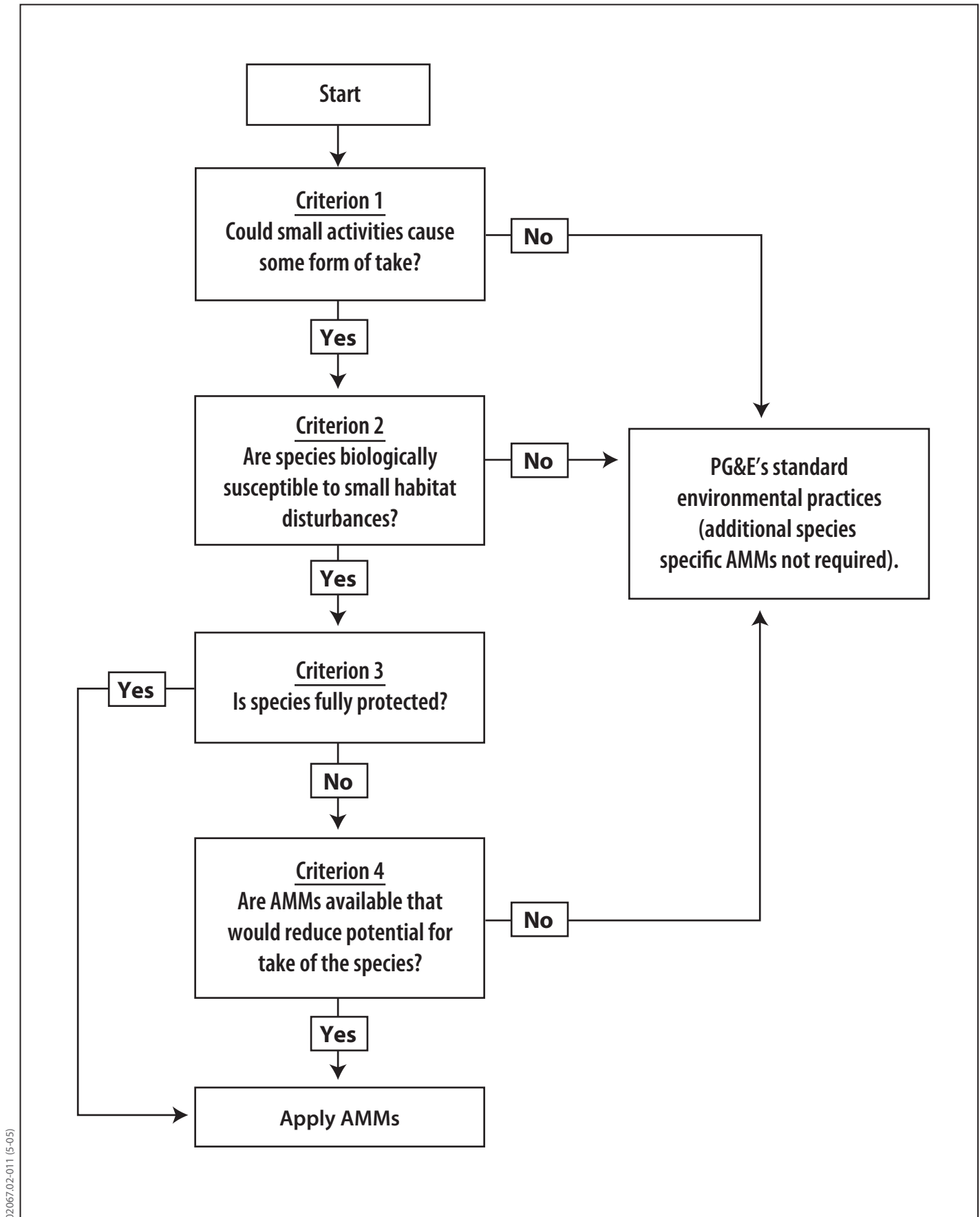


Figure 4-1
Process Used to Identify Species that Warrant Application
of Avoidance and Minimization Measures (AMMs)
for Small Disturbance Activities (<0.1 acre)

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., the narrowly endemic plant covered-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, map-book process, 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 small 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 pre-survey 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 at small, medium, and large activities 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 current data from

DFG and CNDDDB and professional judgment 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 at all small, medium and large activity sites 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 be trained to avoid burrows outside paved road shoulders that could contain blunt-nosed leopard lizards and to call in a biologist if work cannot avoid occupied burrows. 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 wildlife 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 designated-occupied habitat range 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 suitable habitat areas of the designated occupied habitat will avoid take of these species. PG&E will use the Map Book process (described below) to ensure small activities avoid suitable habitat within the designated occupied habitat (Appendix I).

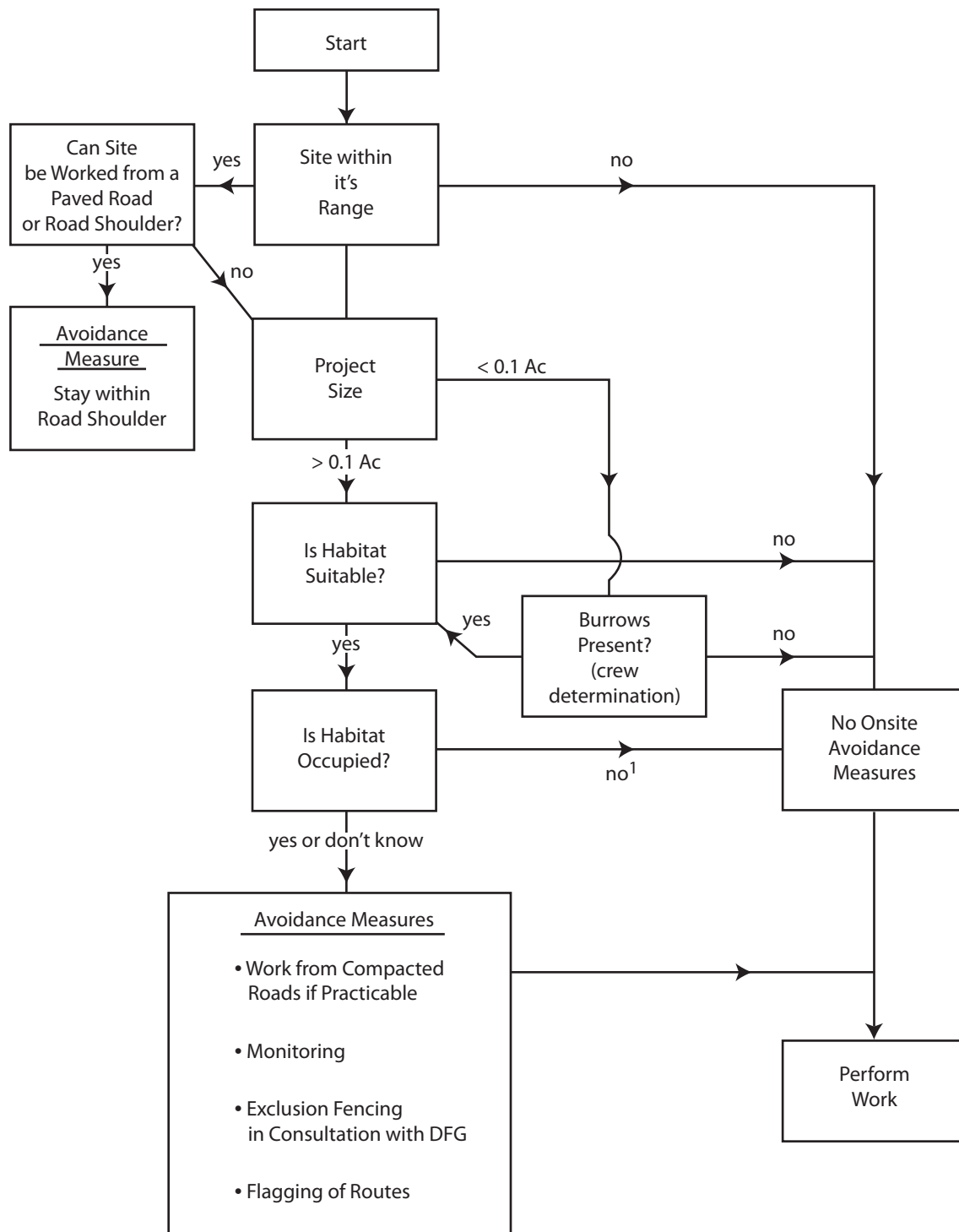
Apply AMMs in Areas with Known Occurrences of Colonial Wildlife Species. This approach will be applied for colonial wildlife species for which the geographic extent of suitable habitat cannot be defined in a predictable manner and, therefore, for which pre-activity surveys are impracticable. The approach involves querying the CNDDDB for current data regarding known colony occurrences within 350 feet of proposed small-activity work areas and using professional judgment to determine when to apply AMM 23. PG&E will use the Map Book process (described below) to ensure small activities avoid take of colonial wildlife. For ground-disturbing activities, these species include the following: bank swallow (AMM 23), and tricolored blackbird (AMM 23).

Western burrowing owl effects will be avoided and minimized through implementation of AMM 18 when owls are present at any activity site. PG&E crews will be trained to be aware of western burrowing owl habitat, including potential burrows, at all small, medium, and large covered-activities. If potentially occupied burrowing-owl habitat or burrows are sighted within 250

Table 4-5. Location Criteria Used to Trigger AMMs for Species That Are Biologically Susceptible to Activities <0.1 acre¹

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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feet of the work zone during breeding season, February 1 through August 31, or 160 feet of the work zone from September 1 through January 31, crews will contact the HCP administrator before proceeding with work on the covered-activity.

Substations with burrowing owl occupancy within the fenced enclosure will have a management plan outlining site-specific protective measures for the owl. These management plans will consider 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, and will propose protective measures to minimize effects on the owls. The management plan will also consider relocation of owls outside the breeding season. If conditions warrant relocation, a PG&E qualified burrowing owl biologist will coordinate with DFG.

Avoid Effects of Ground-Disturbing Activities in Occupied Habitat for Narrowly Endemic Plant Species.

PG&E will use the “Map Book Process” if occupied-habitat for a “narrowly endemic” plant covered-species is known to be present in a small-disturbance covered-activity site. The Map Book Process for applying AMMs is discussed below.

PG&E defines narrowly-endemic plant species as the 18 federally- and state-listed plant covered-species and 16 plant covered-species currently known from less than 10 locations and that could be biologically sensitive to small-disturbance activities. These narrowly endemic plant species are: Large-flowered fiddleneck (*Amsinckia grandiflora*), Bakersfield smallscale (*Atriplex tularensis*), Mariposa pussypaws (*Calyptridium pulchellum*), Tree-anemone (*Carpenteria californica*), Succulent owl’s clover (*Castilleja campestris* ssp. *succulenta*), California jewelflower (*Caulanthus californicus*), Hoover’s spurge (*Chamaesyce hooveri*), Merced clarkia (*Clarkia lingulata*), Springville clarkia (*Clarkia springvillensis*), Vasek’s clarkia (*Clarkia tembloriensis* ssp. *calientensis*), Palmate-bracted bird’s beak (*Cordylanthus palmatus*), Kern mallow (*Eremalche kernensis*), Congdon’s woolly sunflower (*Eriophyllum congdonii*), Delta button celery (*Eryngium racemosum*), Bogg’s lake hedge-hyssop (*Gratiola heterosepala*), 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*, San Joaquin woollythreads (*Monolopia [Lembertia] congdonii*), Pincushion navarretia (*Navarretia myersii*, a.k.a. *N.m.ssp. m.*), Colusa grass (*Neostapfia colusana*), Bakersfield cactus (*Opuntia basilaris* var. *treleasei*), San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*), Hairy Orcutt grass (*Orcuttia pilosa*), Hartweg’s golden sunburst (*Pseudobahia bahiifolia*), San Joaquin adobe sunburst (*Pseudobahia peirsonii*), Keck’s checkerbloom (*Sidalcea keckii*), Green’s tuctoria (*Tuctoria greenei*), and Kings gold (*Twisselmannia californica*).

The “other” plant covered-species, the eight plant covered species that are not defined by PG&E as “narrowly endemic” are: lesser saltscale (*Atriplex*

minuscula), big tarplant (*Blepharizonia plumosa* ssp. *plumosa*), slough thistle (*Cirsium crassicaule*), Mariposa clarkia (*Clarkia biloba* ssp. *australis*), hispid bird's-beak (*Cordylanthus mollis* ssp. *hispidus*), legenere (*Legenere limosa*), Mason's lilaeopsis (*Lilaeopsis masonii*), and oil neststraw (*Stylocline citroleum*

For the purposes of the Map Book Process (and the subsequent GIS/SAP process), and for the pre-activity surveys at medium and large disturbance sites, "occupied plant habitat" is defined as all areas of natural land-cover that are within the boundary (polygon) of a CNDDDB specific occurrence (CNDDDB accuracy classes 1 and 2), or a CNDDDB non-specific occurrences mapped as bounded features (CNDDDB accuracy class 3), and the occurrence is also classified by the CNDDDB as "presumed extant". Plant "occupied habitat" includes both "standing" individuals (present above ground) and the viable individuals within the soil seed-bank. Species occurrences with other CNDDDB accuracy classes were not considered in the Map Book Process because they are not sufficiently accurate to inform decisions regarding covered activities at small-disturbance (<0.1 acres) activity sites. However, PG&E biologists will consider CNDDDB records of all accuracy classes when they design preactivity surveys for the medium and large disturbance covered-activities, as discussed below in Surveys to Avoid and Minimize Effects.

The purpose of the Map Book Process is to avoid ground-disturbing effects from small activities in habitat known to be occupied by these plant species, to the maximum extent practicable. While the Map Book Process will avoid most effects, there is still a small potential that some effects could occur. Unavoidable effects from the small activities will be estimated and compensated as discussed below under Determination of Compensation Needs

Map Book Process to Prescribe Avoidance and Minimization Measures

PG&E will integrate its GIS software with its activity scheduling software (SAP Work Management Tool) within four years of approval of this HCP to improve the efficiency by which it can prescribe site-specific AMMs for six small-disturbance activities (discussed above) and for vegetation management activities G13, E10c and E10d. Until this computerized approach is ready, PG&E will use a "map book process" to help identify sensitive areas and prescribe appropriate AMMs. PG&E expects to initiate the map book process on or before approval of the HCP, and expects to complete the review of aerial photographs and surveys contemplated in the map book process within two years of approval of the HCP.

PG&E will establish the Map Book by first determining where PG&E facility lines occur: 1) inside HCP designated-occupied wildlife habitat for limestone salamander, Buena Vista Lake shrew, riparian woodrat, and riparian brush rabbit (Appendix I); 2) within 350 feet of known wildlife occurrences of bank swallow and tri-colored blackbird colonies; and 3) inside occupied-habitat for narrow endemic plant species. PG&E has plotted the facilities and species/habitat polygons on high quality aerial photographs. This collection of high-quality annotated aerial photographs is the "map book" that PG&E will use to identify where covered activities may occur in such areas.

To establish the Map Book, qualified PG&E biologists will review these high-quality annotated aerial-photos to rule out ground surveys at locations where the CNDDDB has included a PG&E facility within the boundary of a species occurrence-polygon and natural land-cover is not present where the covered-activity will occur (i.e. the activity site is a road, canal, or other developed or disturbed lands without natural vegetation). PG&E biologists will use their professional judgment and consider the year and month of the aerial photo flight, scale of the flight, and photo resolution. During this preliminary aerial photo review, the qualified PG&E biologist may also consult the full CNDDDB occurrence-report to help inform the decision about the field survey in such areas.

In addition, potential covered-activity sites (facilities and ROWs) inside an Appendix I designated-occupied habitat, but immediately adjacent to a paved road, may be of limited value to riparian brush rabbit, Buena vista lake shrew, riparian woodrat, and limestone salamander and may not be “habitat suitable for occupancy” for that species. As discussed above in Apply AMMs in All Designated-Occupied Habitat, PG&E biologists intend to identify the suitable habitat areas inside the boundaries of the Appendix I designated-occupied habitat areas. This Map Book one-time aerial photo review will help inform PG&E of areas within the designated-occupied habitat boundary that have habitat suitable for occupancy by the species. The Map Book one-time field-survey will be conducted wherever PG&E facilities cross a CNDDDB occurrence for riparian brush rabbit, Buena Vista lake shrew, riparian woodrat, or limestone salamander, and that CNDDDB occurrence is “presumed extant”.

Where a qualified PG&E biologist determines that a facility location inside a CNDDDB occurrence-polygon or inside a wildlife “designated-occupied habitat” does not require an initial field survey, that site will not be included in the Map Book, and that site will not have AMMs prescribed during any small-disturbance covered-activity.

After the aerial photo review (to eliminate some facility segments), PG&E will field-survey pipeline and electric-line segments where they cross 1) suitable habitat areas inside the Appendix I designated-occupied wildlife habitat for limestone salamander, Buena Vista Lake shrew, riparian woodrat, and riparian brush rabbit; 2) within 350 feet of known CNDDDB wildlife occurrences of bank swallow and tri-colored blackbird colonies; and 3) occupied-habitat for narrow endemic plant species (as defined above). Surveys in designated-occupied wildlife habitat will determine if covered-activity work sites have habitat suitable for occupancy by that species. For narrow endemic plants, the survey will be conducted during the appropriate seasonal window (generally following Table 4-10) to maximize the potential to detect any presence of the species within PG&E rights-of-way at covered-activity work sites.

PG&E will use standard species survey methods recommended by the USFWS or DFG wherever practicable to conduct the one-time map-book survey of these areas. Information collected as a result of the plant and wildlife surveys will be recorded using a GPS unit and entered into the Map Book and into the GIS/SAP system for use with regard to any future covered-activities in the surveyed areas.

The Map Book (and the GIS/SAP tool beginning in mid-to late 2009 when the integration is completed) survey data will provide useful information on when and where AMMs should be applied for small activities, when and where AMMs should be applied for Activities G13, E10c, E10d, and will also help inform biologists designing the pre-activity surveys for medium and large disturbance activities. When future small activities are scheduled in an area that contains suitable habitat for the wildlife species described above or narrow-endemic plant occupied habitat, PG&E will employ appropriate AMMs from HCP Table 4-2, to avoid and minimize species effects in these areas.

PG&E will adopt internal practices as necessary to ensure the efficient and effective implementation of appropriate AMMs. As covered species updates and habitat information are available over the 30-year term of the HCP, PG&E will inform crews of where to apply AMMs, may conduct specialize trainings or additional tailboard trainings; may post sensitive resource markers on facilities such as poles, towers or pipelines to help field crews identify boundaries of sensitive areas; or may employ additional seasonal work restrictions. As new electronic copies of the CNDDDB are released by the CDFG, PG&E will install the updated database in their GIS/SAP system when it is operational. This Map Book process (and subsequent GIS/SAP system) will be used to ensure that the appropriate AMMs are implemented and species effects from small activities are avoided or minimized to the maximum extent practicable.

If ground disturbance in suitable habitat for riparian brush rabbit, riparian woodrat, Buena vista lake shrew, limestone salamander, or in occupied habitat for narrow endemic plants cannot be avoided by a small-disturbance covered activity, PG&E shall first confer with USFWS and DFG, as described below under *Confer Process*.

In those instances where small activity sites have been surveyed according to plant protocols and the narrowly endemic plant has not been found, or is avoided, and there are no effects to occupied sites, no mitigation would be required.

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 PG&E Environmental Services 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 Services 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

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

Table 4-3. Continued

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	
Other covered plant species	Y	N	N	N	N	–	–	–	N	
Narrow endemic 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.

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-implementation 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 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 Services Field Specialists

Environmental Services 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.

Preactivity Surveys to Avoid and Minimize Effects

Approach

Preactivity surveys will be conducted in natural 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 extant occurrences of biologically susceptible covered species or wildlife designated occupied habitat. Specific species and measures are identified in Table 4-2 (AMMs 22–30), Table 4-3, and Table 4-4. Preactivity surveys will not be done for small-disturbance activities outside these 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.

Table 4-6. O&M Activities Requiring Surveys

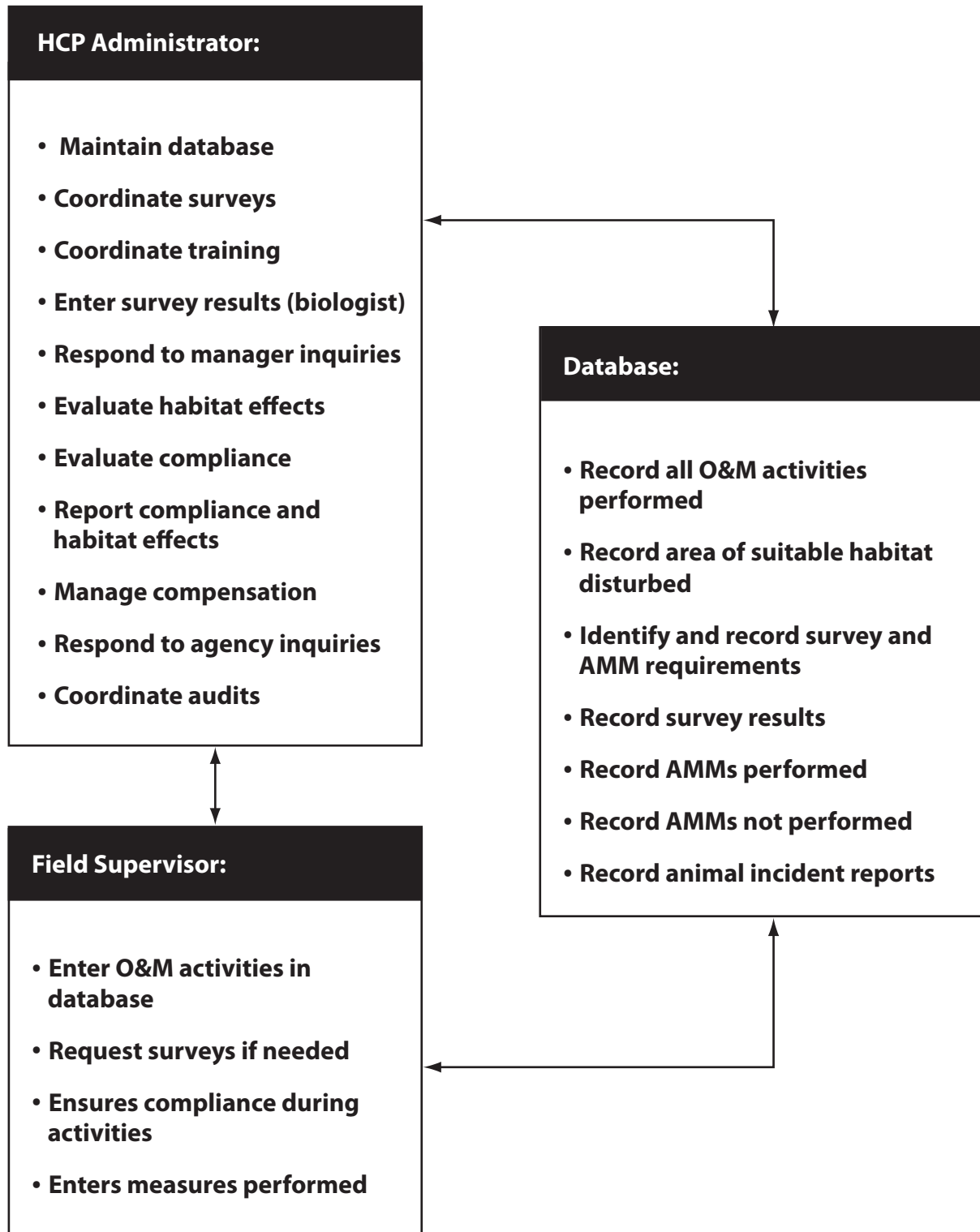
Activity	Pre-Activity Surveys
Gas	
G1. Patrols	None—no habitat loss
G2. Inspections	None—no habitat loss
G3. Remedial Maintenance	Required—likely to affect habitat
G4. Compressor Station Maintenance	None ¹ —no habitat loss
G5. Pipeline Electric Test System (ETS)	None ¹ —negligible to minor habitat loss
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

Table 4-6. Continued

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.



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 minimization measures

Survey Methods

Preactivity Surveys

Preactivity surveys for activities that are 0.1 acre or larger that could result in species effects will be conducted at O&M activity sites in natural land-cover. 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. PG&E biologists will design pre-activity surveys for all medium/large activities occurring in natural land cover, including “minor construction” activities which will extend existing pipelines, electric lines, or other facilities beyond the existing ROW boundaries (i.e. Activities G16, E12, and E13). The PG&E biologists will review the distribution range and habitats of all the covered species to determine which species could be present. This may include a query the California Natural Diversity Database (CNDDDB) and the CNDDDB QuickViewer to review extant and extirpated CNDDDB occurrence records surrounding the activity site to identify those species with a range that overlaps with the proposed activity site.

PG&E biologists and staff will consider CNDDDB records of all accuracy classes when they determine the range of the covered species and as they design pre-activity surveys for the medium and large disturbance covered-activities. As new electronic copies of the CNDDDB are released by the DFG over the term of the permit, PG&E will install the updated database in their GIS/SAP system as often as practicable. PG&E biologists will consider all information available from the CNDDDB, as well as information from PG&E company files of past biological survey results or reports (where available), and other reasonably available data sources. Biologists may also review appropriate GIS layers (such as those discussed in HCP Appendix A and other GIS layers), and other sources of information (e.g., aerial photographs) to determine if sensitive habitats such as meadows, riparian areas, serpentine outcrops, vernal pools, and designated critical habitat could be present at these proposed activity sites

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 the area of suitable habitat losses for wildlife and the area of occupied habitat loss for plants.

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 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 in Table 4-2 (e.g., the establishment of exclusion zones) also may be implemented for activities that could result in effects on covered species.

Except for activities causing negligible effects (i.e. other disturbance activities), 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 12 – 30. 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. In addition to the vegetation management BMPs, the Map Book Process will be used for prescribing appropriate AMMs at vegetation management activities G13, E10c and E10d, as discussed above. The use of herbicides and pesticides is not a covered activity under this HCP.

Wildlife Species

Preactivity surveys will determine the range of each wildlife covered species, 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

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 (CNDDDB) shall be checked for any records of threatened, endangered, or sensitive species.
17. Any locations identified through the CNDDDB search shall be flagged and appropriate avoidance measures shall be put in place. Tailboards shall be held before work begins.
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.

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 CNDDDB 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 pre-activity 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.

Under some circumstances, particularly for medium and large jobs, PG&E may need to confer with USFWS and DFG as described below under *Confer Process*.

Plant Species

Preactivity surveys will help determine the suitability of each medium and large disturbance site for covered plant species, and estimate the area of expected losses. If the biologist's review of CNDDDB, aerial photographs, and other information indicates there is a reasonable potential for covered plants in the vicinity of the work site (e.g., CNDDDB records are located within approximately 1 mile and natural land cover with suitable habitat for that plant species is present at the activity site), a qualified botanist will conduct a more detailed site-specific survey to assess the habitat suitability of the work area for covered plants. If the work area is suitable, the biologist may prescribe delaying the activity and conducting more detailed plant surveys in accordance with USFWS Guidelines (USFWS 1996) at an appropriate time of year for reliable identification (Table 4-10), or may prescribe appropriate AMMs based on the results of the survey. If a narrow endemic covered plant species is found and work cannot avoid the species, the *Confer Process*, described below, will be triggered. Preactivity surveys for minor construction activities will follow a similar methodology, though the biologist will consider a larger regional area and will strive to conduct the survey during the correct seasonal window.

Not all scheduling of work activities is predictable, and not all plant surveys can be performed during appropriate seasons. PG&E will work to minimize this as described under *Performance Standards for Surveys*. If scheduling is not possible and if a CNDDDB record for a plant covered-species (of CNDDDB accuracy class 1, 2 or 3) is located within 200 meters of a proposed medium or large activity site, and a PG&E botanist determines suitable habitat and land-

cover are present at the proposed activity site, then PG&E will assume that the entire area of the disturbance is occupied by that species, and adversely 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. Many annual plant covered-species endemic to the San Joaquin Valley do not flower every year, but remain viable in the soil seed-bank until rainfall and other environmental conditions allow individuals to germinate and flower. Plant “occupied habitat” includes both “standing” individuals (present above ground) and the viable individuals within the soil seed-bank. Therefore, PG&E will consider the suitable habitat within the boundary of an extant CNDDB polygon (accuracy classes 1, 2, or 3) to be occupied plant-habitat, even if there are few or no standing-individuals visible inside the polygon-boundary at the time of the pre-activity survey. PG&E will apply AMMs to the suitable habitat within the boundaries of the plant-occurrence polygon mapped by the CNDDB (accuracy classes 1, 2, or 3), even when plants are not visible in all areas of the CNDDB mapped polygon. If not all occupied habitat can be avoided, the disturbed area will also be mapped and quantified. If the landowner provides written permission to PG&E, the pertinent information will be submitted to the CNDDB.

Under some circumstances, particularly for medium and large jobs, PG&E may need to confer with USFWS and DFG as described below under *Confer Process*.

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, training and survey records, and mitigation sites.

Confer Process

Under four circumstances PG&E will confer with USFWS and/or DFG prior to implementing certain covered activities. These circumstances include:

1. PG&E will confer with the USFWS and/or DFG prior to implementing minor-construction covered-activities G14, G16, and E13 that extend facilities into

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 <i>Branchinecta lynchi</i>	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 <i>Branchinecta mesoallensis</i>	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 <i>Lepidurus packardii</i>	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 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 <i>Ambystoma californiense</i> (= <i>A. tigrinum c.</i>)	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 0.5 miles, and if potentially suitable habitat is	No restriction for habitat survey.

Table 4-9. Continued

Common and Scientific Name	Legal Status ¹		Survey Approach ²	Survey Timing
	Federal	State		
			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 <i>Hydromantes brunus</i>	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 <i>Rana aurora draytoni</i>	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 <i>Gambelia (=Crotaphytus) silus</i>	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. Protocol surveys involve systematic searches for active blunt-nosed leopard lizard burrows in all habitat at the	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 30–50 °C; and require six separate surveys of the site between 0900 and 1400 hours

Table 4-9. Continued

Common and Scientific Name	Legal Status ¹		Survey Approach ²	Survey Timing
	Federal	State		
			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 <i>Thamnophis gigas</i>	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 <i>Buteo swainsoni</i>	—	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

Table 4-9. Continued

Common and Scientific Name	Legal Status ¹		Survey Approach ²	Survey Timing
	Federal	State		
White-tailed kite <i>Elanus caeruleus</i>	—	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 <i>Athene cunicularia hypugea</i>	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 <i>Riparia riparia</i>	—	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 <i>Agelaius tricolor</i>	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 <i>Dipodomys nitratoide nitratoide</i>	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.

Table 4-9. Continued

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 burrows 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 <i>Dipodomys ingens</i>	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.

Table 4-9. Continued

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 <i>Sorex ornatus relictus</i>	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 <i>Ammospermophilus nelsoni</i>	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.

Table 4-9. Continued

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 <i>Neotoma fuscipes riparia</i>	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 <i>Sylvilagus bachmani riparius</i>	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 <i>Vulpes macrotis mutica</i>	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.

Table 4-9. Continued

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 <i>Amsinckia grandiflora</i>	April–May
Lesser saltscare <i>Atriplex minuscule</i>	May–October
Bakersfield smallscale <i>Atriplex tularensis</i>	June–October
Big tarplant <i>Blepharizonia plumosa</i> ssp. <i>plumosa</i>	July–October
Mariposa pussypaws <i>Calyptidium pulchellum</i>	April–August
Tree-anemone <i>Carpenteria californica</i>	July
Succulent owl’s-clover <i>Castilleja campestris</i> ssp. <i>succulenta</i>	April–May
California jewelflower <i>Caulanthus californicus</i>	February–May
Hoover’s spurge <i>Chamaesyce hooveri</i>	July–August
Slough thistle <i>Cirsium crassicaule</i>	May–August
Mariposa clarkia <i>Clarkia biloba</i> ssp. <i>australis</i>	May–July
Merced clarkia <i>Clarkia lingulata</i>	May–June
Springville clarkia <i>Clarkia springvillensis</i>	May–July
Vasek’s clarkia <i>Clarkia tembloriensis</i> ssp. <i>calientensis</i>	April
Hispid bird’s-beak <i>Cordylanthus mollis</i> ssp. <i>hispidus</i>	June–September
Palmate-bracted bird’s-beak <i>Cordylanthus palmatus</i>	May–October
Kern mallow <i>Eremalche parryi</i> ssp. <i>kernensis</i>	March–May
Congdon’s woolly sunflower <i>Eriophyllum congdonii</i>	May–June
Delta button-celery <i>Eryngium racemosum</i>	June–August
Striped adobe-lily <i>Fritillaria striata</i>	February–April
Bogg’s Lake hedge-hyssop <i>Gratiola heterosepala</i>	April–August
Pale-yellow layia <i>Layia heterotricha</i>	March–June
Comanche Point layia <i>Layia leucopappa</i>	March–April
Legenere <i>Legenere limosa</i>	April–June

Table 4-10. Continued

Species	Survey Season ¹
Panoche pepper-grass <i>Lepidium jaredii</i> ssp. <i>album</i>	March–May
Congdon’s lewisia <i>Lewisia congdonii</i>	April–June
Mason’s lilaeopsis <i>Lilaeopsis masonii</i>	April–November
Mariposa lupine <i>Lupinus citrinus</i> var. <i>deflexus</i>	April–May
Showy madia <i>Madia radiata</i>	March–May
Hall’s bush mallow <i>Malacothamnus hallii</i>	May–September
San Joaquin woollythreads <i>Monolopia congdonii</i>	February–May
Pincushion navarretia <i>Navarretia myersii</i>	May
Colusa grass <i>Neostapfia colusana</i>	May–August
Bakersfield cactus <i>Opuntia basilaris</i> var. <i>treleasei</i>	Year-round
San Joaquin Valley Orcutt grass <i>Orcuttia inaequalis</i>	April–September
Hairy Orcutt grass <i>Orcuttia pilosa</i>	May–September
Hartweg’s golden sunburst <i>Pseudobahia bahiifolia</i>	March–April
San Joaquin adobe sunburst <i>Pseudobahia peirsonii</i>	March–April
Keck’s checkerbloom <i>Sidalcea keckii</i>	April–May
Oil netstraw <i>Stylocline citroleum</i>	March–April
Greene’s tuctoria <i>Tuctoria greenei</i>	May–September
Kings gold <i>Twisselmannia californica</i>	March

Note:

¹ Survey seasons are based on the flowering period.

areas beyond PG&E's existing rights-of-way in areas of natural vegetation and pre-activity surveys conducted at the appropriate time of year indicate that wildlife covered species suitable habitat or plant covered species occupied habitat cannot be avoided. If the pre-activity surveys cannot be conducted at the appropriate time of year PG&E will confer with the USFWS and DFG.

Where PG&E conducts pre-activity surveys and determines that covered wildlife species suitable habitat and plant covered species occupied habitat is not present or can be avoided, PG&E will provide USFWS and DFG copies of the pre-activity surveys and will confer with USFWS and DFG only upon request.

When the confer process is necessary, PG&E will contact USFWS and DFG and provide activity information as soon as reasonably practical, and the parties expect this will occur 3 months before the activity occurs. PG&E will provide USFWS and DFG with activity location information, appropriate maps, and other site-specific information for the activity in advance of the discussion.

PG&E, USFWS and DFG will meet by phone or in person as soon as practical, ordinarily within one week of receiving activity information, to discuss likely impacts, species effects, implementation of AMMs to avoid and minimize species effects, and reach agreement in advance about which AMMs are appropriate for each such activity.

2. PG&E will confer with the USFWS and/or DFG prior to implementing a minor new construction covered-activity and other medium or large covered-activities within designated critical habitat. When the confer process is necessary, PG&E will contact USFWS and DFG and provide activity information as soon as reasonably practical, and the parties expect this will occur 3 months before the activity occurs. PG&E will provide the Service with location information, appropriate maps, and other site-specific information for the activity in advance of the discussion. PG&E and the Service will discuss likely impacts, species effects, appropriate AMMs, and ways to ensure that the critical habitat unit is not adversely modified.

3. PG&E will confer with the USFWS and/or DFG when a minor new construction (including E12) or other medium and large ground-disturbing activities cannot avoid occupied habitat for narrow endemic plants, and soil disturbance will occur inside the boundary/polygon of the narrow endemic plant's occupied-habitat. PG&E will determine whether such activities are likely to result in occupied habitat disturbance based on pre-activity surveys of medium or large disturbance sites, or from the map book process described above for the small disturbance sites.

Before implementing a medium or large covered activity that may affect narrow endemic plant occupied habitat, PG&E will contact USFWS and DFG and provide:

- a) The results of the survey that detected the species;
- b) A description of the planned covered activity and a map;

- c) A description of the AMMs that PG&E proposes to use;
- d) An assessment of whether impacts to the species will be avoided as a result of the AMMs, for narrow endemic plants;
- e) If there will be unavoidable impacts to a narrow endemic plant an assessment of whether the resulting effect will be temporary or permanent; and
- f) For any unavoidable impacts, a proposed compensatory mitigation approach, as outlined later in this chapter under Compensation. PG&E's mitigation ratios will be applied: 3:1 for permanent loss of habitat, and 0.5:1 for temporary loss of habitat.

PG&E and USFWS and DFG shall, as soon as reasonably practicable, confer to determine which AMMs should be used, whether unavoidable impacts, if any, will be temporary or permanent, and what compensatory mitigation is appropriate. For purposes of effects to narrow endemic plant occupied habitat, an impact shall be regarded as permanent if it cannot be restored to pre-impact conditions within one year. If USFWS and DFG determine that any impact caused by the covered activity will be permanent, PG&E shall not thereafter be required to provide any additional mitigation for covered activities for within the boundaries of that impacted area, for the term of the permit.

4. PG&E will confer with the USFWS and/or DFG when a medium or large covered-activity will affect suitable riparian brush rabbit, riparian woodrat, Buena Vista lake shrew, or limestone salamander habitat inside the Appendix I designated-occupied habitat areas.

Before implementing a medium or large covered activity that will affect occupied riparian brush rabbit, riparian woodrat, Buena vista lake shrew, or limestone salamander, PG&E will contact USFWS and DFG and provide:

- a) The results of the survey that detected the species;
- b) A description of the planned covered activity and a map;
- c) A description of the AMMs that PG&E proposes to use;
- d) If there will be unavoidable impacts to a narrow endemic plant an assessment of whether the resulting effect will be temporary or permanent; and
- e) For any unavoidable impacts, a proposed compensatory mitigation approach, as outlined later in this chapter under Compensation. PG&E's mitigation ratios will be applied: 3:1 for permanent loss of habitat, and 0.5:1 for temporary loss of habitat.

Emergency activities, by definition, are exempt from this confer process, though if an emergency activity causes effects to one of these species, PG&E would need to confer regarding appropriate mitigation as outlined under Compensation.

In the event there are still unresolved issues at the end of this confer process, work on the activity in question will not proceed and PG&E and the Wildlife Agencies will follow the dispute and issue resolution process in Section 12.7 of Implementing Agreement.

Other Notable Species and Monitoring Issues

Kit Fox in Urban Areas in the Southern San Joaquin Valley

PG&E will develop and implement a training program to educate PG&E field staff on kit fox use of urban land-cover, other disturbed and developed land-cover, and other land-covers in western Kern, western Kings, or western Fresno counties where pre-construction surveys are not conducted.

If PG&E staff working in urban or other disturbed and developed land-cover in western Kern, western Kings, or western Fresno counties observes a burrow with signs of potential kit fox use, then PG&E field staff shall immediately contact a PG&E biologist or the PG&E HCP Administrator. A PG&E biologist will stake or flag AMM 21 work exclusion-zones or other AMM 21 elements, as required.

If permitted activities cannot avoid a kit fox active-den in urban or other disturbed or developed land-cover in western Kern, western Kings, or western Fresno counties, PG&E shall provide compensation for the loss of that active den. Appropriate compensation for the loss of kit fox dens in urban or other disturbed or developed land cover will be determined on a case-by-case basis between PG&E and the Wildlife Agencies using the Confer Process.

PG&E will annually contact the Endangered Species Recovery Program (ESRP) at California State University Stanislaus to acquire current information on the locations of kit fox dens in the Bakersfield area. PG&E will contact the appropriate monitoring biologist) to request the current information on kit fox den locations and other biological information monitored under the Metro Bakersfield HCP.

Non-Covered Fairy Shrimp

The incidental take permit does not authorize take of longhorn fairy shrimp and Conservancy fairy shrimp. PG&E will consider amending the permit to add these two species. PG&E will maintain information on longhorn fairy shrimp and Conservancy fairy shrimp occupied habitat using the best available current data sources, including but not limited to CNDDDB, to determine where occupied

and suitable vernal pools need to be avoided. Using these data PG&E will, in conference with the Service, create a map of designated occupied habitat. If covered activities do not completely avoid all direct and indirect effect to vernal pools inside the boundary of the designated occupied habitat, those pools shall be surveyed using current USFWS protocol prior to PG&E conducting covered activities to ensure avoidance.

Data Sources

PG&E shall make reasonable efforts to review all relevant biological databases that are reasonably available to the public to plan pre-activity field surveys at medium- and large-disturbance covered-activities. Currently, reasonably available databases include those maintained by ESRP at California State University Stanislaus, and the databases in the CDFG's BIOS system. PG&E will use other biological databases as they become reasonably available. Where GIS spatial data is available, PG&E will incorporate covered-species information from these other biological databases into the PG&E biological GIS database. PG&E will request updated information from all reasonably available biological databases over the term of the Permit. PG&E will use the Metro Bakersfield HCP as a reference for San Joaquin kit fox occurrence of dens in urban areas and update the GIS information annually.

Designated Occupied Habitat

PG&E and the Wildlife Agencies will use the Adaptive Management Process to modify the boundaries of the wildlife Designated-Occupied Habitat identified in HCP Appendix I, as necessary, if occupied habitat for Buena Vista Lake shrew, riparian brush rabbit, riparian woodrat, or limestone salamander expands in area over the 30-year term of this Permit.

Performance Standards for Surveys

PG&E will strive to conduct pre-construction surveys at the appropriate time of the year whenever the range of a plant or wildlife species overlaps a medium or large covered-activity site, and natural land-cover with potentially suitable habitat for the species is present at the medium or large covered-activity site. PG&E will strive to conduct pre-construction surveys at the appropriate time of the year for every minor-construction activity that expands facilities outside the existing PG&E rights of way (i.e. covered activities G14, G16, E12, E13, and E14).

If over the first 5 years, or any subsequent 5-year period, less than 25% of medium and large disturbance covered activities (i.e. activities G3, G7, G8, G9, G10, G11, G12, G13, G15, E9, E10c, E10d, G14, G16, E12, E13, and E14) occurring within a natural land-cover type and within the range of a plant covered-species or limestone salamander do not have a preconstruction survey

conducted during the correct seasonal window for each eligible plant species or limestone salamander, then PG&E will confer with the USFWS and DFG and discuss the reasons why this standard was not met. USFWS, DFG and PG&E will develop and PG&E will implement techniques to meet or exceed this standard over the term of the permit.

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 (medium and large activity) and estimated (small activity) habitat losses. Preactivity surveys will record the acreage of suitable habitat to be disturbed for all activities that could result in 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 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 plant covered species 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

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.

Figure 4-5. San Joaquin Valley O&M HCP — Pre-Activity Survey Data Collection Form

	Work-site land cover type(s), affected area ¹			
Job Information	Land Cover Type	Temporary (sq.ft.)	Permanent (sq.ft.)	Other
Biologist:	☐ Agricultural fields			
	☐ Grassland			
Date:	☐ Open water			
	☐ Other developed & disturbed lands			
Time:	☐ Riparian – Woody riparian			
	☐ Upland scrub			
County:	☐ Urban	—	—	—
	☐ Wetland – Permanent freshwater wetland			
GPS Coord:	☐ Wetland – Seasonal wetland			
	☐ Woodland – Blue oak			
Job No:	☐ Woodland – Blue oak/foothill pine			
	☐ Woodland – Coastal live oak			
Pole #/ MP:	☐ Woodland – Conifer			
	☐ Woodland – Montane hardwood			
Activity Code:	☐ Other: _____			
Were vernal pools on-site or nearby? ☐ Yes ☐ No Were other wetlands or waterways on-site or nearby? ☐ Yes ☐ No If yes to either, note approximate distance from work area:				

Species Presence and Habitat Suitability – Avoidance and Minimization Measure Actions

Species	CNDDDB nearby ²	Suitable habitat	Occu- pied	Rationale ³	Per- cent ⁴	AMM
Mammals						
Buena Vista Lake shrew	☐	☐	☐			AMM 25 – Stake and flag up to 100 feet.
Giant kangaroo rat	☐	☐	☐			AMM 20 – Stake and flag up to 50 feet. Additional precaution in core areas.
Riparian (SJV) woodrat	☐	☐	☐			AMM 27 – Stake and flag up to 100 feet.
Riparian brush rabbit	☐	☐	☐			AMM 26 – Stake and flag up to 100 feet. LOP January 1 to May 31.
San Joaquin antelope squirrel	☐	☐	☐			AMM 20 – Stake and flag up to 50 feet. Additional precaution in core areas.
San Joaquin kit fox	☐	☐	☐			AMM 21 – Stake and flag 50-100+ feet per USFWS protocols. <i>Record GPS of den location:</i> -----
Tipton kangaroo rat	☐	☐	☐			AMM 20 – Stake and flag up to 30 feet.
Amphibians						
California red-legged frog	☐	☐	☐			AMM 16 (17) – Stake and flag 50-250 feet. LOP first significant rain to May 1.
California tiger salamander	☐	☐	☐			AMM 17 – Stake and flag up to 50 feet. No monofilament.
Limestone salamander	☐	☐	☐			AMM 28 – Stake and flag up to 100 feet.
Reptiles						
Blunt-nosed leopard lizard	☐	☐	☐			AMM 17 and/or 24 – Avoid all take; work from road or road shoulder when possible. Stake and flag up to 50 feet. No monofilament.
Giant garter snake	☐	☐	☐			AMM 16 (17) – Stake and flag 50-250 feet. LOP October 1 to May 1.

¹ Affected area = Temporary or Permanent Disturbance (sq. ft.); Temporary disturbance consists of: a) excavations or b) ground disturbance via tracked vehicles; Permanent disturbance occurs through placement of more permanent structures (e.g., poles, tower footings, pads, new access roads, etc.). Compute area as that disturbed or entered by vehicular equipment (L x W). Other: staging, parking or lay-down areas.

² CNDDDB records within 2 miles.

³ Include note about indicators of occupancy: observed, consider species range, habitat characteristics [burrows, proximity to wetlands], and surrounding land use.

⁴ Percent of worksite suitable for the species.

Pre-Activity Survey Data Collection Form - Continued

Species	CNDDDB nearby ²	Suitable habitat	Occu- pied	Rationale ³	Per- cent ⁴	AMM				
Birds										
Bald Eagle	☐	☐	☐			AMM 22 – 500 foot setback from nests. (veg mgt activity)				
Bank swallow	☐	☐	☐			AMM 23 – Stake and flag up to 350 feet of colony. Possible LOP. Avoid medium and large within 0.5 mi. of active colony. <i>Record GPS coordinates:</i>				
Golden Eagle	☐	☐	☐			AMM 22 – 500 foot setback from nests. (vegetation management activity)				
Swainson's hawk	☐	☐	☐			AMM 19 – 0.25 mile buffer; may need LOP. <i>Record GPS coordinates (nest):</i>				
Tricolored blackbird	☐	☐	☐			AMM 23 – Stake and flag up to 350 feet of colony. Possible LOP. Avoid medium and large within 0.5 mi. of active colony. <i>Record GPS coordinates:</i>				
Western burrowing owl	☐	☐	☐			AMM 18 – Exclusion zone: 160 ft. nonbreeding, 250 ft. breeding, or site plan.				
White-tailed kite	☐	☐	☐			AMM 19 – 0.25 mile buffer; may need LOP. <i>Record GPS coordinates (nest):</i>				
Invertebrates										
Midvalley fairy shrimp	☐	☐	☐			AMM 15 (Vernal Pools) –250 ft. setback from pools. LOP: pools are dry and soil is firm or after June 1.				
VELB	☐	☐	☐			AMM 11 – Survey within 20 feet of worksites. Follow VELB program.				
Vernal pool fairy shrimp	☐	☐	☐			AMM 15 (Vernal Pools) –250 ft. setback from pools.				
Vernal pool tadpole shrimp	☐	☐	☐			AMM 15 (Vernal Pools) –250 ft. setback from pools.				
Plants										
Lesser saltscare	☐	☐	☐			As appropriate: AMM 9 (erosion control), 10 (reseeding), 11 (VELB), 12 (exclusion zone of up to 100 feet), 13 (LOP if needed), 14 (stockpile top 2-4" of soil), 30 (no herbicide within 100 feet), and 31 (fall trees away from populations).				
Big tarplant	☐	☐	☐							
Succulent owl's-clover	☐	☐	☐							
California jewelflower	☐	☐	☐							
Mariposa clarkia	☐	☐	☐							
Springville clarkia	☐	☐	☐							
Hispid bird's-beak	☐	☐	☐							
Palmate-bracted bird's-beak	☐	☐	☐							
Kern mallow	☐	☐	☐							
Bakersfield cactus	☐	☐	☐							
Other: _____	☐	☐	☐							
(See HCP for complete list.)										
Were plant surveys conducted during appropriate season to identify?			☐ Yes ☐ No	Are there CNDDDB records within 200m of the activity?						
Other Site Information (species, individuals, area, notes, exceptions):										

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 all land was considered suitable habitat for San Joaquin kit fox during all previous 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 would not affect species habitat and would therefore 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 vernal pool covered plant species are unlikely to be directly or indirectly affected by a single O&M activity. AMMs will limit overall effects, but approximately 26 acres of vernal pools and approximately 4–25 acres of occupied plant habitat may be affected over 30 years. Vernal pool effects would include temporary and permanent effects, and are most likely in counties with the greatest density of vernal pools. PG&E will quantify actual direct and indirect effects to vernal pool habitat during the pre-activity surveys for minor-construction covered-activities (i.e. activities G14, G15, G16, E12, E13, E14, and E15) and from the deeper ground-disturbing activities (i.e. activities G8, G9, G10, G11) using the methodology excerpted from the Service's Programmatic Formal Endangered Species Consultation To The Sacramento District Of The USACE For Projects With Relatively Small Effects On Listed Vernal Pool Crustaceans (Service 1996). Disturbances to the

wetted area of a vernal pool shall be considered a direct effect to vernal pool habitat. If any part of a vernal pool is impacted, then the entire area of the pool shall be considered directly affected.

A qualified PG&E biologist shall use GPS or other appropriate methods to determine accurately the entire area of the affected pool, defining the perimeter of the pool using Army Corps of Engineer jurisdictional guidelines. Vernal pool habitat indirectly affected shall include all habitat supported by impacted upland areas and swales and all habitat otherwise damaged by loss of watershed, by loss of hydrological integrity, by human intrusion, by introduced species or by pollution caused by the permitted activity. Where the reach of these indirect effects cannot be determined definitively, all areas within 250 feet of an impacted vernal pool shall be considered indirectly affected. All direct and indirect effects to vernal pool habitat from the minor-construction covered-activities (i.e. activities G14, G15, G16, E12, E13, E14, and E15) and all direct and indirect effects from the deeper ground-disturbing activities (i.e. activities G8, G9, G10, G11) shall be compensated at the 3:1 ratio for wetlands. In the event the covered-activities reoccur at the same site and the direct and indirect effects from the subsequent covered activities are the same, no additional mitigation will be provided.

The other ground-disturbing covered-activities (i.e. activities G3, G5, G6, G7, G12, G13, E5, E6, E7, E8, E9, E10c, E10d, and E11) are smaller and occur at existing PG&E facilities where the vernal pool landscape may have been significantly disturbed previously. If the Wildlife Agencies and PG&E biologists determine that implementing covered-activities G3, G5, G6, G7, G12, G13, E5, E6, E7, E8, E9, E10c, E10d, or E11 within 250-feet of the vernal pool could not change the existing habitat quality of that vernal pool, then the area of indirect effect may be compensated using the 0.5:1 ratio. In the event covered activities reoccur at the same site within 3 years and the direct and indirect effects from subsequent covered activities are the same, no additional mitigation will be provided. The total vernal pool mitigation shall not exceed 3:1 at any one site. Direct ground disturbance inside the wetted perimeter of a vernal pool or swale from covered-activities G3, G5, G6, G7, G12, G13, E5, E6, E7, E8, E9, E10c, E10d, or E11 shall be compensated at the HCP's 3:1 ratio for wetlands.

PG&E will also use the methodology described above to quantify any direct and indirect effects to occupied habitat for the vernal-pool plant covered-species (i.e. Hoover's spurge (*Chamaesyce hooveri*), legenere (*Legenere limosa*), succulent owl's clover (*Castilleja campestris ssp. succulenta*), pincushion navarretia (*Navarretia myersii ssp. myersii*), Colusa grass (*Neostapfia colusana*), San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*), hairy Orcutt grass (*Orcuttia pilosa*), Greene's tuctoria (*Tuctoria greenei*) and Boggs's Lake hedge-hyssop (*Gratiola heterosepala*). The amount and type of compensation provided for the vernal-pool plant covered-species shall be the same as that provided for the vernal-pool shrimp covered-species – each acre of vernal pool habitat compensated at 3:1 ratio will include a minimum of 2 acres of vernal pool preservation and up to 1 acre of created vernal pool. The affected vernal-pool plant covered-species shall occupy the vernal pool(s) selected for preservation. The information will be captured in PG&E's GIS system. In the event the

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

[illegible]

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

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
<i>Additional acreage required to ensure all species are covered.</i>	<i>1.83</i>	<i>1.47</i>	<i>6.33</i>
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. Bank swallow and Buena vista lake shrew will benefit from riparian mitigation but 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.			

covered activities reoccur at the same site within 3 years and the direct and indirect effects from the subsequent covered activities are the same, no additional mitigation will be provided. The total vernal pool mitigation shall not exceed 3:1 at any one site.

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 narrow endemic 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; for these species, mitigation must occur in advance of the impact. Potential effects for other covered plant species will be similarly determined. In instances where the covered 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.

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

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 <i>Opuntia basilaris</i> var. <i>treleasei</i>	0.68	1.36			X
Succulent owl's-clover <i>Castilleja campestris</i> ssp. <i>succulenta</i>	0.45	0.91	X	X	
Mason's lilaeopsis <i>Lilaeopsis masonii</i>	0.23	0.45	X		
Lesser saltscale <i>Atriplex minuscula</i>	< 0.1	< 0.2		X	X
Big tarplant <i>Blepharizonia plumosa</i> ssp. <i>plumosa</i>	< 0.1	< 0.2	X		
Hoover's spurge <i>Chamaesyce hooveri</i>	< 0.1	< 0.2	X	X	X
Slough thistle <i>Cirsium crassicaule</i>	< 0.1	< 0.2	X		X
Mariposa clarkia <i>Clarkia biloba</i> ssp. <i>australis</i>	< 0.1	< 0.2	X		
Springville clarkia <i>Clarkia springvillensis</i>	< 0.1	< 0.2			X
Hispid bird's-beak <i>Cordylanthus mollis</i> ssp. <i>hispidus</i>	< 0.1	< 0.2		X	
Palmate-bracted bird's-beak <i>Cordylanthus palmatus</i>	< 0.1	< 0.2		X	
Kern mallow <i>Eremalche parryi</i> ssp. <i>kernensis</i>	< 0.1	< 0.2			X
Congdon's woolly sunflower <i>Eriophyllum congdonii</i>	< 0.1	< 0.2	X		
Delta button-celery <i>Eryngium racemosum</i>	< 0.1	< 0.2	X	X	
Striped adobe-lily <i>Fritillaria striata</i>	< 0.1	< 0.2			X
Legenere <i>Legenere limosa</i>	< 0.1	< 0.2	X		

Table 4-13. Continued

Species	Compensation ³		Species Range in SJV Counties		
	5 yr	10 yr	Northern	Central	Southern
San Joaquin woollythreads <i>Monolopia congdonii</i>	< 0.1	< 0.2		X	X
Colusa grass <i>Neostapfia colusana</i>	< 0.1	< 0.2	X	X	
San Joaquin Valley Orcutt grass <i>Orcuttia inaequalis</i>	< 0.1	< 0.2	X	X	X
Hartweg's golden sunburst <i>Pseudobahia bahiifolia</i>	< 0.1	< 0.2	X	X	
San Joaquin adobe sunburst <i>Pseudobahia peirsonii</i>	< 0.1	< 0.2		X	X
Large-flowered fiddleneck <i>Amsinckia grandiflora</i>	0	0	X		
Bakersfield smallscale <i>Atriplex tularensis</i>	0	0			X
Mariposa pussypaws <i>Calyptridium pulchellum</i>	0	0	X	X	
Tree-anemone <i>Carpenteria californica</i>	0	0		X	
California jewelflower <i>Caulanthus californicus</i>	0	0		X	X
Merced clarkia <i>Clarkia lingulata</i>	0	0	X		
Vasek's clarkia <i>Clarkia temblorensis ssp. calientensis</i>	0	0			X
Bogg's Lake hedge-hyssop <i>Gratiola heterosepala</i>	0	0	X	X	
Pale-yellow layia <i>Layia heterotricha</i>	0	0		X	X
Comanche Point layia <i>Layia leucopappa</i>	0	0			X
Panoche pepper-grass <i>Lepidium jaredii ssp. album</i>	0	0			X
Congdon's lewisia <i>Lewisia congdonii</i>	0	0	X		

Table 4-13. Continued

Species	Compensation ³		Species Range in SJV Counties		
	5 yr	10 yr	Northern	Central	Southern
Mariposa lupine <i>Lupinus citrinus</i> var. <i>deflexus</i>	0	0	X		
Showy madia <i>Madia radiata</i>	0	0	X	X	X
Hall's bush mallow <i>Malacothamnus hallii</i>	0	0	X	X	
Pincushion navarretia <i>Navarretia myersii</i>	0	0		X	
Hairy Orcutt grass <i>Orcuttia pilosa</i>	0	0	X	X	
Keck's checkerbloom <i>Sidalcea keckii</i>	0	0		X	X
Oil netstraw <i>Stylocline citroleum</i>	0	0			X
Greene's tuctoria <i>Tuctoria greenei</i>	0	0	X	X	X
Kings gold <i>Twisselmannia californica</i>	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.

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. All conservation easements will be protected in perpetuity. Independent oversight of these lands will occur unless otherwise agreed to with USFWS and DFG.

Purchase of Conservation Easements

It may not be feasible to purchase conservation credits for narrowly endemic plant covered species and susceptible wildlife species from an existing mitigation bank. Furthermore, because of timing issues, determination of the presence of covered 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 plant covered species or susceptible wildlife species 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. All conservation easements will be protected in perpetuity. Independent oversight of these lands will occur unless otherwise agreed to with USFWS and DFG.

Conservation Organization Donation

In the event that plant covered species compensation areas or susceptible wildlife covered-species compensation areas cannot be established through any of the foregoing mechanisms because of the rarity of a species, PG&E might donate money to a conservation organization (e.g., The Nature Conservancy, a local land trust, or the USACE Wetland Plant Conservation Program) for use in habitat acquisition, habitat preservation, and habitat restoration which benefits the species that was impacted. Habitat compensation would be 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 species, 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 conservation efforts. These donations will be subject to the review and approval of USFWS and DFG. The need to use the Conservation Organization Donation compensation-mechanism will be discussed with the USFWS and DFG prior to PG&E implementing any activity that could affect such covered-species. Donations must be completed within two years of impacts.

Enhancement as Compensation

Enhancement of plant and wildlife covered species habitat is another possible compensation tool. In the event a covered plant and wildlife species is identified within a ROW during pre-activity surveys, a qualified biologist will identify actions that could enhance habitat conditions. Compensatory enhancement and its contribution toward HCP compensation obligations will be contingent on USFWS and DFG advance approval. If approved, 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-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 annual indirect vernal pool impact of 0.29 acres. The estimate of the combined direct and indirect impacts to vernal pools is approximately 0.865 acres (25.9 acres over 30 years). To estimate the quantity of compensation required for project effects to vernal pool habitat, PG&E applied the 3:1 compensation ratio to the annual direct vernal pool effects (0.577 acre on HCP Table 3-9) and applied the 0.5:1 compensation ratio

to the annual indirect vernal pool effects (0.29 acres). PG&E estimated they will provide approximately 1.875 acres of vernal pool compensation annually, or 56.26 acres over the 30-year permit term. 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 similar proportions throughout the San Joaquin Valley. Mitigation will still occur in advance of effects to vernal pools.

Plant covered-species 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 wherever 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

[illegible]

Page 1 of 2

[illegible]

Table 5-2. Continued

	Avoidance and Minimization Measure Number ¹															
Species	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 under the San Joaquin Valley HCP

Page 1 of 2

Common and Scientific Name	Federal Legal Status ^a	Amount of Take Requested over Permit Term (acres of suitable habitat) ^b
Vernal pool fairy shrimp <i>Branchinecta lynchi</i>	T	26
Midvalley fairy shrimp <i>Branchinecta mesovallensis</i>	—	26
Vernal pool tadpole shrimp <i>Lepidurus packardii</i>	E	26
Valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	T	24
California tiger salamander <i>Ambystoma californiense</i> (<i>A. tigrinum</i> c.)	T	1,001 (including 26 acres of aquatic habitat)
Limestone salamander <i>Hydromantes brunus</i>	SC	30 ^{c,d}
California red-legged frog <i>Rana aurora draytoni</i>	T	181.5 (including 50 acres of aquatic habitat)
Blunt-nosed leopard lizard <i>Gambelia (Crotaphytus) silus</i>	E	699 ^{c,d}
Giant garter snake <i>Thamnophis gigas</i>	T	93 (including 9 acres of aquatic habitat)
Swainson's hawk <i>Buteo swainsoni</i>	—	870
White-tailed kite <i>Elanus caeruleus</i>	—	462 ^c
Golden eagle <i>Aquila chrysaetos</i>	BGPA	480 ^e
Bald Eagle <i>Haliaeetus leucocephalus</i>	BGPA	210 ^e
Western burrowing owl <i>Athene cunicularia hypugae</i>	SC	153
Bank swallow <i>Riparia riparia</i>	—	30.3
Tricolored blackbird <i>Agelaius tricolor</i>	SC	123 ^d

Common and Scientific Name	Federal Legal Status ^a	Amount of Take Requested over Permit Term (acres of suitable habitat) ^b
Buena Vista Lake shrew <i>Sorex ornatus relictus</i>	E	0.3 ^d
Riparian brush rabbit <i>Sylvilagus bachmani riparius</i>	E	1.5 ^d
Riparian (San Joaquin Valley) woodrat <i>Neotoma fuscipes riparia</i>	E	1.5 ^d
Tipton kangaroo rat <i>Dipodomys nitratoide nitratoide</i>	E	123
Giant kangaroo rat <i>Dipodomys ingens</i>	E	153
San Joaquin (Nelson's) antelope squirrel <i>Ammospermophilus nelsoni</i>	SC	1,155
San Joaquin kit fox <i>Vulpes macrotis mutica</i>	E	2,220 ^d

^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.
- BGPA = Bald and Golden Eagle Protection Act
- = no listing.

^b The nature of the take that could result from covered activities is more completely described in Chapters 3 and 5 of the HCP and in the Biological Opinion. 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 “Take” as defined under section 86 of the Fish and Game code is not requested for fully protected species because take of fully protected species is prohibited by California law. Take authorization is requested for each covered species that is fully protected if and when it is “delisted” as a fully protected species or take of fully protected species is authorized under California law.

^d If a direct mortality occurs PG&E will confer with the Service to evaluate why it occurred and determine if O&M procedures need to be altered to reduce the level of take. Covered activities are not expected to cause direct physical injury to individuals of these species because of the nature and location of covered activities and because of the implementation of AMMs. However, if an individual of these species is killed or injured by a direct physical impact caused by a covered activity, PG&E will meet and confer with the USFWS to evaluate the cause of the death or injury and to discuss whether modifications to one or more AMMs are necessary to avoid direct physical impacts to individuals of the species in the future. If an AMM modification is necessary, PG&E will incorporate the modification through the Adaptive Management Process.

^e PG&E currently has take authorization for nest removal in instances where nests are inactive or in consultation with USFWS and DFG for occupied raptor nests that are imminent hazards under a special purpose permit 50 CFR 21.27. The authorization in the table will become allowable if these species become listed.

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	Amount of Take Requested over Permit Term (acres of suitable habitat) ^b
Vernal pool fairy shrimp <i>Branchinecta lynchi</i>	—	—	—
Midvalley fairy shrimp <i>Branchinecta mesovallensis</i>	—	—	—
Vernal pool tadpole shrimp <i>Lepidurus packardi</i>	—	—	—
Valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	—	—	—
California tiger salamander <i>Ambystoma californiense</i> (<i>A. tigrinum</i> c.)	SSC	— ^c	1,001
Limestone salamander <i>Hydromantes brunus</i>	T, FP	— ^c	30 ^d
California red-legged frog <i>Rana aurora draytoni</i>	SSC	— ^c	181.5
Blunt-nosed leopard lizard <i>Gambelia (Crotaphytus) silus</i>	E, FP	— ^c	699 ^d
Giant garter snake <i>Thamnophis gigas</i>	T	Take	93
Swainson's hawk <i>Buteo swainsoni</i>	T	Take	870
White-tailed kite <i>Elanus caeruleus</i>	FP	— ^c	462 ^d
Golden eagle <i>Aquila chrysaetos</i>	FP	— ^c	480
Bald Eagle <i>Haliaeetus leucocephalus</i>	E, FP	— ^c	210
Western burrowing owl <i>Athene cunicularia hypugea</i>	SSC	— ^c	153
Bank swallow <i>Riparia riparia</i>	T	Take	30.3
Tricolored blackbird <i>Agelaius tricolor</i>	SSC	— ^c	123
Buena Vista Lake shrew <i>Sorex ornatus relictus</i>	SSC	— ^c	0.3
Riparian brush rabbit <i>Sylvilagus bachmani riparius</i>	E	Take	1.5
Riparian (San Joaquin Valley) woodrat <i>Neotoma fuscipes riparia</i>	SSC	— ^c	1.5
Tipton kangaroo rat <i>Dipodomys nitratoideus nitratoideus</i>	E	Take	123

Common and Scientific Name	State Legal Status ^a	State Requested Authorizations	Amount of Take Requested over Permit Term (acres of suitable habitat) ^b
Giant kangaroo rat <i>Dipodomys ingens</i>	E	Take	153
San Joaquin (Nelson's) antelope squirrel <i>Ammospermophilus nelsoni</i>	T	Take	1,155
San Joaquin kit fox <i>Vulpes macrotis mutica</i>	T	Take	2,220

^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.
- = no listing.

^b Estimates are more completely described in Chapters 3 and 5 of the HCP.

^c PG&E requests take authorization for non-listed covered species should they become listed in the future or should other federal or state regulations be revised.

^d Direct mortality take is not authorized by this permit because species is fully protected by the California Fish and Game Code.

Table 5-5. Requested Take Authorizations of Take for Covered Plants

Common Name	Legal Status ^a		Requested Authorization	Federal	State	Amount of Take of Occupied Habitat ^b (acres) over Permit Term
	Federal	State	CNPS			
Large-flowered fiddleneck	E	E	1B	No direct take	No direct take	0.01
Lesser saltscale	–	–	1B	Take	–	3.69
Bakersfield smallscale	SC	E	1B	No direct take	No direct take	0.0
Big tarplant	–	–	1B	Take	–	1.85
Mariposa pussypaws	T	–	1B	No direct take	–	0.01
Tree-anemone	SC	T	1B	No direct take	No direct take	0.01
Succulent owl's-clover	T	E	1B	Take	Take	1.82
California jewelflower	E	E	1B	Take	Take	2.24
Hoover's spurge	T	–	1B	Take	–	0.37
Slough thistle	SC	–	1B	Take	–	1.0
Mariposa clarkia	–	–	1B	Take	–	2.9
Merced clarkia	SC	E	1B	No direct take	No direct take	0.01
Springville clarkia	T	E	1B	Take	Take	0.74
Vasek's clarkia	SC	–	1B	No direct take	–	0.01
Hispid bird's-beak	SC	–	1B	Take	–	0.86
Palmate-bracted bird's-beak	E	E	1B	Take	Take	0.04
Kern mallow	E	–	1B	Take	–	2.1
Congdon's woolly	–	R	1B	Take	Take	0.8

Table 5-5. Continued

Common Name	Legal Status ^a		Requested Authorization	Federal	State	Amount of Take of Occupied Habitat ^b (acres) over Permit Term
	Federal	State	CNPS			
sunflower						
Delta button-celery	SC	E	1B	Take	Take	1.06
Striped adobe-lily	SC	T	1B	Take	Take	0.59
Bogg's Lake hedge-hyssop	–	E	1B	Take	Take	0.01
Pale-yellow layia	SC	–	1B	No direct take	–	0.01
Comanche Point layia	SC	–	1B	Take	–	0.01
Legenere	SC	–	1B	Take	–	0.87
Panoche pepper-grass	SC	–	1B	No direct take	–	0.01
Congdon's lewisia	–	R	1B	No direct take	No direct take	0.01
Mason's lilaeopsis	SC	R	1B	Take	Take	2.07
Mariposa lupine	SC	T	1B	No direct take	No direct take	0.01
Showy madia	–	–	1B	No direct take	–	3.49
Hall's bush mallow	–	–	1B	No direct take	–	0.30
San Joaquin woollythreads	E	–	1B	Take	–	3.38
Pincushion navarretia	–	–	1B	No direct take	–	0.03
Colusa grass	T	E	1B	Take	Take	0.09
Bakersfield cactus	E	E	1B	Take	Take	1.5
San Joaquin Valley Orcutt grass	T	E	1B	Take	Take	0.3
Hairy Orcutt grass	E	E	1B	Take	Take	

Table 5-5. Continued

Common Name	Legal Status ^a		Requested Authorization	Federal	State	Amount of Take of Occupied Habitat ^b (acres) over Permit Term
	Federal	State	CNPS			
						0.05
Hartweg's golden sunburst	E	E	1B	Take	Take	0.01
San Joaquin adobe sunburst	T	E	1B	Take	Take	0.01
Keck's checkerbloom	E	–	1B	No direct take	–	0.01
Oil neststraw	–	–	1B	Take	–	1.25
Greene's tuctoria	E	R	1B	Take	Take	0.2
Kings gold	-	-	1B	No direct take	–	0.0

^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 The take authorization requested in this column refers specifically to disturbance of occupied habitat and is based on currently known occurrences of the species. In the event additional populations of a species are discovered, the authorized take for that species may be increased by USFWS and DFG by written notice to PG&E based on the meet and confer process.

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 than 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 nest protection 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

Compensation proposed for Swainson's hawk and 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 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.

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 CNDDDB 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 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 may lead to a separate MOU between PG&E and the agencies for burrowing owl management and 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 CNDDDB 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 be 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 CNDDDB. 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 CNDDDB records. The quality of a potential site could be partially assessed based on a records search for covered species and the CNDDDB; 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 manager 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 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 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 affected 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 federal 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 3 rd 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		<i>First 5 years:</i> 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 SJV Fee-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 1 st 5 years mitigation (184 acres of fee-title land) in perpetuity based on operating costs.

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
\$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
\$10	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
	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, annual 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 Costs¹	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	\$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					Identify Alternative Species Measures	Use Existing HCPs	Rely Solely on Compensation
		Eliminate Activity	Modify Activity	Restrict Activity Seasonally	Conduct Preactivity Surveys for All Activities	Conduct Activity-by- Activity Permitting			
<i>Gas</i>									
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, I	E, I	E, I		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
<i>Electric</i>									
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

Table 8-1. Continued

Activity	<u>Tier 1 Screening Criteria</u> ¹ Level of Disturbance	<u>Tier 2 Screening Criteria</u> ² Logistical, Legal, Cost, Public Safety, Effectiveness, and Consistency Standards							
		Feasibility of Implementing Changed Practices					Identify Alternative Species Measures	Use Existing HCPs	Rely Solely on Compensation
		Eliminate Activity	Modify Activity	Restrict Activity Seasonally	Conduct Preactivity Surveys for All Activities	Conduct Activity-by-Activity Permitting			
<i>Minor Construction</i>									
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 condonii*, *Malacothamnus hallii*, *Navarretia myersii*, *Orcuttia 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.

Chapter 9

References Cited

Printed 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. 2003. Special animals list. The Resources Agency, California Department of Fish and Game, Wildlife and Habitat Data Analysis Branch. Sacramento, CA. Available: <http://www.dfg.ca.gov/whdab/html/animals.html> (accessed July 23, 2003)
- Holland, R. F. 1986. *Preliminary descriptions of the terrestrial natural communities of California*. Sacramento, CA: California Department of Fish and Game.
- _____. 1996. Ecology, conservation, and management of vernal pool ecosystems—proceedings from a 1996 conference. *Great Valley Vernal Pool Distribution, Photorevised 1996*. Auburn, CA. <http://www.cnps.org/vernalpools/contents.htm> (accessed July 23, 2003)
- Mayer, K. E., and W. F. Laudenslayer, Jr. 1988. *A guide to the wildlife habitats of California*. Sacramento, CA: The Resources Agency, California Department of Forestry and Fire Protection.
- Nelson, J. R. 1987. Rare plant surveys: techniques for impact assessment. In: T.S. Elias (ed.), *Conservation and management of rare and endangered plants*. Sacramento, CA.
- San Joaquin County Council of Governments. 2001. *San Joaquin County multi-species habitat conservation & open space plan*. Stockton, CA. Available: <http://www.sjcog.org/sections/habitat/sjmsep.php> (accessed July 23, 2003).
- Sawyer, J. O., and T. Keeler-Wolf. 1995. *A manual of California vegetation*. Sacramento, CA: California Native Plant Society.

STATSGO, NRCS. 1995. State soil geographic database. Soil data for the San Joaquin Valley. U.S. Department of Agriculture—Natural Resource Conservation Service, Soil Survey Division. Available: http://www.ftw.nrcs.usda.gov/stat_data.html (accessed July 23, 2003).

U.S. Fish and Wildlife Service. 1998. *Recovery plan for upland species of the San Joaquin Valley, California*. Portland, OR.

Personal Communications

Estep, Jim. Senior Wildlife Biologist. Jones & Stokes, Sacramento, CA. May 22 and June 19, 2003—Brief meetings.

Chapter 10

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